



# Discoveries

News and Views from Discovery Southeast

Winter 2001

## Bite marks and bathtub rings

A clue-reading toolkit for Southeast naturalists

Richard Carstensen

The world is a chewed-on place. But for naturalists, if not grocers, blemishes are half the fun. Our outings are series of 'whodunits.' What rodent, beetle, storm, slug or volcano left us this incisor scrape, larval gallery, beach berm, slime trail or ash layer? How long ago? Is the culprit just around the corner? Is the event more aptly dated by growth forms and annual rings of nearby trees? Or did this happen in such archaic time that 30 generations of ancient spruces have come and gone?

On the Herbert River floodplain, for example, we discover the above megabite, chomped from a 20" diameter cottonwood tree. Closer inspection reveals hundreds of paired tooth marks. The span of the combined incisors is about half an inch.

"Come on," you're saying. "It's a *beaver*. Give me something harder!" Well, that can be arranged. But when were these bites taken? Is this tree being felled on the installment plan? Or was the lumberjack distracted by, say, death? How long does a beaver live?

My ink drawing can't show the wood color, but it's been weathered grey. If you shaved the surface with a knife you'd find pale blonde beneath. Grey weathering takes about a year. This scar, however, is much older.

On the left side it appears that bark is trying to roll back over the wound. Because the resilient cottonwood was incompletely

girdled, the surviving cambium continued to lay on new annual rings, about 2 additional inches worth. Typical cottonwood growth on productive river-laid sand is about 5 rings per inch. At that rate this wound would be a decade old.

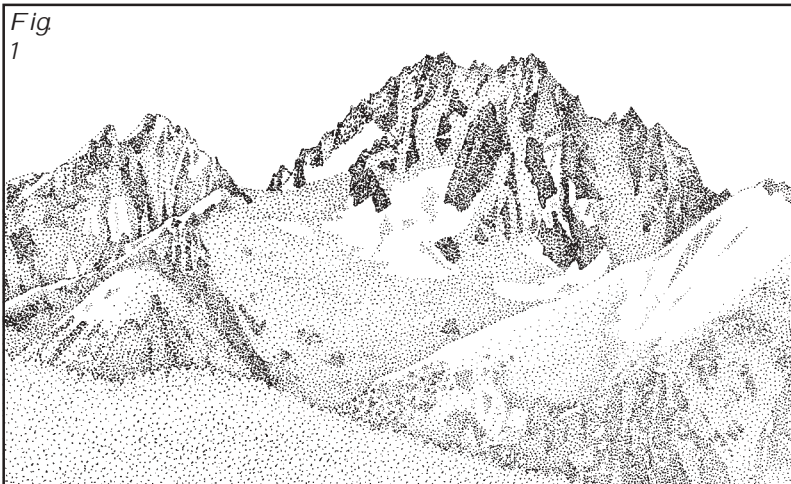
A naturalist, like an auto mechanic or dentist, has a bag of tricks, diagnostic rules of thumb. Applying a handful of these to otherwise intractable puzzles can open doors, and make the worked-over world more interesting.

Several interpretive puzzles follow. I'll offer observations to get you started, but defer "solutions" until page 6. Of course, there really are no final answers in natural history; opening one door just reveals another. Soon you come to doors that only open for specialists. But nobody gets to play in more rooms than a naturalist.

**Jagged versus smooth.** Figure 1 shows peaks nearly 6000 feet tall across the Chilkat River from Haines. The view is to the southwest, so you're seeing the steepest north-facing cirques. In the lower left is a rolling, forested ridge about 2500 feet tall.

Why is the foreground more rounded than the summits? If you drew a horizontal line about half-way through this scene, everything above it would be jagged and angular, while the terrain below seems smoother. If the Chilkat Valley were a giant

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# From the director

Jono McKinney

Sitting here at the director's desk, writing grant proposals, letters to prospective funders, and exploring strategies to introduce Discovery Southeast's hands-on nature programs to more children, teachers, and families in Southeast, I wrestle with the language to define the need for, and importance of, our work. You and I know the value of a child dipping her hand in a creek to find a mayfly nymph - but how best to articulate the quality of these experiences to funders, parents, and administrators?

Yet a trip down south over the holidays hit me like a hammer over the head with the importance of what we do and the imperative to give voice to this work. Forests of plastic indoor plants, miles and miles of cookie cutter suburbs with little more than muddy duck ponds for green space, kids wandering the malls instead of the woods, virtual this and virtual that - so much of what I witnessed reminded me how easy it is to disconnect with nature. I thought to myself how much Discovery Southeast was needed in Oklahoma City, and in so many other towns. I was so thankful for the work of Discovery naturalists, and of so many of you with your families, who've helped keep understanding and connecting with nature a focus of our lives in Southeast Alaska. Our home is better for it.

This issue of *Discoveries* speaks eloquently of our purpose. Richard's article has us pondering chew marks, "bathtub rings" and feathers, prompting us to look closer for clues to the complex stories in nature. Hank Lentfer brings us into the classroom in Gustavus, where a deer provided lessons remembered for a lifetime. And finally, Auke Bay Elementary students share poems from a Nature Studies field trip.

If only I were as articulate as they. Yet, it is the words and actions of these naturalists, educators, and children that tell the true stories of Discovery Southeast - stories rich in connections with nature. I am thankful for their voice. May we sound it throughout Southeast Alaska.

We hope you'll add your voice by attending our upcoming annual auction fundraiser on March 9. As always, it will be a fun celebration that helps us to sustain core programs such as Nature Studies and Outdoor Explorers.

Sincerely,

Jono



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**Discoveries** is published by *Discovery Southeast*, Southeast Alaska's leading source for natural history and conservation education. A non-profit education organization founded in Juneau, Alaska, in 1989, *Discovery Southeast* promotes direct, hands-on learning from nature. *Discovery Southeast* presents natural science and outdoor education programs for youth, adults, and teachers in communities throughout Southeast Alaska. By engaging youth and adults in the study of nature, *Discovery Southeast* naturalists deepen and enrich the connections between the people of Southeast Alaska and nature.

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### Welcome Jan Carlile

Discovery Southeast is very lucky to have Jan Carlile as our new administrative assistant. We could hardly have dreamed of a better candidate for this position.

Several of our naturalists have gotten to know Jan as a parent joining with Nature Studies and Vanderbilt Creek Stewards field trips. An environmental scientist herself in a previous life at ADEC, Jan appreciates the natural science that children learn on these excursions. She also knows from first-hand experience how these programs foster a sense wonder about the natural world.

Jan has dedicated the last eight years to raising her two children with her husband, Dave Carlile. Jan also is active with the PTA at Auke Bay Elementary School.

### Discovery Days - March 5

It's March 5, a staff collaboration day for Juneau teachers - do you know where your child is? Sign 'em up early for Mendenhall Watershed Discovery Days. It's a full day learning adventure with games, outdoor science, and exploration with Discovery Southeast naturalists and volunteers from the Mendenhall Watershed Partnership. And thanks to support from the USFS, Juneau Ranger District, it's FREE. Call 463-1500 to reserve a space.

### Outdoor Explorers

*"I love this program. The children have a blast in a very positive atmosphere, and learn all about the ecology and wildlife in Southeast. It's great!"*

Outdoor Explorers is summer fun. We are planning sessions for kids 7-8, 9-10, and 11-13 in July and early August. Get your name on our list and we'll call when we have details and confirmation of our grant from the CBJ Youth Activities Board.

## ***Investigate the FBI***

(Fungus, Bacteria, and Invertebrates, that is!)

### **...at Discovery Southeast's 12th Annual Auction**

Friday, March 9, at the ANB Hall, 5:30p.m.

Get ready to "Investigate the FBI" (that's *Nature Studese* for Fungus, Bacteria, and Invertebrates - the all-stars of the decomposer world that we learn about on 4th grade Nature Studies field trips.)

Celebrate Discovery Southeast's 12th annual auction and help support our great programs for youth, teachers, and families.

Lady Jane Mulready brings her panache to an expanded live auction, and the silent auction tables will once again be full of treasures from tasty desert treats to fun getaways. As usual, we'll be serving a great dinner amidst a festive atmosphere. Bring the family! Festivities start at 5:30 at the ANB Hall. Get your tickets at Hearthside Books or Discovery Southeast (\$15 adult, \$5 children, \$35 family special) - or at the door.



*These ravens photographed at the ANB are gearing up for a raucous live auction. How 'bout you? See you there!*

### **Auction Volunteers**

If you are interested in volunteering for this event, please call Scott Miller, 586-6135.

## Bite marks and bathtub rings

continued from

bathtub, we might expect to find a ring of some kind at this rounded-to-jagged contact. Perhaps instead of dirt flecks and hairs, we'd discover large boulders of a different bedrock type than the mountain shoulders on which they came to rest. Close up, we'd find that the rough/smooth contrast applies even on a micro-scale. The rock above the contact is pocked and eroded, with protruding crystals, while the rock below feels almost polished in places.

How did this scene look as the bathtub ring was forming?

**Deformed conk** This summer I made maps of one-acre patches of big-tree forest throughout Southeast Alaska. The maps showed all standing and down trees, and the ages of many, determined with increment borers. My goal was a sense of the history of each forest. How did these trees respond to past windstorms, stream flooding, or handlogging? In many cases I wanted to know how long ago a log had fallen.

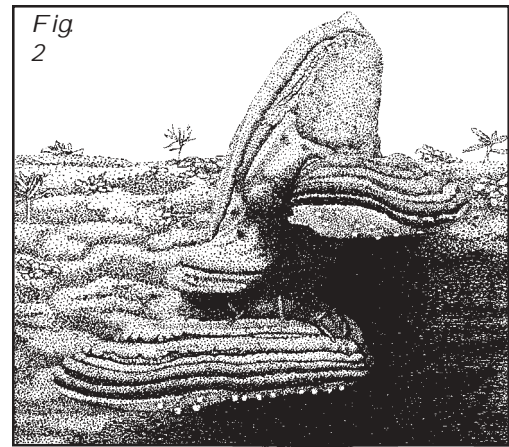
There are many approximate indicators. Mosses, forbs and conifer seedlings slowly colonize a down log, only to be dumped after several decades when the crumbling bark sluffs away. Within about one human lifetime, the log becomes a barely perceptible lump on the green floor that you can kick in with your foot. With practise, the floral assemblage and firmness of wood permits rough guesses at a log's time on the ground. But one clue allows much more precise estimates for those logs most recently felled.

Many of the dead and dying spruce and hemlocks on my big tree plots sported "bear bread," the red belt fungus *Fomitopsis pinicola*. These conks disperse tiny air-borne spores from pores on their pale lower surfaces. To achieve this, the actively dispersing layers "want to be" roughly level.

In Figure 2, how long has this section of conk-bearing hemlock been on the ground?

### Wetland/forest boundary

Figure 3 looks south along the eastern edge of Mendenhall Peninsula toward the mouth of Mendenhall River. The brackish wetlands in the center are sometimes called the Wigeon Ponds. On high tides much of the left mid-distance of this scene is flooded. In the foreground are scattered red alders and a few spruce saplings. Hundreds of logs litter the flats, many with sawn edges. Few have the battered and rounded ends of logs on wave-exposed beaches.



Why are the foreground trees so young? Are they replacing a previous forest? Does that account for the logs in the foreground, some of which have human cuts? Or could they, like logs farther out in the flats, be drift logs?

But alder and spruce are intolerant of salt water! So are meadow herbs like black lily, whose overwintering pods poke up between the logs at left. How could such plants grow beside ocean-deposited logs?

Why do so many of the logs point toward the forest, with root wads on the left? And why is there a belt (bathtub ring?) of smaller conifers lined up against the base of Mendenhall Peninsula? Entering this forest

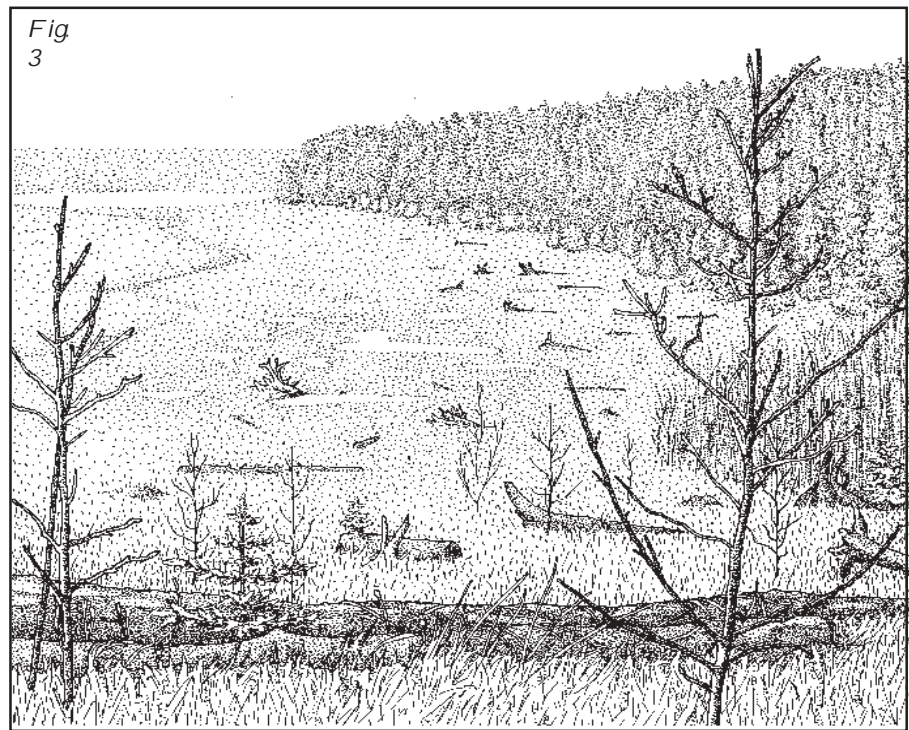
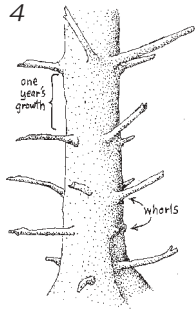


Fig 4



belt, you'd find open-grown spruces (Figure 4). That is, they have branch stubs even down near ground level, indicating a lack of competition for sunlight in the sapling stages. Such spruces can be aged by counting the whorls of branches - one year per whorl. Many are growing more than a foot per year. Trees near the forest edge are youngest, with age increasing up to about 100 years as you bushwack inland, until suddenly an old-growth hemlock forest appears.

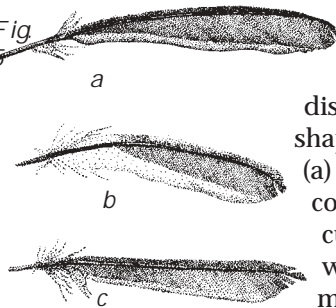
One phenomenon neatly explains all of these observations.

**Flight feathers** Exploring an old-growth forest in late July, you come upon a scattering of tiny feathers on a log. It takes a moment to realize that these are not body contours, but actual wing and tail feathers of a truly miniscule bird. Most are grey, with hints of yellowish green on the leading edge. Figure 5 is a lifesize illustration.

A sharp-shinned hawk had lunch here. Such elfin prey would scarcely have interested a larger raptor like a goshawk, and an owl would have swallowed it whole. The forest location rules out open country hunters like merlin and kestrel. And the lack of chewed-off quill bases suggests the killer

wasn't a mink.

Fig 5



You sort through the feathers and discover 3 basic shapes. Feathers (a) and (b) have consistently curving shafts, while (c) is mostly straight-shafted except for a

curve at the base. Feathers in the (b) pile are wider but shorter than (a) types. They're white at the base and along the trailing edges, but when you lay one atop the other, the natural overlap conceals this color pattern.

Wing feathers of almost all birds are curve-shafted. Tail feather shafts (ducks excepted) are curve-based, then straight for most of

their length. Shafts of central tail feathers are straight throughout. Curvature shows that all of these samples came from the right side of the bird. Feather (a) is a primary, originating from the outermost "hand bones" of the wing. Feather (b) is a secondary, anchored in the "forearm," or radius-ulna section. Feather (c) comes from the right outer tail.

Knowing this, build yourself a lifesize sketch of the victim as seen from above, with wings outstretched in flight. Show the position of the 3 sample feathers. What was the approximate wingspread of this bird?

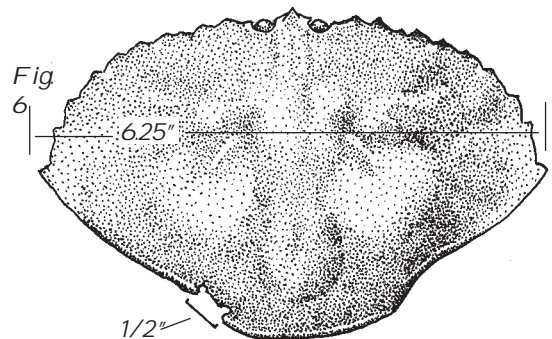
Which Southeast old-growth birds are this small? (I can think of only 4 or 5 species.) The smooth grey color of the flight feathers is pretty nondescript, but that helps to rule out a few similar-sized possibilities. Also keep in mind that in late July the commonest hawk victims are probably fledglings.

**Midden** In the moss and needle litter under low-limbed spruces edging a rocky beach, you find a collection of shells. Small cockles are mostly intact, while the butter clam and mussel shells are broken. Several 6-inch dungeness crab carapaces lie among the bivalves. No scats identify the collector. This isn't the sort of place where ravens, crows, eagles or gulls would repeatedly choose to dine. In fact, it's a good place to eat *without* being seen and pirated by such avian competition.

Mink and otter both commonly carry their marine prey under cover to favorite hiding places, eventually creating shell middens. The fragments may also include fish bones, chiton dorsal plates, and urchin tests. The question here is *which* mustelid assembled this midden - mink or otter? The best shell texture for preserving tooth marks is crab. Examining the dungie backs, you notice that all were bitten along the thinner rear margin - the easiest place for a mink or otter to pry open the exoskeleton. On Figure 6 there's a pair of BB-sized tooth holes exactly half an inch apart.

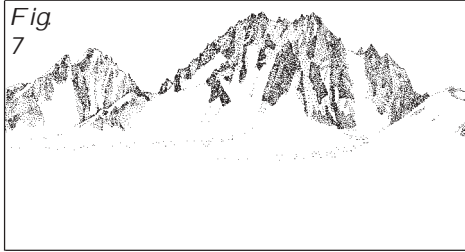
When you've unravelled these puzzlers as far as they'll go, have a look at page 6.

Fig 6



This article was inspired by *Reading the Forested Landscape*, by Antioch naturalist Tom Wessels, 1997, Countryman Press. Each chapter in Wessels' book begins with an etching of a forest scene, which he then dissects, tree by tree. Wessels' writing follows his teaching style, with abundant leading questions. His book is aimed at the forests of central New England, and only the broadest of its investigatory principles apply here in Southeast Alaska. Someday a book of this caliber should be available for every bioregion.

Some thoughts on the puzzlers



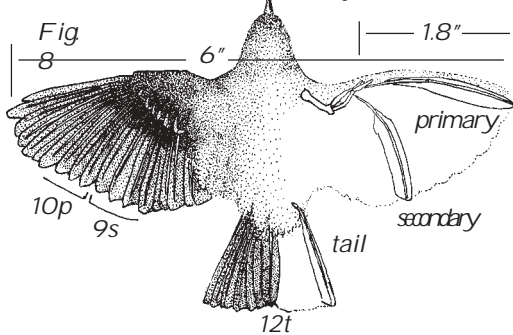
**Jagged vs smooth.**  
Like most of mainland Southeast Alaska, the mountains in Figure 1 lay buried under a mile-thick ice sheet at the peak of the Wisconsin Glaciation about 20 millennia

ago. Only the highest peaks protruded. Because they were ice-free, they escaped glacial erosion that mellowed the contours of lower topography. Climbers today often encounter odd boulders perched on high ridge tops and ledges. Such "erratics" were stranded there by a vanished ice sheet, once so thick and vast that nobody would believe it; except that we can still visit such white plateaus behind Juneau, and below the Fairweather Mountains. Figure 7 shows what it looked like when "Haines" lay deep under ice.

**Deformed conk** The mycologist Gary Laursen from Fairbanks pointed out to me that if a *Fomitopsis* conk survives the impact of a falling tree, it will reorient the "shelf" so that the pore-dispersing surface remains level. Each year, the conk builds a new lower layer. In Figure 2, the upward-pointing shelf formed while the tree was still standing. Six horizontal layers have formed since the tree fell, 6 years ago.

**Wetland/forest boundary** In the 1950s and 60s, virtually all of Mendenhall Valley east of the river was logged. Sawed stumps on the lip of steepening river cutbanks were undermined. They washed down into the Mendenhall Wetlands and were stranded there by high tides. Floating logs with attached root wads hang lower at the base, and as they drift into the shallows, the less encumbered top often swings up-beach.

For more than a century, northern Southeast Alaska has been rising from the sea, a phenomenon most geologists attribute to glacial rebound. The rate of uplift on Mendenhall Wetlands has been about 0.6"/year for as far back as tide gauge data are available. In 1950, tides therefore reached 30 inches higher than today, even into the foreground of Figure 3. That was about when the two nearest logs in the scene were deposited. At the time, only salt-tolerant plants like goose



tongue and hairgrass could grow here.

The distant belt of open-grown spruces colonized as scattered individuals in an "uplift meadow" much like the foreground. No previous forest grew

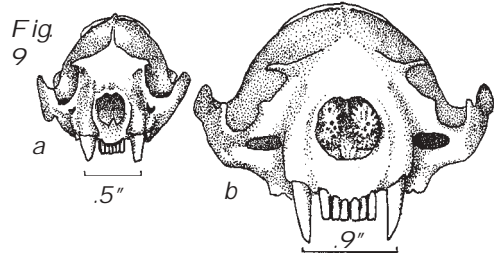
on this site, at least not since Neoglacial ice-loading depressed the land, radically re-working these flats. The contact between the young spruce bathtub ring and the old-growth hemlock forest marks the highest level reached by tides during the Little Ice Age. Such tides would have placed today's Superbear under water.

**Flight feathers** Here are some average wingspans for our smallest forest birds: Rufous Hummingbird - 4.5"; Chestnut-backed Chickadee - 7.5"; Brown Creeper - 7.75"; Winter Wren - 5.5"; Golden-crowned and Ruby-crowned Kinglets - 7" & 7.5"; Townsend's Warbler - 8"; and Pine Siskin - 9."

In Figure 8 the 1.8" primary feather accounts for more than half of the right wing length. The wings span about 6" in this normal flying position, but if we opened them fully, as in official wingspans, they'd reach 7." (Don't try this with a living bird!) Of the above species, that rules out everything but chickadee and the two kinglets. The yellow-green tints on the leading feather edges (which are *not* concealed by overlap) suggests kinglet. My drawings are actually from a recently fledged Golden-crowned Kinglet that died on a neighbor's driveway.

**Midden** Figure 9 shows mink (a) and otter skull (b) from the *Discovery Southeast* collection. The mink teeth fit perfectly into the indentations in the dungie shell I selected to draw. No dungie leg pieces occurred in the midden, so the mink probably didn't kill this fairly large crab, but merely scavenged the carapace for muscle and gill scraps.

By the time I examined it, the shell was so old that most of it disintegrated in my coat pocket. The pieces mingled with the residue of rock, leaf sample and owl pellet that would identify my occupation, should my own remains be so privileged as to reside someday in the glamorously cluttered midden called Southeast Alaska. 🐾



*This year we are pleased to extend our elementary school Nature Studies program to new communities. In addition to longstanding programs in Juneau and Wrangell, we are working with youth and teachers in Gustavus, Angoon, and Hoonah.*

*With guidance from Hank Lentfer, and with support from the Chatham School District, our members, and a grant from the Hugh and Jane Ferguson Foundation, Nature Studies took on a particularly wild flavor this fall for the children of Gustavus. With permission from the deer, fishes, trees, insects, rocks, and other members of our biotic and abiotic community, we look forward to deepening and enriching the bonds between nature and children in Southeast Alaska. JMCK*

## Lessons From a Deer

Hank Lentfer

“Who knows what a ceremony is?” Eager hands shoot up around the circle of 15 kids, from kindergarten through the fifth grade, seated on the floor of the Gustavus school-room.

“Like weddings and things,” says Logan.

“When people die,” adds Delphine.

“Christmas!” beams Mickey.

“Some native Americans do ceremonies when they kill things,” says Hannah. An astute answer from a girl who knows exactly where I was trying to lead with the opening question. Since the school year began, lessons on habitat, predator and prey cycles, adaptations and anatomy were all precursors to today’s activities. The kids know we will spend the next two days skinning and butchering a deer that lies on the floor of an adjacent unheated classroom. They know we will make jerky and have a thanksgiving feast.

“Ceremonies,” I offer “are ways we celebrate the special days and changes in our lives like one year to the next and one life to another.” I describe my own ceremony around hunting, how I gather the bunchberry and trailing raspberry and other deer food around each place a deer dies, how I dry the leaves and later burn them with thoughts of thanks for the deer’s life. “Let’s go now,” pleads Mickey, fidgeting on the carpet. “I am getting squirrely.”

As we tromp into the room there are the predictable squeamish squeals and remarks about Bambi. A brief debate erupts about whether Bambi actually dies or just his parents. The deer lies stiffly on a blue tarp in the center of the room. We form another circle, deer in the center, and I tell the story

of the hunt; my neighbor Paul and I boating over to the island at dusk, wearing soft clothes to

move quietly through the bushes, using a flame from a lighter to know which direction the wind carries our scent. The students look at the deer’s big ears and prominent nose to discuss why such precautions are needed. I describe how, around mid-day, we found the deer standing on the edge of a muskeg looking back over its shoulder. I show the kids the bullet hole through the ribs.

We examine the deer’s heart and discuss how similar in size it is to the hearts beating blood through all our bodies. I lift the deflated lungs dangling from a long stretch of wind pipe and talk about the mixing of air with blood, the invisible connection all critters have to each other through sharing the same pool of breath. I blow on the windpipe, filling the deer’s lungs like misshapen pinkish balloons.

The students head back to their normal room to spend the day with Kathy Hocker studying skulls, learning about different teeth and their uses and how the eyesight of predators differs from that of prey. Students break from Kathy’s lessons alone or in pairs to help with skinning and quartering. There are a few wrinkled

up noses and perfunctory yucks but all the kids are anxious to grab the knife and try their hand at skinning. Only five-year old Kenny holds back explaining that he is not allowed to use sharp knives. Eight year-old Andrew later writes; *“The knife eases through the leg. . . I cut the back leg off. It was harder. You had to find the ball and socket and twist it until it cracked, then you had to cut it in half.”*

Eleven year-old Delphine writes: *“I thought it was pretty cool that we got to skin a deer. I mean how many tims do you get to be puld out of class 2 at a time to skin a deer? The deer was about 1 1/2 years old. The bulit went through*



*all photos by Ellie Sharman*





*the other side of the deer. At first I thought it was pretty gross but by the time it was time to go I thought it was asom."*

*Eight year-old Maggie: "I started cutting the leg. Hank he help me. I cut the deer. It soundid like popcorn to me. We have a girl here named Kathy. She is a naturalist and she shod us skulls. May favorit is the*

*deer and I am going to tell you about it. Its ears are in the back of I's head and their eyes are on the sids of their head. Tomorrow we are going to make jurky out of the deer. It will be fun, I hope."*

By early afternoon the deer is transformed from complete animal to chunks of meat awaiting the next day's butchering.

The next morning Paul and I show up with a meat grinder, food dryers and knives for a day of butchering and jerky making. The class continues their work with Kathy, drawing skulls and studying the gaits of various animals. The kids rotate through three at a time to help with the butchering. Delphine gives the details of work in the kitchen:

*"First you cathch a deer, then you butcher it, after that you cut the meat off the bones and gind it up. You put the ground up meat in a boll and put soyasas and black peper on it. Then you put it in a jerky gun and squort it on the dehgtrter and leve it four a day."*

Nine year old Courtney describes the classroom activities:

*"Kathey came to school to show us stuff and how to drow a sull. It is kind of hard becasse they have so many cracks and terns and so many teeth - the kanines, molers, insicors, carnasials. Before we got to drow we had to study the sull for fifteen minouts. I thouth it was fun and after that we got to go to the gym and play."*

With the jerky drying and the kitchen cleaned the whole class gathers to dissect the head.

As I begin skinning hide from skull lively banter reflects the tension between curiosity and repulsion. "If you look at with scientific eyes it isn't that gross," says Sarah. "Can I touch the tongue?" asks Ian. "Ooh..it has bumps!" he exclaims, rubbing his finger along its pale gray length. "I wonder if it will be a different color on the inside." The banter continues as I begin sawing the skull in half.

"I wonder what color the brain will be?"

"Can you take the brain



out through the eyes, through the nose?"

"Is it going to gush blood or fluid or anything?" There is a pretty even mix of "ah cool!" and "oh gross!" when I lift the skull apart. "Can I pass the brain around?" asks Ian. I scoop the tissue from the skull and plop it in his eager hands. "The brain looks like spaghetti," declares Delphine.

"Can I hold the eyeball please?" asks Sarah. Banter erupts once again as I work on cutting the eyeball out.

"Don't make it splatter."

"I don't want a part of the eyeball I want the whole eyeball."

"Oh my goodness, this is so neat." The eyes get passed around and seven year old Ashley notices that they change color when she squeezes them. We focus back on the rest of the skull, noting the convolutions in the nose and the position of the vocal cords in the wind pipe. We all feel the lump of our own voice boxes. I remove the delicate roll of cartilage from the sinus cavity. "It looks like rolled filo dough," says Delphine.

The next morning the sun breaks, promising a dry field trip. We pile into cars and head for the edge of town. The dissected head, remaining bones and the hide are bundled into a plastic tote for the ride. We





tumble from the cars at the end of a road and pause near the wood's edge. I explain that we want to find a peaceful place to leave the deer's remains. The kids scatter through the young pine and spruce forest, searching for a spot. I ask the kids near me what they are looking for.

"A place with no noise," says Courtney

"Not bushy, away from the road." says

Delphine

"A secret place" says Sarah. We agree on a spot and empty the tote. We pile the bones, placing the skull out in front. We take shelter from the wind behind a clump of pines and light a small fire. I start the ceremony with thanks for my new set of friends, for their curiosity and respect. I drop a pinch of dried deer food on the fire and pass the bag around the circle.

"I am sorry the deer died," says Courtney, dropping a pinch of dried leaves on the fire.

"I am thankful for the deer teaching about science, for the fun and good food." says Ian. Cindy, a mother of two of the children and a newcomer to town takes a pinch of food and says, "I am thankful to be so welcomed in this town and for the deer for sharing its life with these kids. May the deer have a good life too." Six year old Landon is the last to speak, "The deer has taught us things we could not have learned without it"

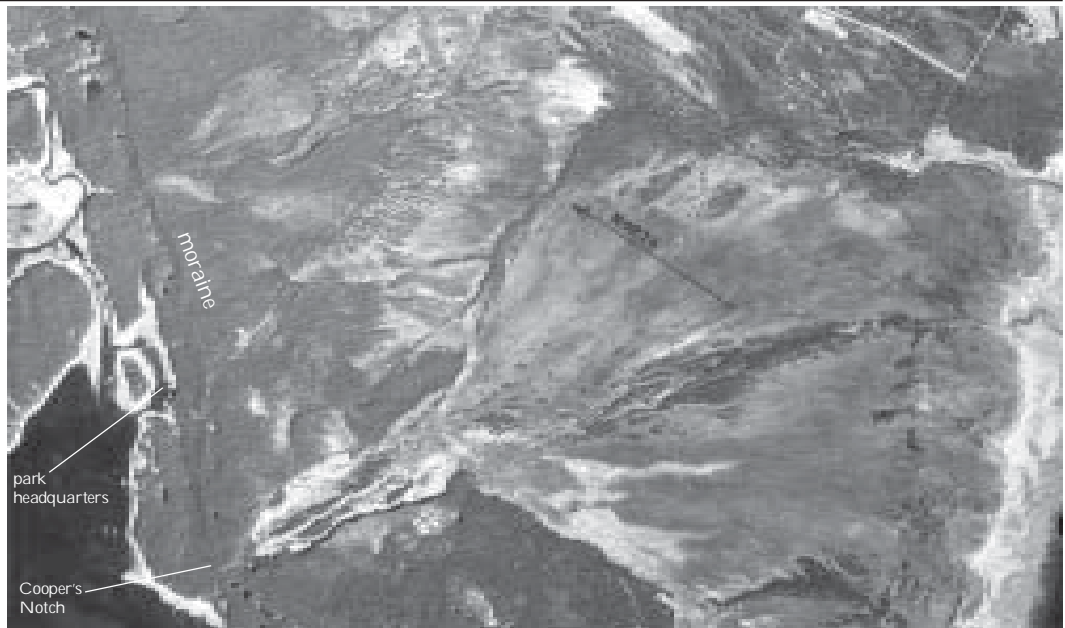
The circle breaks and the kids scatter to gather bits of deer food. They weave back from the woods and place their findings of leaves and lichen before the deer's skull. When the last person has made their offering we cover the jumble of bones with the smooth textured hide.

Back at school Forrest, Seth, and Dakota help boil the tongue and fry the backstrap and heart. The kitchen bustles as parents bring by loaves of bread, mashed potatoes, cupcakes, and carrots. The kids proudly add platters of meat to our thanksgiving feast. 🐾🐾🐾



**Bartlett Cove on left. Western Gustavus on the right. NASA 1979.**

*The 200-foot-tall terminal moraine of the Little Ice Age advance lies right behind Glacier Bay National Park headquarters. The ice stopped short of today's Gustavus, which occupies the outwash plain that was built about 200 years ago. These materials were spread in huge fans originating from low points in the moraine, such as Cooper's Notch. Which fan apex formed most recently?*



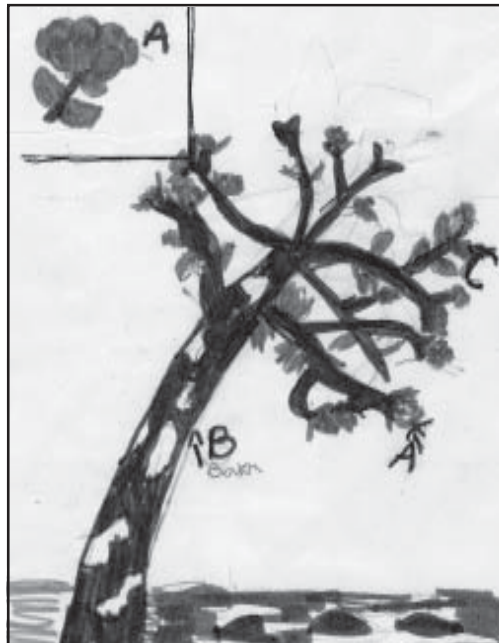
# Young Naturalists

Poems and prose from Carol Pratt's classroom, Auke Bay Elementary, written after a Nature Studies field trip with Jane Roodenburg. Illustrations by Charter School Nature Studies students Charli Childers and Lauren Hopson.

## The forest

Michan Gallagher

I've never seen anything so green,  
although it's not very clean,  
the sunlight bursts through the tree's,  
making it hard to see the bee's,  
there's little things growing everywhere,  
there's even chirping over there,  
there's pine and spruce,  
look above there's a goose,  
up in Alaska by a lake,  
where I won't see a snake,  
surrounded by tree's that go sky high,  
I walk away and say goodbye.



## The red squirrels

Raymond Stevens

A red squirrel is like a  
fire running around in the  
snow then he will climb  
up in his hole in the tree  
and find his wife!

A fact

a lot of red squirrel's  
makes a lot of holes.



## Pleasures of the forest

Michaela Goade

This is my first time in the woods, I thought to myself, I love it. I sighed.

The enormous trees towered above me, leaving me feeling unusually small. The warming sun peeked through the gaps between the trees, painting little splotches of light everywhere.

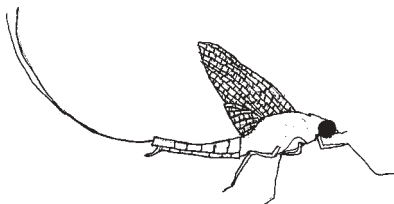
I lay down comfortably, a gentle breeze caressing my tired body. A carpet of plush, green moss that covers the ground, comforting me like a plush mattress.

Little plants burst with eagerness to grow big and strong. Closing my eyes I hear the sweet melody of a lively bird, awaiting the arrival of spring.

I breathe in one gulp of crisp, fresh air and I savor every last scent. The aroma of soil and wildlife hang in the mysterious air. A bronze color sweeps through the forest magnificent forest, giving off an enchanted feeling.

The dew glistens in the light almost translucent, shimmering joyously and sliding off the leaves of plants.

As I sit here, taking in all these pleasures, my head drops slowly and I am lazily taken in by sleep.



## This is a planet

Catie Frega

This is a planet,  
It is strange and wonderful,  
I like this planet

## Why I like camouflage

Jesse Morris

I like camouflage because I like the idea of hiding as a animal and not moving till the person trying to find you says to come out. It is good for you because, lets say your hunting and you need to stand still you could practise by playing camouflage.

## Nature

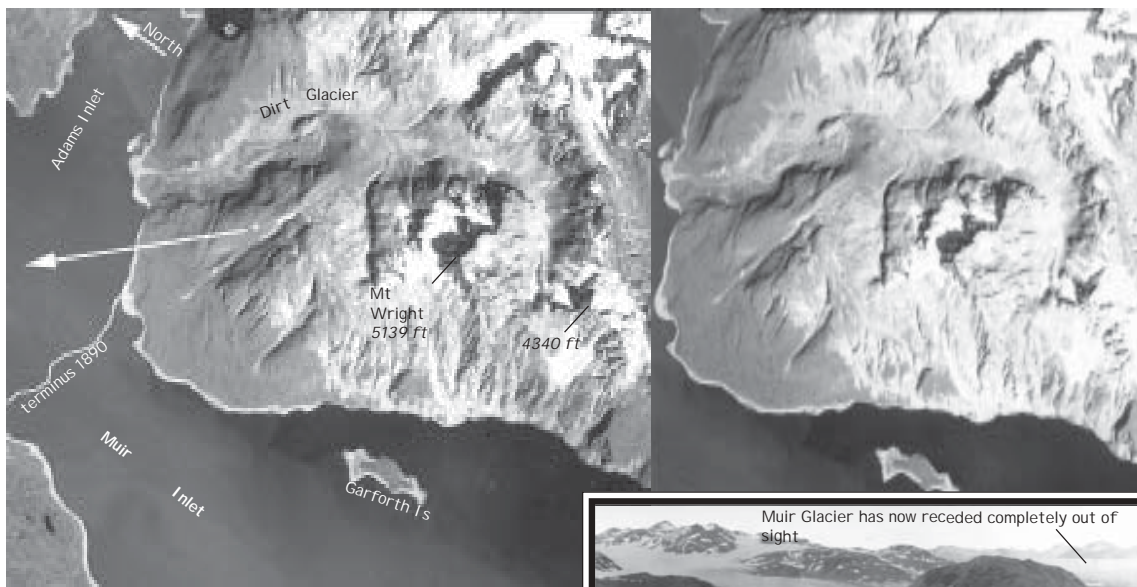
Hunter Brown

Playing in nature is really fun.  
Getting to run around in the sun.  
Poking skat with sticks and stones.  
Getting to look at broken bones.  
Learning stuff you never knew.  
Getting to look at icky goo.  
Falling, slipping, slopping and stuff.  
Finding out that trees are ruff.  
Berries sweet, sour, and bitter.  
Surly do not taste like litter.  
Winter here is very cold.  
Things that live here must be old  
So now I've decided to live without strife.  
A guy - lost in the wildlife.

**Jagged vs smooth behind Gustavus**

Stereogram of Muir Inlet, Glacier Bay, NASA, July 1979. (Use 3D viewer that came with your summer 2000 newsletter!)

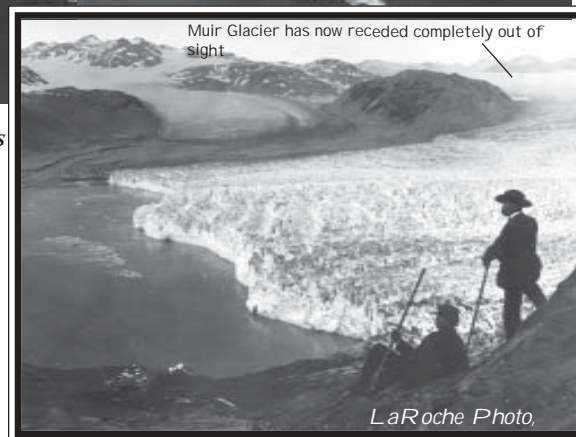
Dot and arrow show location and direction of the LaRoche historical photo, taken from 1800 feet on the mountain's north shoulder. Photo is undated but position of the



Muir terminus suggests about 1890. Only a century earlier, Vancouver saw this ice front at the mouth of Glacier "Bay." At that time even the LaRoche photopoint was under ice; maximum Little Ice Age thickness here was about 2200 feet, or about half way to the jagged summit of Mt Wright.

Study this topography in 3D, searching for the transition from glacially rounded (lower) to jagged and uneroded (higher). Remember that during the Great ("Wisconsin") Ice Age, coalescing glaciers rose even higher than in Vancouver's time. In fact, the inland waterway did not exist. How high in this scene did the Wisconsin ice reach?

It's important to know that Mt Wright and peak 4340 consist of crumbly limestone! See Streveler comment below.



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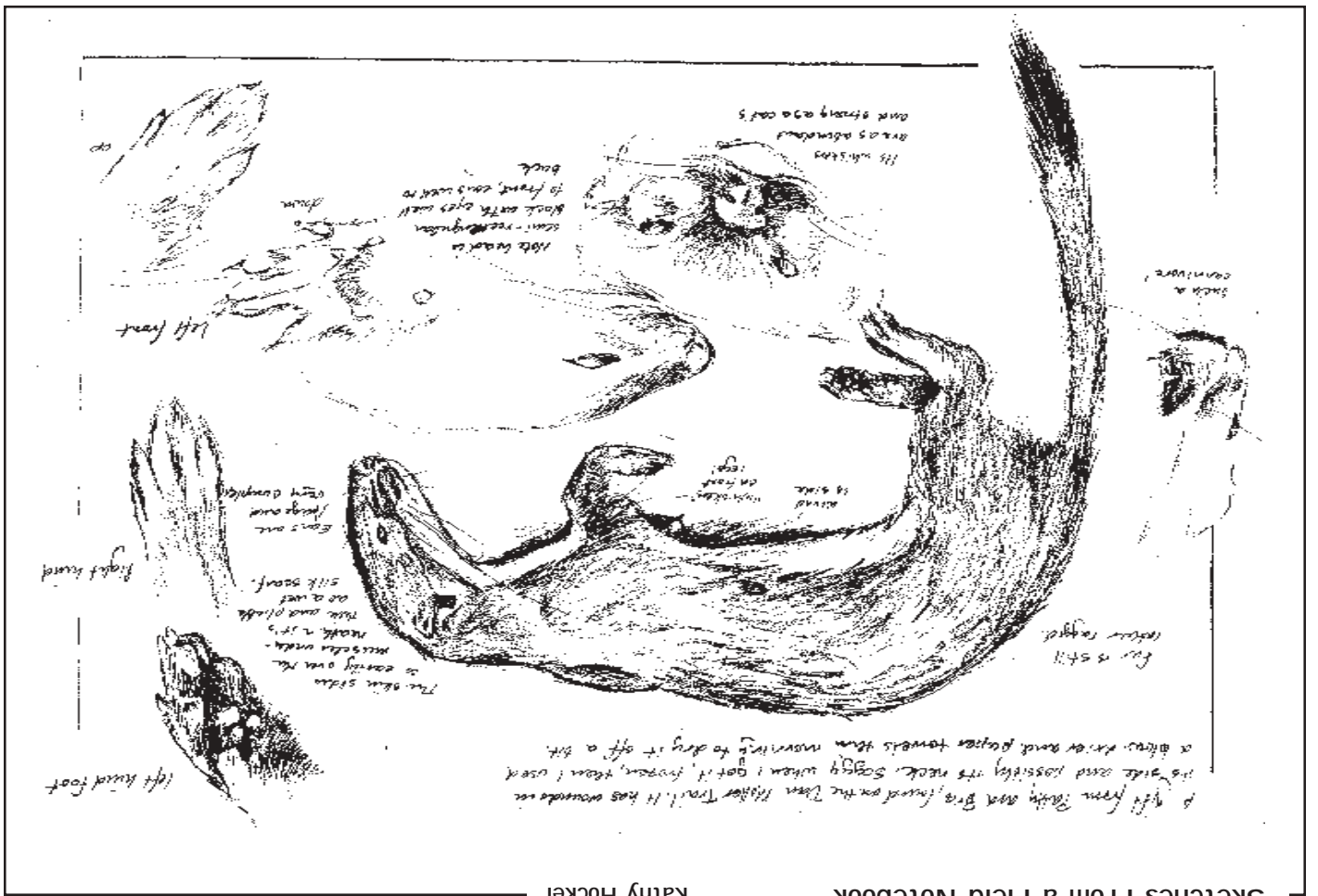
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Gustavus naturalist Greg Streveler estimates that Wisconsin-period high ice limit in this area was about 4500 feet. So only the top 600 feet of Mt Wright protruded, along with the high summits in the upper right. Peak 4340 was apparently overridden. Why then is it so jagged? Because the water-soluble limestone here and on the western slopes of Mt Wright erodes very rapidly in geologic terms, trenching deeply even since the end of the Little Ice Age.



Kathy Hocker

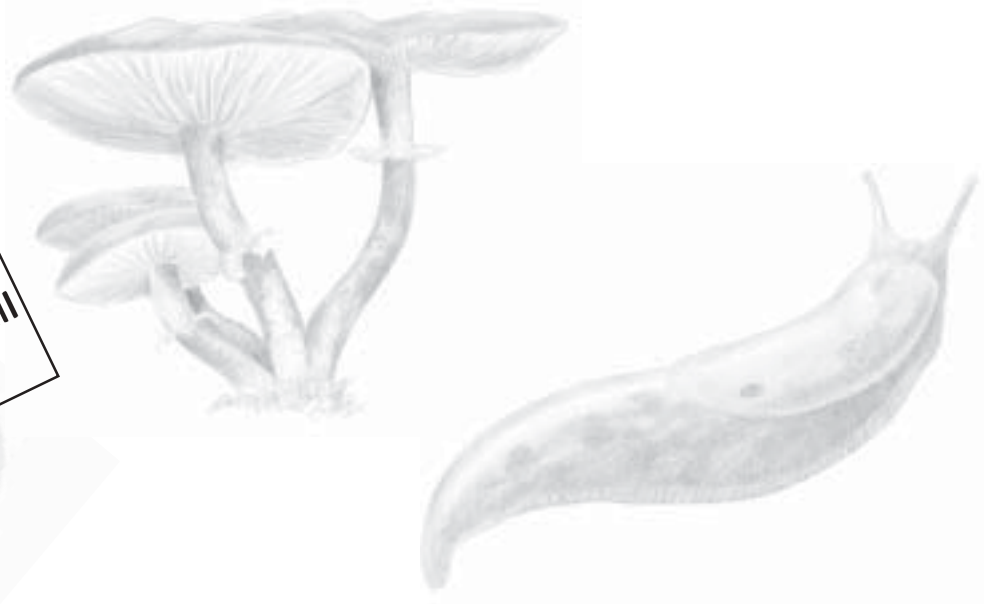
Sketches From a Field Notebook

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