

# Nature Study

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## WINTER



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Teachers are alerters, whether in a classroom or outdoors. My dictionaries lack the word 'alerter' but you know what I mean, a person who is part alarm clock, part hand lens, and part telescope all mixed in a warm, enthusiastic personality. "AWAKE, Students! Look at the wonders of our universe!"

Teachers like alert students, ones with a ready-for-anything attitude and nimble mentality, ones sensible to dangers of life but daring to investigate unknowns. Of course not all pupils come to us so endowed with vigor and other scholarly attributes. We must help them grow in alertness. Not easy.

Musical instruments can stimulate growth. The incisive note of a whistle can catch attention and initiate or conclude an activity. A drum, perhaps made from a Quaker Oats carton, can establish a somewhat controlling pace. I wish I could play an accordion to get minds dancing. I like accordians.

Accordians are like us: they breathe in and out. If we press suitable keys, they make sounds which suit us, as much harmony and discord as appeals, with more or less rhythm, with upnotes and downnotes to intrigue. Accordians too are good alerters.

Accordion-teaching is a favorite instructional technique of mine. Out and in and out and in. You have to streeetch an accordion so it can take a breath; then you squeeeeeze it—and stretch it again. There is a pattern of motion, dynamism, plus illimitable patterns of tones and rhythms. Try the stretch-and-squeeze technique for alerting students to the wonderful patterns of WINTER.

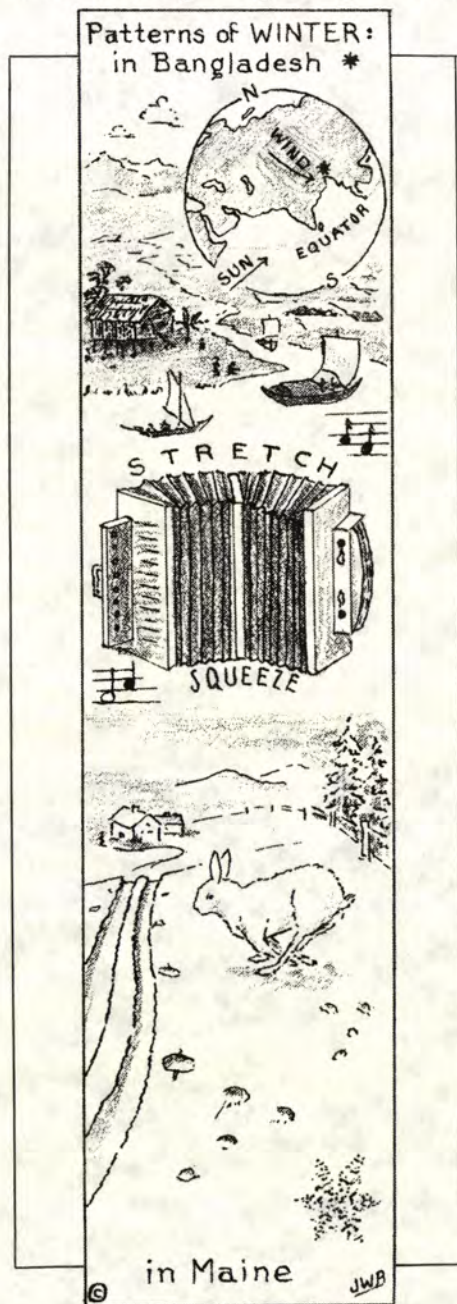
To most middle and upper latitude folk, thoughts of winter bring cold and snow to mind. But to the people in Bangladesh, over 1000 of them per square mile, winter means a relatively cool, dry half year after the monsoon rains have ceased bringing in marine air. Thus we think of patterns of world climate created by the tip of Earth's axis and the amount of seasonal heating by the sun, with these patterns of different kinds of winter influenced also by sizes of continental land masses and by nearness to the sea. We need to stretch our thinking to travel worldwide in search of different kinds of winter.

Back home, (Dear reader, where is

## PATTERNS OF WINTER

John Brainerd

your home? Of course it may be Bangladesh!) teachers can challenge students to find statistics about the winter of their state or province. What temporal pattern does it make within the twelve months of the year? Is it best described as extending from autumn equinox to spring equinox? From the winter solstice to the spring equinox? From the first killing frost of fall to the last killing frost of spring, thus excepting the growing season?



From when the furnace, if any, is first turned on to the date it is shut off in warming weather? From when the last flock of some species of bird leaves until it reappears in spring? Is "winter" to me the same as "winter" to you, or is it just a feeling? Can a poet give us as good a description of winter's pattern as a scientist can? Scientists probably have more statistics to help them define winter. What do poets have that many scientists do not? Socrates knew what all teachers know: questions are great mind-stretchers.

Winter tracks are down-to-earth patterns or down-to-snow patterns depending on the spacial patterns of climates. In some places, at the edge of winter a half inch of wet snow on a not-too-cold blacktop drive or parking lot can make a chalkboard on which a pet cat or dog can make beautifully clear marks; the pressure of its feet melt the snow down to the dark pavement. A student's mind can feel a little squeeze from the paws of a ten-pound pussy or the pads of a hundred-pound St. Bernard. (The accordion comes in close.)

But what kinds of tracks survive the windsweeping sands of Saudi Arabia where winter's when-and-if rains average only six-to-ten inches? Perhaps an overhanging rock will shelter a fine powder of sand inscribed by a little lizard or large beetle leaving a pattern such as might be made by a toy bulldozer. (Stretch and shrink in one little paragraph.)

Praise be for the patterns of winter. Some can be pricked out as winter stars in black craft paper. Some can be colored a cool blue on a world map. Some patterns can be photographed on a subtropical beach where tourists from colder climes have left their footprints amidst the multicolored shells. And some of us rejoice in snow; we watch the changing patterns of lengthening shadows of spruce and fir as the sun arcs low to the south. Homeward bound, we let our ski tracks run parallel to the snowshoe tracks of a varying hare who somehow responded to celestial spinnings and grew its 'winter' coat.

What teacher would want to hibernate when they can be alert to the season's patterns...and can alert others to the marvels of WINTER? □

**JOHN W. BRAINERD** is an alerter who now lives in West Brooksville, Maine.

# Nature Study



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*Cover Photo by Helen Ross Russell*

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## WINTER GLIMPSES OF THE WILD TURKEY

Walter F. Meade



The wild turkey, our largest game bird, is strictly all-American. *Meleagris gallopavo silvestris*, as it is known to scientists, was found in the forests by the first American colonists. A century earlier the Spanish explorers in Mexico saw turkeys that, unlike the eastern sub-species, had been domesticated by the Aztecs. Some of the Mexican birds were taken back to Europe and raised for many years before eventually their offspring returned to America to become our modern tame turkeys. But the eastern wild turkey is a very different bird from its barnyard cousin, even though they are both good food to eat.

The succulence of roasted wild turkey is legendary. Its large size and tasty meat made it a very desirable commodity for the early 19th century market hunters. Turkeys were pen-trapped, baited, and shot twelve months of the year. Meanwhile the farmers were clearing the land, destroying vast areas of the forests that were vital to the survival of the turkeys. The combined adversity was just too great for the big birds and the wild turkey nearly lost its struggle to remain alive.

It took the passage and enforcement of strict laws to protect the remaining birds. Once afforded protection, the wild turkeys started a slow but steady comeback. In the mid-20th century, as the small flocks increased, some of their members were trapped and transferred to new, likely habitats, thus starting new flocks. The success of this trap and transfer program has been one of game management's most outstanding achievements. Now there are thousands of turkeys throughout the United States; in fact, many places that never had wild turkeys in the first place support large flocks.

The restoration of the wild turkey was successful because of the efforts of many trained persons who worked countless hours. They learned to improve the existing habitat so it could carry even more birds. Their studies showed which predators did the greatest damage to nesting hens, how wet weather destroyed the newly hatched poults, and in what ways deep snow

and intense cold affected the adult birds in the winter-time.

Winterkill is always a threat to any species that remains active during the colder months. Deer, which feed on the abundant offering of the tree, may be trapped by deep snows and starve. So it is no surprise that wild turkeys often face even greater hardships find-

ing food at this time of year. Yet turkeys do survive most winters fairly well.

Turkeys can be called omnivorous—they are opportunists that will eat most anything. They commonly visit spring seeps in winter and feed on a variety of things such as algae, insects, and even the green grass that grows along the unfrozen edges of the seep, or



Photo by Walter F. Meade

*Winter is a real test for wild turkeys. Deep fluffy snow will confine most turkeys to their night-time roosts. Often they find it impossible to wade far enough to find necessary food.*



Photo by Walter F. Meade

*Note that two of these turkeys are each using only one leg while warming the other foot under their body feathers. This is common behavior for turkeys during very cold weather.*

perhaps a salamander if it can be found. The evergreen ferns, such as the Christmas fern and others that remain green all winter, are important food items too. I have followed the tracks of turkeys that had scratched clear the snow blanketing these green ferns and then devoured every leaflet and even the stems. Wild turkeys readily feed on the sporeheads of the sensitive fern; in fact it seems to be a favorite.

The wild turkey certainly isn't a picky eater, for it often turns to feeding on corn and other seeds found in the cattle manure spread on the fields by the local farmers during the winter months. I know of one area where a farmer feeds corn generously to his cattle and spreads the resulting manure on a field beside a small stream. It isn't uncommon to see one hundred-fifty turkeys feeding there. This is the largest flock I know of, but I have seen other smaller flocks around our county feeding behind the farmers' manure spreaders.

If turkeys can find shelter in evergreen trees with food nearby they will restrict themselves to a rather small range during the winter. It was this habit that led to my observations of a small flock of turkeys one winter.

We live adjacent to a large stand of evergreen trees, and we also feed birds in our backyard. Our offerings of cracked corn and sunflower seeds often attract more than just hungry songbirds. Red squirrels, cotton-tailed rabbits, and an occasional deer often come to our feeder, but never wild turkeys until the late fall of 1984.

On December 16th, four wild turkeys came to our bird feeders and gorged themselves on the cracked corn we had put out for the squirrels and rabbits. Within a week this flock of four had increased to eleven birds. The eleven remained constant until March 27th when they were joined by a very large gobbler.

I kept almost daily notes on the actions of the eleven turkeys during the entire winter. My study was conducted from the windows of our home and from a photographic blind; I spent many hours in both places watching and photographing. I was involved almost daily during the months that these turkeys visited our backyard. My experience with wild turkeys isn't limited to this one winter behind our



*Photo by Walter F. Meade*

*The young males, or jakes, can readily be identified by their longer tail feathers in the center of their fans. The very short beard is a second mark of a juvenile male.*

home; I have spent several years watching, photographing, and tracking turkeys, studying what they eat, how they fare in deep snow and extreme cold and their struggle with various predators. However, there is no way that I could have gotten to know eleven wild turkeys as intimately as I did the birds that came to our feeder.

These wild turkeys were no less shy and wary than any others to be found in the woods. They always approached the bird feeder very cautiously; even a noise within our house would spook them. The wild turkey has a reputation as being one of the most difficult game species to bag. Wild turkeys are intensely xenophobic; they are distrustful of every strange movement in the woods and a whole suspicious flock can fade away before one's eyes, like a dissolving picture from a slide projector.

The wild turkeys' eyesight is outstanding. They are credited with the best daytime vision in the woods. I saw several examples of their keen sight during my winter watch. Twice one day a red-tailed hawk tried to strike down one of the eleven birds, but the hawk failed because each time as it approached the turkeys saw it and fled into the thick cover. A young goshawk was denied turkey over and over because it too could not get close

to the flock without being discovered by the sharp-eyed turkeys.

I soon learned that the turkeys could see the corn in the birdfeeder from their retreat in the evergreen woods hundreds of yards away. If I failed to replenish the supply, no turkeys would come. But only minutes after I placed more corn out, all eleven birds would arrive and start feeding. It was during these feeding assemblies that I noticed how much the stronger turkeys harassed the weaker ones. A strong pecking order existed among the members for our offerings of cracked corn, even though there was always plenty of food for all the birds. The pecking order went from the strongest bird to the weakest one, with each bird having its own place in the group. There was plenty of corn at the feeder, but still the weakest bird was forced to feed by grabbing a mouthful of corn and then running to another pile and grabbing another mouthful before it was chased away. The competitiveness seemed rather cruel and uncalled for by my standards, because I am sure the weaker birds would have died before spring if they had had to survive on what food could be found in the wild. Nature is wiser than I am, for the way of the turkey insures that only the best breeding stock will be left to carry on

in the breeding season.

Turkeys locate most of their food by scratching with first one foot and then the other. During the winter they will discover acorns, beechnuts, black cherries, and other edibles found in the forest by scratching away leaves or a light amount of snow to uncover the hidden food. This practice is understandable. But when a turkey stands in a pile of corn and continues to scratch, sending the kernels flying in every direction, I find myself asking, "Why?" I watched these eleven birds do this unnecessary gesture over and over, as if it were an uncontrollable action.

On page 94 of my notes I recorded an example of this scratching habit.

*I watched a hen walk to a pile of corn and eat a few kernels, and then she started scratching with first one foot, and then the other, scattering the corn in all directions. Heedlessly, she kept scratching every thirty seconds or so; in fact, she spent more time raking the ground with her feet than she did eating. Shortly another hen came over to the corn and challenged the first hen for it. The pecking order became evident between the two hens, for the first hen left without protest and what did the second hen do? She scratched over the corn again even before she started to feed.*

This and several other examples I observed while watching these turkeys led me to believe that they scratch automatically while feeding.

During good weather turkeys are early to bed and early to rise. My flock arrived at the birdfeeder shortly after daylight in the morning and always went back to the woods by late afternoon. This routine didn't hold true during foul weather, although rain didn't affect them as much as wind or heavy snow. Windy, cold, and snowy weather kept the turkeys on their roosts in the evergreen woods. Deep, soft snow will confine turkeys to their roost trees for days at a time. Even if it means they will starve, they refuse to wade in deep, powdery snow. But usually this weather condition does not last more than a few days at a time here in the Catskills, and the turkeys are able to leave their roosts and feed.

These turkeys spent much of their

day feeding, preening, and sleeping when the weather was bright and clear. After feeding all the birds would settle down on a snowdrift and preen their feathers for several minutes. Then, one by one, the turkeys would doze off, as if they had not slept a wink the night before. Yet there would always be one or two turkeys that remained very much awake: This flock would never be caught napping by any predator.

The turkeys amazed me by their indifference to a winter rain storm: the birds would feed as they did on a clear day and then would settle down on the snow and just sit there for long periods without moving. During a downpour they resigned themselves to a good soaking, but not so when the wind blew hard or an advancing snow storm threatened. All the turkeys would become very nervous and jumpy, especially if the snow was starting to fall fast. The dominant birds would show their authority with quick, vicious pecks to the backs and heads of the weaker ones, thus keeping them away from the still plentiful corn. Gregarious birds such as turkeys are much more vocal than solitary birds like blue herons. And during these times of extreme irritation, some of the stronger turkeys would give a vocal warning that drove the shier birds away from the corn and that seemed to be an effective deterrent

without the spiteful peck.

But a warning sound is far from the wild turkey's only utterance. Turkeys learn to make sounds before they hatch from the egg. A day or two before the poults break out of the shells, they begin to make low peeping sounds and the hen responds by clucking to them. The young brood's safety depends on the calls of the mother hen. They learn to interpret her every sound, for if danger arises, her alarm call will send every poult into hiding. And the youngsters will not move or peep as long as they can hear her sounding the warning cry. Wild turkeys survive and prosper because over eons of time they have developed a wide repertory of sounds to communicate with each other.

One more of the privileges I enjoyed while studying this small flock of wintering turkeys was to learn of their unfamiliar calls, often so low in volume that the sounds could not be heard by the human ear more than a few feet away. I discovered that these low conversational purrings, yelps, and clucks are heard when the flock is contented and undisturbed.

There is an indescribable excitement when you find yourself spying on the daily routine of a creature as wary as the wild turkey. My eleven wintertime turkeys gave me unique glimpses into their lives that I had never dreamed of before they came to our



*Photo by Walter F. Meade*

*During the coldest weather of the winter, wild turkeys often congregate in fields near active dairy farms to pick grain from the manure the farmers spread.*

birdfeeder. My daily insights revealed to me priceless bits of first-hand knowledge about their habits of feeding, preening, sleeping and scratching. I didn't have an inkling of the status struggle within the flock until I watched their pecking order in action. And like the hawks, I was amazed by their unbelievable eyesight. This all too short winter gave me a new understanding and appreciation of the wild turkey in its struggle to survive. □

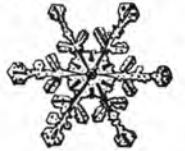
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**WALTER F. MEADE**, retired as director of Manhattan Country School Farm in Roxbury, N.Y. several years ago, to devote full time to his twin interests: learning about wild animals through on-going observation and photography.

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## CANADIAN WINS NATIONAL AWARD



"Wear a dress kid," advised Canadian Wildlife Service biologist Gerald McKeating. "And practice your curtsy," added Paul Griss, director of the Canadian Nature Federation, an affiliate with ANSS.

Joy Finlay, who had been asked to represent the Canadian Nature Federation at the Last Mountain Lake dedication ceremony, was puzzled by the suggestions, but she dutifully complied.

When she found herself on the platform with HRH Prince Philip and Environment Minister Tom McMillan, she was glad she did.

Despite all the cryptic hints, Finlay says she was "flabbergasted" when McMillan called her forward to receive the Environment Canada award, presented by Prince Philip, honouring her contribution toward organizing Wildlife '87.

McKeating was less surprised. He said the Alberta native—the first person to receive such an award—was "an obvious choice. We're clearly identifying Joy for all the work she has done and we're also identifying her as a symbol of concerned citizens across the

country who have contributed to Wildlife '87.

Finlay, a CNF vice-president representing Alberta, BC and the Yukon, was a driving force behind the year-long celebration commemorating the creation of the first wildlife sanctuary in North America at Last Mountain Lake. Together with her husband, Cam, she originally approached the Canadian Wildlife Service with the idea. When federal cutbacks prevented that agency from spearheading the project, she turned to the Canadian Nature Federation.

Together, they presented a proposal to the federal environment department to designate 1987 as a year of wildlife conservation in Canada. The slogan would be: Wildlife '87—Gaining Momentum.

Environment Canada gave the go-ahead, but there was no funding available to hire a national coordinator. Putting her career as a professional development consultant with the Edmonton Public School Board on hold, Finlay stepped in to chair the volunteer Wildlife '87 national steering committee.

She says she has no regrets about the long hours without pay. "It's not happening because there is money available. It's happening because so many people have put so much effort into it."

One of the main efforts for Wildlife '87 came from Joy's husband Cam. In 1985, Cam Finlay urged the CNF to do something special to commemorate the 100th anniversary of Canada's first wildlife sanctuary in 1987.

Determined not to let the occasion slip by, he came up with the concept of Wildlife '87 and worked hard to sell the idea to anyone who would listen.

At the CNF's annual banquet this summer, the super-salesman was presented with the 1987 CNF Volunteer Award in recognition of his efforts. With the help of Joy, Wildlife '87 became a family affair and the Finlays made sure Canadians from coast-to-coast had something to celebrate.

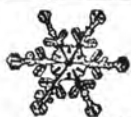
—from *Nature Canada* magazine. □

### CALLING ALL MEMBERS . . .

. . . The next Journal will feature the written word: how to write about the environment and sell what you have written, or get it published. How to teach young people to observe and to write. How to use written (and in today's world taped) materials.

We are working on the Journal on women and their contributions to environmental education, which will be published in late summer, and need your contributions and suggestions. Deadline: June 1.





## WINTER RECIPES

by Margaret Nathanson

A tuft of dried grass poking through the snow, clear blue skies following a silent all-night snowfall, every twig of every tree coated with mounds of whipped cream snow, tail marks of a field mouse scurrying for cover underneath a log, bark nibbled away by a hungry cottontail—all images of winter, its beauty on the surface, its drama played out below.

A simple activity, easily adaptable to children of varying ages, grades 4 through 8, and one which I have found to be successful, is what I call "Winter Recipes".

When the class has gathered, tell them that this will not be "just a walk" in the woods, but that everyone will be expected to make use of all their senses, seeing, smelling, touching, listening; that although they may not always be able to see the animals themselves, they will find various sorts of signs for us to interpret. Whether it be a bit of fur, a feather, a hole in an acorn, some scat, a covered-over bird's nest, or a rabbit's distinctive tracks, they all tell a story. That story speaks of the constant struggle for survival under the difficult conditions imposed by winter.

Following your walk through the woods, (or field or beach or any other available habitat), hand out paper and pencils. Utilizing what their senses and feelings have told them, the students are asked to make up a "recipe" for winter.

There are three parts to the assignment. The first is to list the "ingredients"; the second to give directions on what to do with them; and last, to sum up and give a name or title to the end result.

What follows is a memorable example composed by a sixth grader who, together with her class, spent a day at Caumsett State Park on Long Island a few years ago.

**MARGARET NATHANSON** is at Nassau BOCES, Caumsett State Park, Lloyd Harbor, New York 11743 and Volunteer Naturalist at Muttontown Preserve, Nassau County Museum System, Muttontown, New York 11732.



Photo by Margaret Nathanson

### WINTER

#### Ingredients:

- 3 gusts of wind
- 1 blade of dead grass
- 2 blankets of snow
- 5 dried leaves
- 4 bare trees
- 2 cold spells
- 1 grey owl
- 3 trees blowing
- 5 animal tracks
- 1 fox

**Directions:** Mix wind, snow, bare & blowing trees together. Put the rest of the ingredients in. Mix well.

**Results:** A fresh winter's day at Caumsett.

I have a strong feeling that neither she nor I will soon forget that particular day.



## INTO WINTER

by Fran Ludwig

"I sincerely believe that for the child, and for the parent (or teacher) seeking to guide him, it is not half so important to know as to feel. If facts are the seeds that later produce knowledge and wisdom, then the emotions and the impressions of the senses are the fertile soil in which the seeds must grow."

"A child's world is fresh and beautiful, full of wonder and excitement. If a child is to keep alive his inborn sense

of wonder...he needs the companionship of at least one adult who can share with it, rediscovering with him the joy, excitement and mystery of the world we live in." Rachel Carson, *The Sense of Wonder*.

### Winter Wonders

**Ice Art.** Arrange small objects on a tray, add water and a string that extends over the side of the tray. Place outside on a below freezing day. Take

inside when frozen. Hang in a sunny window and watch. Would it work with another liquid? Add salt to the water. Try oil.

**Puncture a very small hole** in the bottom of a juice can. Add a string handle to the top. Hang this outside in freezing weather. Add water. Use different color food coloring for each batch of water. Predict what will happen. Did it?

**Snow race.** Take a coffee scoop of snow for each person. See who can melt it the fastest. (no fair eating it—see next experiment).

Fill a cup to the top with snow. Predict what will happen. Mark the level of water you expect.

Place squares of different materials on a section of snow (light and dark cloth, paper of different colors, aluminum foil, saran wrap, etc.) Allow these to stay in the sun for a few hours. What will happen? Why? Check out your ideas by touching cars (caution) of different colors. Are some warmer than others?

**Pure as the Driven Snow??** Set up a coffee filter or paper towel in a cone shape. Strain melted snow through the paper. What do you see on the paper? Will the results be different for different places? Depths? Ages of snow? Should you eat snow? Use a magnifier to see if you can identify any of the particles in snow.

**Snow Crystals.** Catch snowflakes on cold black paper. Look with a magnifier. How many points on each flake? How many different shapes? (see Bentley's Snow Crystals) Play a matching game with photos of crystals. Try cutting your own 6 sided snow flakes. Start with a paper circle. Fold it into quarters. Fold into thirds. Cut. Look at a slice of snowbank—is the top the same as the bottom? What stories does it tell?

**How Deep is Snow?** Sink a measuring stick into snow. Where do you think the snow is the deepest? Is it? Why?

**Roll Your Own Ice Cream.** Combine 1 C. milk, 1 C. medium cream, 1 egg, ½ C. sugar, ½ tsp. vanilla, and beat. Put mixture into a clean 1 pound coffee can, and close lid. Place inside a 3 pound coffee can. Pack layers of crushed ice (snow!) and salt, four times, to the top. Place the lid on the

large can and tape it. Roll the can on the ground for about 20 minutes. Enjoy "Snow Cream" (recipes courtesy Edie Sisson, Drumlin Farm). Check to see frost patterns on outside.

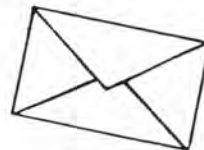
### Where Do They Go In Winter?

**Active Track Detectives.** Make a crayon rubbing on paper of the bottom of each person's boot. Make some snow tracks. Mix up the crayon rubbings and see if you can find the snow print to match. Try to follow the person's trail. Was the person walking or running? How can you tell? Look for car tracks. Look for other animal tracks. How many toes? Which way is front? How many feet? Any tail or feather marks in the snow? Find stories in the snow. Which happened first (find a place where one track is on top of another track). Which way was the person or animal going (look for toes)? Make animal tracks with cut out styrofoam trays. Stamp out stories on paper. Make life sized tracks in correct patterns on large paper. With the paper patterns on the floor, see if you can do a "bunny hop." Label your "paws" with tape.

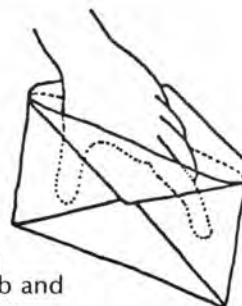
**You're for the birds!** Make cardboard tube binoculars (they really work to focus attention), and go for a bird walk. What are the birds doing? Try making a simple bird feeder. Look carefully at bird food. Smell it. How many different types of seed can you find? Make a bird seed collage and then grow it! Place the paper with the collage on the top of a damp sponge. Keep the sponge in a pan of water. Will all the seeds sprout? Will they all look alike? Eat like a bird. Get some sunflower seeds with the shell on, and some millet at the health food store. Why do we people have to cook popcorn to eat it? Make a bird beak puppet with an envelope. Can you pick up seeds with it? What happens if the seeds are in a deep cup? Are all bird beaks the same shape? See *Capture Them With Magic*.

**Slow Down** Find some insect eggs. Note praying mantis egg cases and tent caterpillar eggs (only on fruit trees). Look for the pupa stage of the pine tube moth. Find a white pine tree and look for a place where the needles look like they have been cut off and bound together. Carefully open the bundle. In some of the clusters you

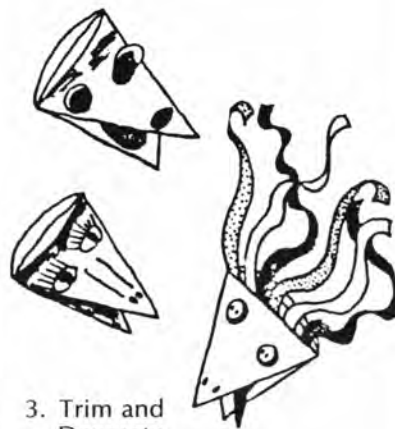
## ACTIVITY "JIFFY" PUPPETS



1. Use any envelope.



2. Bring thumb and forefinger together, use finger of other hand, push up bottom of envelope.



3. Trim and Decorate

This is one of the few "jiffy" puppets children can make with a mouth that opens and closes. It can sing...bite...eat...pick up things...peck and kiss.

— from *Capture Them With Magic* by Mary Anne Hall

will find an orangy middle stage of the pine tube moth. In your hand the pupa might wiggle when it warms up. What should you do when you have finished looking? (wrap up in its tube again). Look for galls (see display). Many oak leaves have bumpy areas caused by chemicals from a mother insect when she lays eggs. The chemicals stimulate unusual growth in the plant causing a protective bump around the egg. When the egg hatches the plant around it is "instant break-fast". How does a gall protect the egg from the cold? (note styrofoam appearance of many galls.) Many more ideas in *Winter Search Party*. Allow soil from a forest or field to warm up. A light shining on the soil will help. Look at the bottom of the soil for animals who have "woken up". Scoop water, leaves and mud from a pond. Let it settle. Watch for increased activity in tiny pond creatures.

**Hibernation** Only 3 mammals in New England truly hibernate: woodchuck, little brown bat and jumping mouse. In a hibernating animal, body temperature goes down to just above freezing (37°F). Breathing rate can go down to 1 breath every 5 minutes. Heartbeat may be 3 beats/min.

**Plants in Winter.** Some plants lose their leaves in winter. Leaves in sunshine use water to make food. In this process, some water is given off to the air. In the winter, much water is frozen in the ground. If plants continued to give off water in sunshine, they might become dehydrated (winter burn). Plants have developed several ways of dealing with this problem. One way is to drop leaves.

**Study twigs.** Note ways in which buds are protected from the cold (fur coats on apple buds, etc.). Slice open a bud. Find the scar where the leaf used to be. Other plants stay green all winter. They have changed in ways that limit the amount of water given off when their leaves are food making. They are leaves with small surface areas (needles) or they have waxy coatings (needles, rhododendron, etc.). Force some twigs by placing them in water. **Try to find plants that stay green all winter.** Some plants winter over as seeds. **Scoop some mud from the surface of the ground.** Bring it in and keep it moist. Watch for sprouting seeds. Carefully open a maple key.

**Twig Teams.** Find a partner who has

the same twig as you. Hike the twig trail and find the bush or tree with twigs like yours. Use almost all your senses—not taste! Don't forget to scratch'n sniff. Together, find something interesting about your plant to share. Tie a piece of yarn around a twig on a tree or bush. Visit it in winter and then frequently in spring and fall. How does it change?

**Migration.** Go to the library and find out about bird and monarch butterfly migration. Play the goose game. In a class of 25, pass out a card to each

child. All but 8 have a variety of animal sounds on them, one sound per card and all different. The other 8 cards have the Canada goose flocking call, "honk". Students are asked to stand in a large space and spread out. Everyone closes their eyes and gives their call. How long does it take for the geese to flock? □

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*This material was prepared under a grant from the School Improvement Funds, Lexington, Massachusetts.*

## SNOW FUN

by Joy Finlay

There's no fun like snow fun! Every child loves the snow, so let's get out with them to enjoy and explore the world of winter. It is not often viewed as a learning resource, even though it is a very significant feature of winter-time across most of the United States and Canada. Perhaps if snow were a rarity we would go to great lengths to appreciate and study the phenomenon that it is.

The following activities may start project ideas, be used as winter carnival events, or to compliment subject areas in an integrated unit. All that is required is snow, the more the better.

### Shake Paintings

Using powdered tempera paint sprinkle from a salt shaker to create paintings in the snow. Choose a day without wind to avoid paint powder being blown around.

Make a walk-around frame for easy reach over the snow "canvas", or improvise by attaching a long handle to the shaker for larger pictures. Dried leaves, small stone, or other natural found objects can be incorporated in the picture.

### Snow sculpture

The best known and simplest form of snow sculpture is the art of making snowmen, the conditions for which are warm weather and wet snow. More complicated modeling with water, snow and ice in cold weather is a traditional part of winter carnivals and festivals. Elaborate structures and characters are a result of patient construction, using internal framework, snow packing, icing, slush modeling, freez-

ing, carving and colouring techniques.

To create super snow creatures in the yard, use the snow pile modeling method. Several working together can build larger sculptures. Begin by piling snow in the general shape of the object or animal to be created. Leave the snow pile to consolidate for several hours or overnight. Spray the snow with water to help pack the snow into shapes. Use snow slush, made by adding water to snow in a bucket, to join pieces of ice and snow, for building details, and for glazing the sculpture. Details can be carved with ice scrapers and blunt kitchen knives.

To colour the sculpture, paint or spray on tempera paints, laundry bluing, or food colouring. Painted sculptures should be glazed with a fine spray of water. This helps brighten the colour and protect it from wear. Painted surfaces will melt faster than unpainted surfaces when exposed to the sun.

Twigs, branches and icicles can be added as legs or antennas.

When it is cold outside, it is important to try to keep dry and warm. In lieu of rubberized outer mitts, use plastic bags over woollen and leather mitts. Elastic bands over the bags and jacket cuffs will help keep wrists covered. Wind or warm-up pants are essential, too.

For the safety of climbing visitors, keep sculptures bulky and close to the ground. Avoid delicate and protruding details that can easily be broken off. Make arrangements to remove any sculptures that might pose a threat during spring thaw.

## Snow Snakes

This game was popular among northern native tribes. Each player had his own carved "snake" stick. The object of the game was to send the snake as far as possible along an icy trench made in the snow.

Use broomsticks, broken hockey sticks or a metre length of doweling for the snake. Sand, paint or wax the snake to make it smooth and speedy. Carve or paint a design on the stick. A short bolt through the head end of the snake gives it extra throwing weight as well as the impression of eyes.

To make a snow trench, first tramp down a straight line on flat ground at least 10 metres long and about 10 centimetres deep. Fill a plastic bleach bottle with hot water, secure the cap well and tie a string to it, then drag the bottle along the trench to make it smooth and slippery. Mark a starting line and several distance points along the trench.

To launch the snake, kneel beside the trench behind the starting line. Hold the snake in line with the trench, one hand under its head, the other under its tail. Hook the index finger over the end of the tail and with a long underhand swing, thrust the snake forward. The player whose snake goes the farthest in the trench wins a point. Keep playing until either time is up or a total of 10 points has been reached by one player or team.

For safety, players must stay clear of the track when others are throwing snakes. Also, the underhand throw is safer than overhand. The game can be played in teams or by individuals. The trench may require rebuilding after each use, a snowfall, blowing snow, or trampling.

## Snow-Ball Contests

Although game oriented, the students success with snow-ball contest will depend on their discovering and investigating some of the aspects of snowball-making and related conditions of heat energy that affect the snow.

### 1. Snowball Relay.

In relay teams, have players pass snowballs over, then under members of the team, from front to back, using warm hands. When the snowball reaches the last in line, he or she runs to the front

and starts the snowball down the line again. The winning team is, of course, the one that has some snowball left. One of the challenges in the game will be to determine how to make snowballs that are of equal size for each team. The size of the snowball does affect the speed at which it will melt. It's worth playing this relay often in order to develop strategies and test observations and hypothesis for meeting the challenge.

Instead of trying to make the snowball last the longest, try the opposite and see which team can make a snowball melt fastest.

### 2. Snowball Splots

Under defined rules, throw snowballs of different shapes and sizes at a wooden fence or solid brick wall. The object is to see which snowball leaves the biggest "splot" mark. Plan time for investigating some factors of good snowball making and safety. Try making snowballs from fresh snow, cold snow and old snow, and use a thermometer to find the temperatures of the snow used. To speed the process, bring a pile of snow indoors to find out how temperature may affect snow compaction. Also try throwing equal size snowballs at varying distances. Now which snowball leaves the biggest mark? How big?

## A Quinzhee

The igloo is a well known shelter

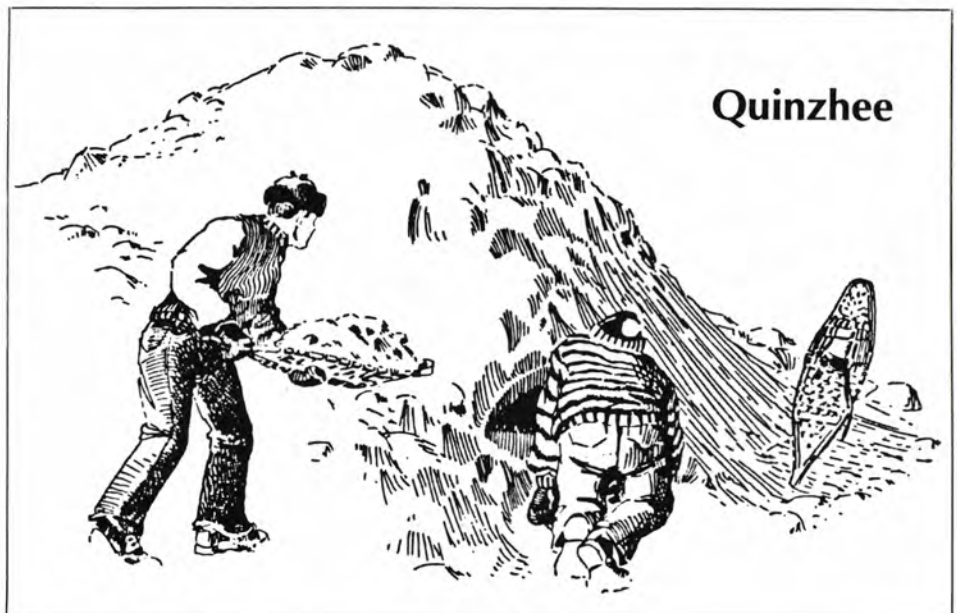
made of blocks of wind-driven, hard packed snow. The quinzhee is also a native style snow shelter used in forest areas where snow is not wind packed. It is built of loose snow heaped into a large pile and hollowed out inside.

To try building a quinzhee, choose a site where the snow has not been trampled. Pile up a mound of snow, about 2 metres high and 3 or 4 metres in diameter. Let the pile of snow set 1 or 2 hours or overnight before tunneling into it. The greater the difference in shape and temperature between the snow crystals at the top and those at the bottom of the snow field, the more recrystallizing and hardening will occur when the snow pile sets.

Begin burrowing through a doorway in the mound at ground level. Keep the entrance just big enough for one person to crawl in. Start to hollow out from the top, then move to the sides. A thickness of at least 20 cm. is needed for structural support and to insulate the inside from the outside. The walls are right when the outside light just begins to glow through the snow.

Compare temperatures outside with those inside the snow shelter, with and without occupants. Many small animals live under the snow cover in winter.

Be an Alice in Winterland and enter a quinzhee to experience the subnivean world of a deer mouse. The environment in a quinzhee is like being under the snow blanket—it is moist, sounds from outside are muffled, it is



darker, and most important of all, it insulates from outside temperatures. The quinzhee is a temporary shelter that can serve well as an overnight shelter in an emergency situation or for winter camping. A small hole at the top is needed for ventilation if the entrance is closed off.

Snow changes constantly with weather conditions and human or animal activity on it. Expecting snow structures to last unchanged may be disappointing and unrealistic. Snow vandalism may be unavoidable, unless there is an enclosing fence or courtyard to prevent access. Try a vested interest approach by involving several groups or classes in joint projects and cross-age activities. This may help to diffuse competitive destruction and create mutual appreciation for snow as a meaningful resource.

### Big Feet

Snowshoes and skis are foot extenders, and adaptation for moving over snow. The idea of the foot extender is, like the wheel, a very old invention. Nature thought of it first and equipped some animals, such as the snow-shoe hare and the ruffed grouse, with their own "big feet" for staying on top of the snow.

In lieu of snowshoes, make snowboards by attaching a piece of plywood, wide boards, or stiff cardboard on each foot and walk over the snow.

To make a permanent set of snowboards, cut plywood into an oblong shape, about 1 to 1½ times the length and width of the foot. Make a toe hole in the front quarter of the board and attach 2 or 3 small strips of wood or rug across the bottom for gripping.

Using old inner tubes, canvas, or rug remnants, create a harness to hold the snowboard on the foot. Snowboards are particularly useful with young children, being much less demanding or complicated to use and care for than real snowshoes. With one snow board on and one off measure and compare how much difference a Big Foot makes. The ratio of body weight to size of feet is one of the important factors for staying on top of the snow.

### Snow Scapes

Create a special winter landscape after Christmas when discarded evergreens can be a forest, "planted" in

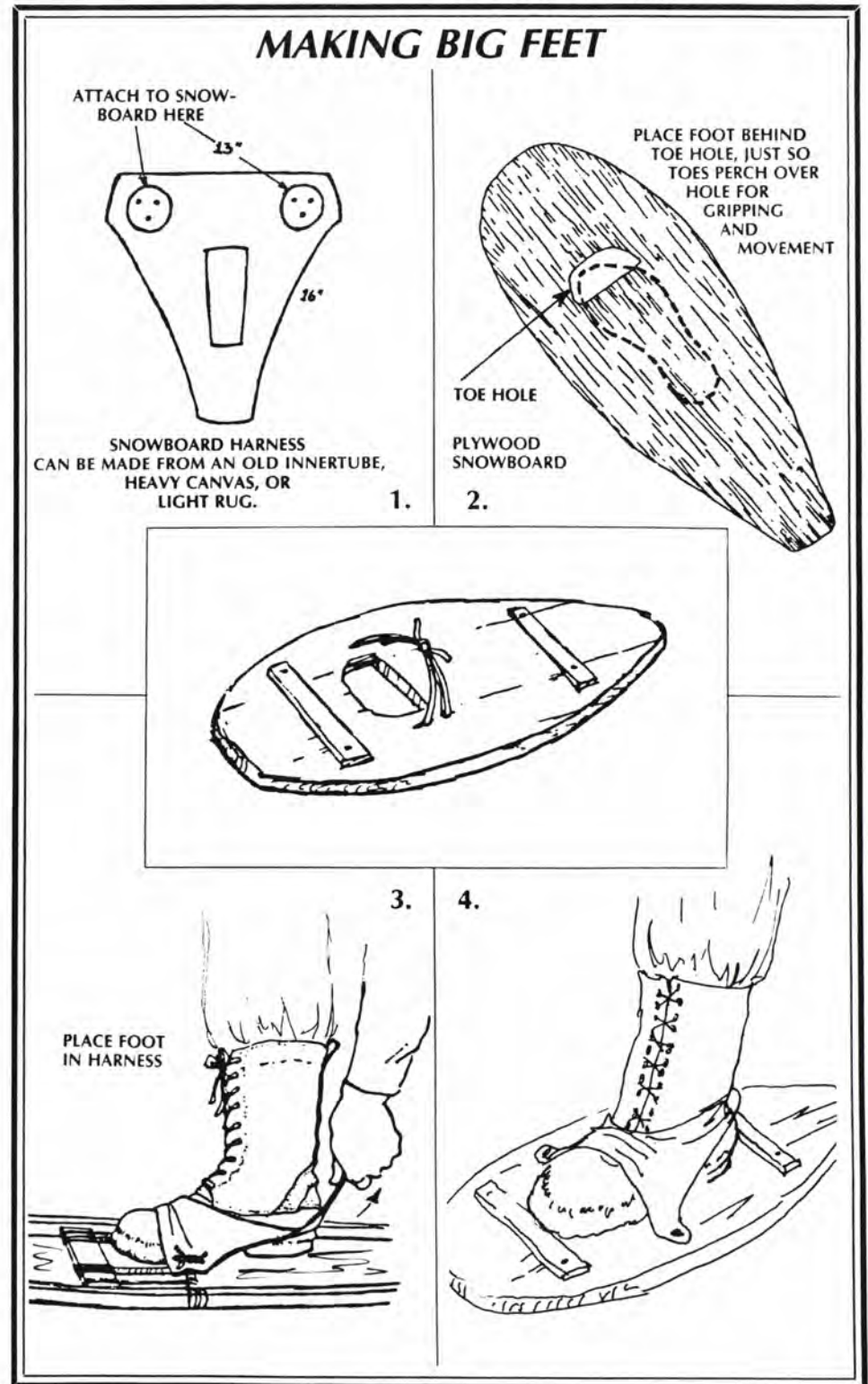
blocks of ice or snow. Spray the trees with water on a cold day to form icicles. Build garden walls, benches, pathways, hummocks and hills with snow.

### Snow Sense

Dress sensibly for keeping warm. Since we do not grow our own fur coat, we must choose clothing for in-

sulation against cold. To test the insulating value of different material and layers, "dress" film canisters or pill bottles filled with warm water, place them outdoors and observe which ones stay warm the longest. □

*JOY FINLAY is Recording Secretary of ANSS. She is an active environmentalist and teacher. (See page 6).*

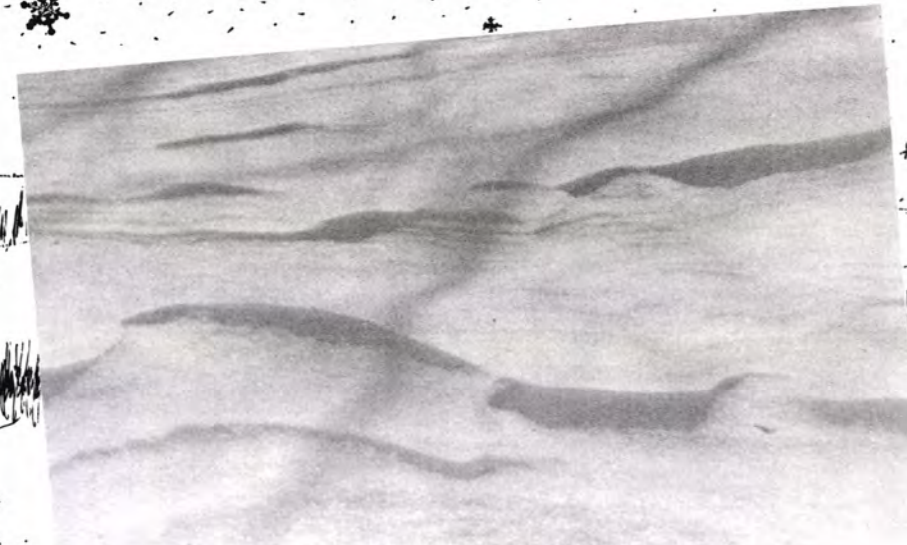


## OUTDOORS IN WINTER

by Helen Ross Russell

Plant curtains are drawn back in winter, exposing or highlighting stories that have been unnoticed. Go out with warm boots, cross-country skis or snowshoes and learn to read the landscape.

Photographs by Helen Ross Russell

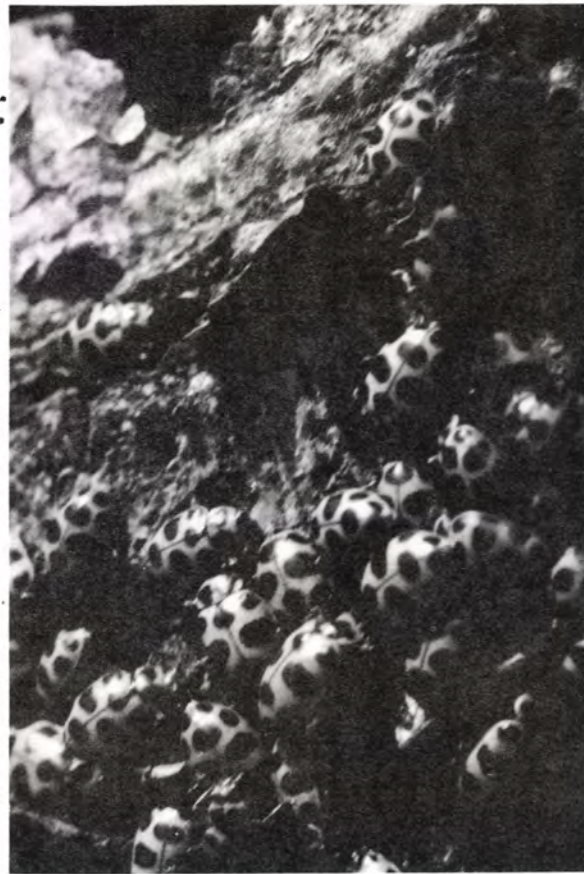


By definition, a mineral is a naturally occurring inorganic substance with a definite chemical composition and a characteristic crystalline structure, color and hardness. Water fits this definition perfectly and in its solid state demonstrates a great variety of geological phenomena. Here, wind-carved ledges and caves under alternate layers of soft snow and crust represent one kind of differential weathering.



As vegetation dies back, trails like this woodchuck trail from a hole in the bramble patch to a nocturnal feeding area become conspicuous.

Tracks are an all-year phenomenon. Watch for them on stream banks, in dust, in mud puddles, on wet sand, in frozen earth (a time-lapse record). Look for other information. These raccoon tracks tell of weather that remained cold enough so the prints did not melt while wind carried in and deposited a layer of dust. Other questions: wind direction and source of pollution.



A cluster of hibernating ladybird beetles brightens any winter hike. Watch for them at the base of trees, in a hollow log, under a rock ledge, under building trim or in other sheltered places.



A mourning dove's nest in front of a Manhattan apartment house. How many other nests become visible after leaf-fall in your community?



Tree buds are present all year except for the few weeks in spring when new growth is developing. With leaves gone in winter, they are conspicuous. Learn to recognize them and have a key to woody plant identification for more than eleven months.



When winter food is snow-covered, rabbits often prune young woody plants at snow-level, leaving a record of the depth of the snow.



## BLACK DOT PHENOMENON

- Joy Finlay

The first spider on top of the snow on a sunny day in later winter may be a clue that tiny insects are out. Looking closer, there may be black dots all over the snow. If the black dots jump when a finger is placed near them, we know they are not dust. They are springtails, or Collembola, one of the most primitive insect orders alive today.



These tiny snowfleas, which have no relation to real fleas, have no wings. A forked appendage is tucked under their bodies. When the insects are frightened, this spring is released, triggering their jumps. In one jump, these tiny insects cover a distance that is sixty times their length. They are about 6mm long. Imagine making a leap sixty times your own height!

Snowfleas are widespread. Look for them struggling upward through the snow during bright days in late winter - in backyards, meadows,

fields, and woodlands. They live in Antarctica and in Alpine regions all over the world. Their food is fungi, spores, pollen, and microscopic plants or animals. Not many other insects are active in the snow; thus, competition for food and space should not be a problem.

Cross-country skiers have been puzzled over "dust" inside a moose footprint track, or "shadows" on the walls of a snow bowl around a tree. Millions of snowfleas gathered on the sunniest side of a depression in the snow give this shadow or dusty effect. A shrew, a tiny mouse-like insectivore who needs nearly its own weight in food each day, could have a real feast on such a gathering of snowfleas.

## FIELD NOTES ON SPRINGTAILS

Include:

Date:

Temperature:

Snow depth:

Site description:

Microhabitat description:

Other wildlife:

## WOLVES

They answer each other under stars  
first, lone low howls far off  
then the pack  
a chorale of barks, howls  
over the shimmer of moon on snow  
Morning, I find their tracks  
leading away into silence



From *Trillium*. Used with permission of the author Maxwell Corydon Wheat Jr., teacher of English at Freeport High School and the publisher Virginia Wheat, 33 Bedell St., Freeport NY 11520.



## FIVE TIPS FOR BETTER WINTER PICTURES

Frank Knight



The outdoors is at its visually simplest during winter and beckons us to record its stark images on film.

Here are five tips to help insure your success:

1. COLD BATTERIES - Extreme cold

can weaken batteries and turn cameras into useless baggage. Carry extra batteries in a warm inner pocket. Zip or button your camera inside your jacket with just the lens protruding so it won't fog when you take it out for shooting.

2. SNOW and ICE - Fresh snow or an icy glaze will provide some wonderful settings and subjects, but wait for the sun to come out again—often the next morning after the weather front passes.
3. ANIMAL TRACKS - Waiting for the sun also gives mammals and birds time to leave their tell-tale tracks. If you get out early in the morning or mid-afternoon when there are longer shadows, your snow track pictures will have just the right contrast. Take advantage of three shadows during these times of day, too. Use diagonal shadows or those coming right at you to improve compositions.
4. DARK SNOW - Camera exposure meters are best at reading middle tones of light. Bright snow (and sand and water at the beach in summer) inaccurately call for a small lens opening resulting in dark pictures. Override your meter when shooting bright scenes—when it calls for f16 for example, set your lens at f11 for a shot, and bracket again for a shot at f8. A little experimenting will prepare you for perfect exposures on your next trip afield.
5. BARE GROUND - Many *Nature Study* readers live where there is seldom, if any, snow accumulation. Even in the north, brown ground is common between snowy times. Take advantage of these simple winter landscapes to practice and improve your basic compositional skills. Keep in mind that strong diagonal lines make the most dramatic pictures. □



*Queen Anne's Lace*

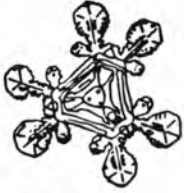
*Photograph by Frank Knight*

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**FRANK KNIGHT** is President of ANSS.

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# OWL PROWL AND OTHER WINTER ENCOUNTERS

Thomas L. Carrolan



At our best, we naturalists make compelling interconnections. Most often this happens when the fox unexpectedly yips from the other side of the broad moonlit field; the owl calls out (finally!). And the interpretation to accompany these “teachable moments?” Well, you don’t need to say a lot while the magical sparks of direct experience are flying naturally. You just let it happen and carefully plan your interpretation. With confidence, you keep it simple. The encounter almost speaks for itself.

*I swear I see what is better than to tell the best.  
It is always to leave the best untold.<sup>1</sup>*

This can be radical stuff: this guiding ourselves and others to accept the truth and meaning of our own feelings. No authorities. The emphasis is on direct experiences, on making connections, rather than distinctions. Making those connections on terms not wholly ours: we enter from the edge, rather than assuming we’re at the center, open to learning from teachers of every species.<sup>1</sup>

*‘If an individual can express what is undeniably real to him (sic) without invoking any authority beyond his own experience...’ without translating it into the abstractions of the dominant social paradigm...he (has) started with the experience of nature.<sup>3</sup>*

So, if we are ready to walk out into the night, leaving much of our human baggage behind, except for a small satchel of science, each experience will be one-of-a-kind and the following notes will be of interest to you...

## Owl Prowl: The Program

*Nothing is as ridiculous, as pathetic, as obscene as an organism out of context...unable to find an environment against which to test its potentialities for (evolutionary) success, (it) epitomizes the abyss of meaninglessness...we are denied the opportunity to understand why the organisms are the way they are.<sup>4</sup>*

□ If we interpret Kozlovsky’s words to mean no owl parts—wings and feet,



Illustrated by Karen F. Odgen

no stuffed owls, and no live owls out of context before live wild owls are seen, and I believe this, what are the indoor possibilities for introducing an owl prowl?! Good color slides showing live wild owls in a natural context work very well and it’s all I use with no complaints.<sup>5</sup>

*Many who attend our live nature programs yearn for M and M’s (magic and meaning) and get N and N’s (names and numbers) instead.<sup>6</sup>*

□ We have found owls to be a fascination for those who come to us for environmental education and assumed they want (or need) a crash course in owl-science. Owls have always had a much deeper meaning for us humans.

*Perhaps our own deeply intuitive and emotional reaction to the owl’s call intimates that we share with other*

*animals many levels of meaning in behavior beyond the instinctual and utilitarian. Every owl exercising its raucous dirge might well be expressing more than Descarte—or even Darwin—ever dreamed.<sup>7</sup>*

□ Include an “owl call workshop” in your owl prowls. It’s a revelation to most people that owls do more than “hoot”. And in the process you can teach some calls. I once only taught the “who cooks for you, who cooks for you all” of the barred owl and was surprised when demonstrating the screech owl’s whistle how naturally talented one participant was...and how a *real* screech owl called back almost immediately to this new territorial intruder!!<sup>8</sup>

□ So you have never been very successful at calling owls, there are birders in your area who are good at it.

Ask them where the owls were on the Christmas Bird Count.

- A cautionary note on planning: wind is the "kiss of death" for an owl prowl program, so have an alternative date built in.
- Be prepared for: stars, the moon, meteors, high cirrus clouds, the Aurora Borealis, BosWash (ambient eastern seaboard light), foxes, coyotes, roosts of blue jays or robins, sensory deprivation tricks, etc.<sup>9</sup>

### Owl Facts and Myths

Here are some notes, some facts I suppose, which aren't widely known. Some correct misconceptions and others help broaden and deepen our connections with owls.

- Saw-whet and barred owls require a certain patience when you're calling them in. Fifteen or twenty minutes may pass between the time you call them and their response! Nature teaches two things, if nothing else: patience and humility. So wait and failing that, remind folks this is real life: not to be confused with nature on television.

- Two myths about snowy owls: they are diurnal and cyclic. Those studying snowys with night scopes have observed increased activity after dark. Recent studies suggest snowys are regular winter migrants: numbers varying from year to year, but they're *not* cyclic (i.e., predictable based on some factor like rodent cycles); the larger dominant adult females winter farthest north, while the (smaller, inexperienced) immature males range far to the south.

- "Movement" is a better term than "migration" for the seasonal dispersal of owls. In the east, great-horned, eastern screech, short-eared, and barred owls expand their territories or are displaced relatively short distances. Barn, long-eared, and northern saw-whet owls move in numbers over longer distances. Hawk owls, boreal owls, and great gray owls come when they please.

- There is a definite, individual-to-individual relationship amongst predator and prey species. Prey recognize the songs of their community's bird predators and an owl will avoid the roosting site where it was "mobbed", say by chickadees, for months because that's where the chickadees look first!

- Here's another myth: owls rely on their night vision. A young owl relies on its night vision, hunting at close range, until the ears are "calibrated" through experience. At this point, sound becomes the primary sensory hunting tool.

- The asymmetrical hearing arrangement of owls has evolved five times in five different owl lineages! The asymmetry may involve skull, skill, or feather adaptations!!

*To know the owls, class Aves, order Strigiformes, you don't need a degree from Cornell or a grant from Exxon. You needn't go on exotic safaris or buy a lot of expensive gadgets. Only pay heed to whatever district you live in and listen to the night surrounding you: there's more going on under your own window than you can absorb in a lifetime.<sup>10</sup>*

While misinterpretation of others' studies are my fault, this author's owl knowledge has been greatly expanded by Dave Klingener (University of Massachusetts at Amherst), Paul Kerlinger (Cape May Bird Observatory), and Norman Smith (Mass. Audubon).

I have the in-depth references and would be happy to send a paper to anyone who writes (MAS, Lincoln, MA 01773).



Illustrated by Karen F. Odgen

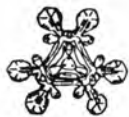
### References

1. From *A Song of the Rolling Earth* by Walt Whitman in *Leaves of Grass* (The New American Library, Inc., New York. 1855 and 1980.)
2. My "entering from the edge" is equivalent to Aldo Leopold's humans as "plain citizens", not masters of the Earth in *A Sand Country Almanac* (Oxford University Press, New York. 1949.) It's also rooted in

the same philosophical territory of "biocentrism" and "intrinsic worth" as discussed in *Deep Ecology: Living as if nature mattered* by Bill Devall and George Sessions (Peregrine Smith Books, Salt Lake City. 1985).

3. These are the words of Robert Combs along with those of Neil Evernden in Evernden's *The Natural Alien* (University of Toronto Press, Buffalo. 1985).
4. From *An Ecological and Evolutionary Ethic* by Daniel G. Kozlovsky. (Prentice-Hall, Inc., Englewood Cliffs, NJ. 1974).
5. Here are two excellent sources: VIREO (Academy of Natural Sciences, 19th and The Parkway, Philadelphia, PA 19130) has an owl slide set for North American species and individual slides available for purchase. *Understanding Northeastern Birds of Prey* is a slide/tape program, half of which deals with owls, and is available for rent or purchase from Cornell University (Distribution Center, 7-8 Research Park, Ithaca, NY 14850).
6. This is from VanMatre himself in *The Earth Speaks* by Steve VanMatre and Bill Weiler (Acclimatization Experiences Institute, Warrenville, IL. 1983)
7. From *The Owl Papers* by Jonathan Evan Maslow (E.P. Dutton, Inc., New York. 1983).
8. There are two schools of thought on calling owls. One says don't do it, don't interfere. The other is divided into those who use tapes and those who develop their own vocal skills and feel only wimps use tapes. Sources for recordings: the Peterson and National Geographic field guides to birds have owl songs on their supplemental records/tapes. *Birding* magazine (ABA Sales, Box 6599, Colorado Springs, CO 80934) now offers a tape titled, "Voices of the New World Nightbirds: Owls, nightjars, and their allies."
9. There is a wonderful and important book related to all this: *Walk When The Moon is Full* by Frances Hamerstrom, illustrated by Robert Katona (The Crossing Press, Trumansburg NY. 1975).
10. Again, from *The Owl Papers*. □

**THOMAS L. CARROLAN** is with the Massachusetts Audubon Society and so is illustrator **KAREN F. ODGEN**.



## GOOD WINTER READING



**LIFE IN THE COLD.** An Introduction to Winter Ecology, by Peter J. Marchand. Illustrated by Libby Walker. University Press of New England, Hanover, NH 03755. 1987. 176 pp. \$9.95 paper; \$18.00 cloth.

Written in scientifically accurate but relatively non-technical prose, this book brings together in one slim volume the latest explanations and theories on how living things cope with cold climates. Having taught a variety of field biology courses in upstate New York for many years, I found that the information in Marchand's book not only interprets what's happening "out there" during two-thirds of the academic year, but "puts life" into what may easily be perceived as an almost lifeless landscape.

Marchand begins with a summary of the latest research on how snow and its derivatives behave, with descriptions of snow metamorphosis and the effect such changes have on its insulating qualities. He then gives a good deal of attention to the way plants adapt to winter conditions, which, it turns out, is quite complex and remarkable, with many unanswered questions. For me this is the most valuable part of the book. Animal behavior in winter has been well documented and lends itself to field observation—birds flock southward or to our feeders, mammals leave "sign" in tracks and scats, fish can be caught through the ice. Plants, on the other hand, do not have the option of migration, so must resort either to dormancy/hibernation or to development of resistance. Woody plants, subject as they are to all the rigors winter can muster, resist the fatal effects of freezing with adaptations at the cellular level which are only recently coming to light.

Marchand ends with a brief essay on humans in cold places, which demonstrates how adaptive our species can be when necessity and low-technology combine. I've found that helping students understand the basics of how to dress and behave on winter field trips, put to the test for three or four hours, is both a learning experience and a help in appreciating the conditions to which living things must somehow adapt.

Teachers and naturalists will find **LIFE IN THE COLD** a valuable resource in their work; college-level students can use it to supplement texts in ecology or field biology. Although the half-tone photographs are of marginal quality, the graphs and sketches are always clear. A thoroughly useful and delightful book!

J. A. Gustafson □

**THE BIRD FEEDER BOOK: AN EASY GUIDE TO ATTRACTING, IDENTIFYING, AND UNDERSTANDING YOUR FEEDER BIRDS** by Donald and Lillian Stokes. Little, Brown, and Company, Boston, 1987. 90 pages. \$8.95 paperback.

In the time it takes you to drink your morning coffee, you can become a minor authority on your favorite winter bird. Thanks to an appealing format and lively style, the Stokes have produced a book that will inspire all birdlovers to have another look.

By following suggestions in the **BIRDFEEDER BOOK** on the type of seed birds *really* eat, and which style feeders to choose, you can save the price of the book in one season. Directions are also given for attracting birds with water and landscape plantings. Hummingbird lures are given special attention, with a caution that using honey could be harmful to these winged jewels. The eternal problem of squirrely raiders is turned into a lesson in practical ecology. In addition to baffling squirrels, the authors coax them away from costly sunflower seed by providing them with their own area of inexpensive cracked corn. Those who have ever maligned these resourceful mammals will be challenged by the section on squirrel watching.

For Don and Lillian Stokes, main-



taining birdfeeders sets the stage for participating in one of their favorite sports—behavior watching. They offer some stimulating starting points for observing the life of a bird. Does it feed in flocks or alone? Does it take one seed at a time, or feed another bird? Why is the bird behaving this way? We are cautioned to avoid the "little feathered people" assumption in trying to answer the latter question. A point well taken is the possibility that confining a rich source of food in the small space of a feeder could stimulate aggressive behavior in the birds we see.

The heart of **BIRDFEEDER BOOK** consists of coffee length (2-3 page) chapters brimming with fascinating information on twenty-three species commonly attracted to birdfeeders. Each chapter is beautifully illustrated by large, clear photographs of both the male and the female bird. This is a boon to those of us who juggle three different field guides, wishing that at least one of the drawings would match the bird at our window.

Introductory discussions on bird identification and behavior watching in general will be mostly helpful to novices, but in the chapters on individual species, even the expert birder will find some nuggets to add to his or her bag of tricks. Do you know how a cowbird got its name? Why does a grackle look at the sky? Why do goldfinches stay at your feeder longer than chickadees? What does it mean when a nuthatch says, "Ank, ank"? In a pleasing mix of personal observation (such as a delightful description of cedar waxwings catching snowflakes) and data from scientific research, the social structure, maintenance activities, language, and special adaptations of each species is described. Be-



havior at the birdfeeder is related to the natural history of the bird. Evening grosbeaks, for example, mysteriously appear at feeders some years and not others. By exploring the social structure and feeding habits of these birds, a plausible explanation is offered. The only suggestion that I would make is that a key for the range maps shown for each bird may be needed by a beginning birder. As the authors feed their backyard birds year round, information on courtship and nesting is included. The Stokes propose that watching even the ubiquitous house sparrow provides an exciting chance to discover how a bird makes its living. Tomorrow I will look to see whether the male house sparrow (which is not really a sparrow) has his winter yellow beak or his spring black one.

Experienced teachers that they are, the Stokes anticipate that the reader will have the same fun that they obviously do in behavior watching and want to record their observations. Space is provided for the reader to begin a birdeeder journal. We are reminded that there are many questions about bird behavior for which we have no answers. Simply by taking the time to record observations and ask questions, you could make a scientific discovery. Examples from the authors' own journal are frequently spiced with "I wonder...?" and "Could it be that...?" Hmmm...exactly when does the male house sparrow's beak change color? Do all male house sparrows change at once?

For the Stokes, the reward of watching the behavior of birds at their feeder is "a deeper sense of connection to nature, a constant reminder that there is more to life than human concerns alone." By taking a few minutes to watch and wonder about birds with your mind wide open you can add a certain balance and sense of perspective to your life. I have already given this attractive book as a gift to a house bound grandma, an elementary school teacher, and to myself. I know we will each see something new each winter day with the guidance of the *BIRDFEDER BOOK*. □

**A GUIDE TO ANIMAL TRACKING AND BEHAVIOR** by Donald and Lillian Stokes. Little, Brown, and Company, Boston, 1986. 418 pages. \$18.95 hardbound, also available in paperback.

Another exciting winter activity is animal tracking. Using the same personal approach that makes the *BIRDFEDER BOOK* so appealing, Don and Lillian Stokes have written *A GUIDE TO ANIMAL TRACKING AND BEHAVIOR*. This book expands greatly on the tracking chapter in Don's earlier volume, *A GUIDE TO NATURE IN WINTER* (which also includes information on winter weeds, insects, trees, mushrooms and snow crystals). The more detailed guide to animal tracking is designed to help the reader to understand and enjoy animal behavior throughout the year. However, as most tracking will be done in snow, the key that quickly divides tracks according to size and number of toes will be a welcome aid to the frosty track buff. Tracks are drawn life size. When individual tracks are not clear, and also to get a better idea of what the animal is doing, track patterns are interpreted in a section appropriately titled "Track Learning". Patterns of footprints are divided into groups with tips for distinguishing similar sequences (fox from housecat for example).

Tracking means more than footprints, however. The Stokes' book has one of the most complete sections that I have seen on animal signs. Holes in the ground and scrapings made by animals are keyed by size. Soon after reading this book, I took a group of third graders out with a ruler and the tracking guide in hand. They were delighted to find dog-like tracks leading to a tunnel with a diameter of ten inches dug through the snow. The youngsters concluded from the key that they shared the woods with a fox. Food remains, disturbed vegetation, scat, and constructed nests, homes and dams are also interpreted in great detail. Excellent illustrations by Gordon Morrison add to the depth of this book as a one of a kind resource for anyone interested in the art of tracking.

Typical of the Stokes' nature guides, the reader is encouraged toward an intimate first hand knowledge of the animal (or plant). By using techniques devised by the authors as they have taught themselves to be skillful at reading mammal clues, the reader can discover the presence and lifestyle of mammals through some rewarding detective work. The lives of only 1% of the four thousand mammal

species have been thoroughly studied. This leaves room for the amateur to add to the body of data on such common mammals as shrews and moles, about which little is known of their social structure. Part two of the tracking guide is devoted to the natural history and behavior of twenty-eight common mammals. Each animal is introduced by the authors' beautifully reported personal observations. A breathless encounter with a dancing fox is one of my favorites. The most recent science research has been included in the sections on Getting Around, Food and Feeding Habits, and Family Life for each animal. A Quick Reference summary at the end of a chapter aids comparisons. A wonderful description of the behavior of the domestic dog (courtesy in part to the Stokes' golden retriever Ego) helps to illuminate the behavior of other mammals. *A GUIDE TO ANIMAL TRACKING AND BEHAVIOR* is the most complete and up to date as well as the most inspiring of the tracking books in my collection.

Fran Ludwig  
Mother of young children,  
naturalist, and teacher. □



**MY FIRST INSECTS, SPIDERS, AND CRAWLERS POP-UP FIELD GUIDE** and **MY FIRST FISHES AND OTHER WATERLIFE POP-UP FIELD GUIDE**  
by Cecilia Fitzsimons, Harper and Row Junior Books, New York, 1987. \$8.95 each.

The mechanism of pop-up books is always intriguing. The color and movement in this book is delightful and will capture the interest of children. The text, on the other hand, is

advanced and will require adult reading and interpretation. Most adults will discover new information as they share the books with children.

The animals are not drawn to scale and can be confusing: a crayfish as large as a rainbow trout, a grasshopper as long as a tarantula. This could easily



be improved by a line showing size beside each insect.

Each set of pages portrays a different ecosystem and provides opportunity for adults and children to explore specific ecological niches together.

Robert S. Russell  
Professor of Art

□

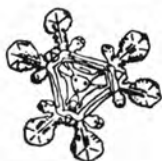
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*A Walk in the Snow*, Phyllis Busch.  
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*Get the Facts Sheets*: Twigs, Winter Tracks, Conifer Key, Animals in Winter. Massachusetts Audubon.  
*Mousekin's Woodland Sleepers*, Edna Miller.  
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*Has Winter Come?*, Wendy Watson.  
*Winter Tree Finder*, May Watts. 1970.  
*The Secret Language of Snow*, Terry Williams. 1984.

#### MUSIC TO WATCH IT SNOW BY

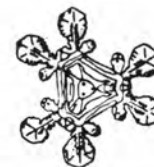
- "Snowflakes are Dancing," Claude Debussy. From the Children's Corner Suite.  
"Journey Through the Snow," and "Waltz of the Snowflake," Tchaikovsky. From the Nutcracker Suite.  
"Opus 8 no. 4 in F minor, Winter," Antonio Vivaldi. From the Four Seasons.

—Fran Ludwig



## DISCOVERING CONDITIONS FOR LIFE IN THE ARCTIC

Louise Carroll



On an island whose shoreline has been slowly emerging from the arctic seas, University of Washington scientists are making fundamental discoveries about the birth and development of ecosystems.

The ice sheet covering parts of Devon Island in the Canadian Arctic is gradually melting. As it does, the land, relieved of the enormous weight, rebounds, literally rising from the sea. Over the past ten thousand years, says Lawrence Bliss of the UW Botany Department, coastal areas of the 21,300-square-mile island have risen by about a yard per century—a rapid rate in geologic terms. Land that has been underwater for millennia is exposed. It's an incomparable opportunity, says Bliss, to study how soil builds up and plant life becomes estab-

lished on new land, and what conditions are required for it to happen.

So far, the researchers have determined that topography is critical; plant life develops in lowland areas with poor drainage. And marine algae that wash up on the shore and die provide the foothold, the beginning of "soil" for the plants and animals that come later. The soil development seems to play a greater role in the survival of plant life than the scientists had expected.

During the brief arctic summer, Bliss, Caroline Bledsoe of the College of Forest Resources, her husband, Lewis Bledsoe of the Center for Quantitative Science, and Leal Dickson of the Botany Department journey to a Devon Island research station nearly 2,000 miles north of Minnesota. The

station, run by the University of Calgary's Arctic Institute of North America, is on a portion of tundra known as Truelove Lowland. There's not a tree—or even a bush—in sight, but it's an area lush by arctic standards, an important habitat for musk ox and water fowl. Even in summer, the climate is rigorous, with daytime temperatures reaching only 35 to 45 degrees Fahrenheit. A real "scorcher" is 55. "You take winter clothes to spend a summer up there," says Bliss.

The process by which plant life becomes established on barren rock and develops into a stable community takes centuries—"we don't really know how long," says Bliss. A team of scientists can hardly keep tabs on a patch of ground that long. But Bliss and his colleagues have done the next best

thing. They are using radiocarbon dating on four basins that represent a sequence of ages from 500 to 3,000 years. ("Age" is defined as the length of time an area has been out of the sea.) These basins, actually saucerlike depressions in the landscape, range in size from half the area of a tennis court to 2½ acres. Each basin is a sort of time capsule, revealing a stage in the development of soil and the succession of plants.

Last summer, and again this summer, the UW scientists and their students thoroughly scrutinized each basin and collected plant and soil samples to be returned to Seattle for analysis.

For fertile soils and plants to develop in the High Arctic, says Bliss, "you need a low wetland area with poor drainage that catches and holds moisture from melting ice and snow. It's essential that it stays wet throughout most of the summer. If you have coarse gravel on a slope it doesn't stay wet. The result is minimal development of soil and plant cover."

The first form of life to take hold, the researchers found, is algae. That much they had suspected. But there were some surprises. "We'd thought that bluegreen algae (a primitive, one-celled plant) were the first forms of plant life to become established. But one thing we found just this summer is that there's a stage before that: marine algae that wash up on the shore. These decompose and are then invaded by the bluegreen algae."

The bluegreen algae perform two critical services. Living, they "fix" nitrogen, drawing this essential nutrient

from the atmosphere and adding it to the soil. "All natural soils are deficient in nitrogen, especially in the Arctic," Bliss says. In temperate zones, the nitrogen is "fixed" by bacteria in association with roots of flowering plants, from electrical storms, and, lately, from rainout of pollutants. "In the Arctic," says Bliss, "there are no legumes, no electrical storms. The very mechanisms for producing nitrogen in most of the rest of the world are absent."

The dead bluegreen algae decompose to form carbon-rich peaty soil. "If you take a core of the soil from one of the younger basins, you find it's almost completely composed of algae," says Bliss.

Over thousands of years, as the soil layer deepens, one species of plant succeeds another as the dominant form. In the youngest basin, algae and lichens dominate. Then grasses and mosses move in. The top of the sequence, the final state, is sedges and mosses. Elsewhere on Truelove Lowland, farther inland from the study area, are broad meadows of sedge-moss. "It looks," says Bliss, "like a lawn that hasn't been cut for a week or so. We think the sedge lowlands developed the way we're seeing it in the basins." Low gravelly ridges cutting across the tundra, he explains, block the flow of water, keeping the land wet. These meadows are the habitat for much of the arctic wildlife.

"The importance of this soil system itself," says forestry scientist Caroline Bledsoe, "is turning out to be greater than we anticipated. One idea we're working on is that the soil is like a

bank into which it's relatively easy to make deposits, but hard to make withdrawals. That's because of the permafrost. The soil freezes solid in winter, then thaws in summer, but only down to four-to-ten inches. Then it gets colder, and the thawed soil refreezes. The ice line is like an elevator that goes up and down. Plants like algae are putting things—nutrients like nitrogen—into the soil, but then can't get them out again." Bledsoe is studying the possibility that the mycorrhiza of fungi may assist the flowering plants in making their nutrient withdrawals.

"We also expected to find only half a dozen species of algae," Bliss continues. "Instead we found at least 40 species, and there may be more. We had no idea of the diversity and complexity of these organisms in these developing ecosystems."

What is emerging from this emerging island, then, is a new picture of soil formation. "The agricultural soils in the temperate zone—the 'breadbaskets' like the Great Plains of North America—develop from grasses," says Bliss. The textbook notion is that the roots of flowering plants decompose and enrich the soils they produce with carbon and nitrogen.

In the Arctic, there's an entirely different process at work, one in which algae play a much greater initial role. Bliss, who has also been studying the revegetation of land blasted by St. Helens, had hoped that the Arctic research might provide some helpful insights that could be applied there or in reclamation of land abused by human activities like mining. "It turns out that the implications for reclamation are limited. Most places where you have mine spoils, for example, are hot and dry. Algae need a moist soil surface. But it would work on wet sites."

Instead, the team is making discoveries that, for scientists, are equally exciting, and some of that excitement comes through as Bliss describes the work. Every scientist hopes to make fundamental discoveries, to uncover something really new about how the universe operates. In a series of soggy basins far above the Arctic Circle, the UW researchers are doing just that. □

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**LOUISE CARROLL**, a former science writer for the University of Washington, now resides in Colorado.

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Polar bear. *Polar Regions*



## THE WINTER CITY

Jeanne Howard



For most of the world's history, and for most people, "winter cities" have not provided the primary examples of what urban life was supposed to be. Cities began in climates which were tropical, not chilly, and so many of our most basic assumptions about urban life and urban services—houses, transport systems, parks and recreation, the arts, education, energy provision—are based on the assumptions of year-round warm weather. Even though in the past five hundred years or more, major world cities have arisen and prospered in colder climates (such cities as London, Stockholm, Moscow, and Amsterdam were becoming centers of world economic life well before the European colonization of America), most patterns of urban living continued to reflect tropical origins and assumptions. It was over a long period of time that European cities began to develop a special set of responses to winter.

During the 19th century, Americans living in colder climates began to develop cities which, like their European counterparts, acknowledged the impact of the changing seasons. Entertainment went indoors—the theater, concert, and opera seasons were developed for winter. Shopping, too, went indoors—the outdoor bazaar became the department store. Both urban and rural families acknowledged seasonal changes by preparing carefully for winter—canning and storing food, sewing and knitting winter clothing, preparing sleds. But as the 20th century introduced such innovations as efficient central heating, mechanized transportation, the telephone and television set, it became possible to minimize or even to deny almost entirely the impact of winter. Communications technologies even made it possible to conduct business from home, via computer, avoiding a wintry journey to work. It is only recently that a specialist in winter cities could regretfully say in his book *The Future of Winter Cities* "We've let the conveniences of a technological society deny us a season of the year."

Admittedly, many (if not most) people feel that the loss of winter is



Photo by Helen Ross Russell

no great loss, especially for those who live in cities. "Winter in the city" usually conjures images of slush, greyness, depression, traffic tie-ups, darkness, and general messiness. Yet, there are other possible images of the winter city; images which have been made real in many cities. In Europe and in many American cities, winter signals the beginning of the cultural season: theater, opera, concerts. It also brings with it the festivity of the holidays: lighted windows in the department stores; streetcorner Santas, music, and magic. A fresh snowfall acts to transform even the dreariest city, and virtually everyone feels a sense of festivity on the first snowy day. Many people report that they feel more hardy, alert and vigorous in colder weather. We also become aware of a different natural world than the one we see in summer. Suddenly we see the evergreens, which may have been only a backdrop for the summer flowers, and we are more aware of the birds and the other species with whom we share the season.

Which of these sets of images becomes the dominant one is a matter of great concern to those who lead and who live in the cities of the Frostbelt. In recent decades it has appeared that much of the U.S. had had

enough of urban winter: the "Sunbelt Shift" has been one of the most important phenomena of recent American history. By 1980, many Frostbelt cities were proclaimed dead or dying, as industries and people departed. The South, aided by the newly-widespread availability of air-conditioning and by the collapse of institutionalized racism captured the economy to such an extent that the 1982 best-seller *Megatrends* declared that "the shift from North to south is irreversible in our lifetimes." This belief became so generally accepted that it was a great surprise when the same author declared, four years later in his book, *The Year Ahead, 1986* that the Frostbelt was resuscitating and that "The (Great) Lakes will Rise Again!" The availability of water, in fact, was seen as a key to the revival of northern cities, but the leaders of these cities pointed out that they had other vital resources as well: excellent educational systems, a progressive tradition in local government, skilled and experienced work forces, and high-quality urban infrastructure, including housing, public transit, the arts, and theater. If a return to the Frostbelt, which seems to be in the beginning phases, continues, northern cities will want to emphasize these advantages. They will also want to seek

ways in which to emphasize the positive aspects of the season itself, while acting to minimize the undeniable difficulties of living in a winter climate. They will be seeking the technological, architectural, and social innovations which will help their cities offer year-round livability, and will also be attempting to enlist the support of citizen groups (especially educational ones) in stressing the attractions of the winter city.



Many of these have been chronicled in a charming book, *The Winter City Book: A Survival Guide for the Frostbelt*, a pioneering work co-authored by William C. Rogers of the University of Minnesota. To Rogers (who has become the U.S.'s best-known advocate of winter cities), "Step One is to realize that you are not in Miami." Winter cities require a different architecture, different building materials, and different colors (wood and brick, reds and yellows, rather than steel and glass, blues and whites). It is extraordinary how few architects, and how few civic design-review boards, ever ask the question "How will this look in winter?" when a project is proposed. Winter cities also require different plantings (Roger favors evergreens, which, despite a reputation as difficult and expensive plants, offer varieties which can grow steadily and successfully in city air). The key is to realize that what works in the tropics cannot always be expected to work in the north. Rogers is convinced that we need a whole new architecture and a whole new vocabulary of winter.

It is certainly realistic to admit that people will want shelter from the ice

and wind of the city streets, and the most successful winter cities have offered well-planned enclosed spaces. The skyway systems, as in Minneapolis, are systems which connect the second storeys of the downtown buildings, providing a continuous and connected downtown. Other welcome forms of pedestrian shelter include fully-enclosed bus shelters, tunnels and underpasses, and galleries. Still, it is best to acknowledge that the weather cannot be tamed or ruled out entirely. Many northern cities have met their greatest successes in the attempts they have made to celebrate the positive aspects of winter. Winter carnivals, for example, have been wonderful attractions for residents and for visitors. Québec's Carnaval de Québec, at the end of February, is the major outdoor celebration of the year. Ottawa offers Winterlude; Chicago, Boston, and other U.S. cities have winter festivals. Akron, Ohio, offers the "Chili Open" in February, an event in which a golf tournament played on the ice is followed by rounds of hot chili and beer. In this connection, the popularity of cross-country skiing and of ice-skating gives northern cities an incentive to maintain open space and water, which can be enjoyed year-round. The arts and theater seasons are at their height in winter—and the posters, banners, and other bright displays advertising these programs can add welcome color to the city streets. The economic possibilities of winter, if one requires them, are considerable. In February 1988 the city of Edmonton will host a Winter Cities Showcase, subtitled "The Business of Winter", focusing on finding solutions to cold-climate challenges and to capitalizing on cold-climate advantages.

There is a great deal that educators can do, both in their roles as professionals and as citizens, to push for greater winter livability in the places where we are. These activities can range from those which are involved with the natural environment: bird-feeding, snow sculpture, planting evergreen, etc., to those involved with assuring that the city administration provides necessary services and amenities: efficient and fair snow-removal policies, local bus and van services, low-cost winter recreational and sports programs, and (possibly) a

winter carnival. Urban winters can be miserable; they can also provide great opportunities for enjoyment and for developing the closeness of the community. Developing a positive image of the city in winter is up to us.

#### GOOD SUPPLEMENTAL READING

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**JEANNE HOWARD** is Associate Professor in charge of urban affairs and planning at Virginia Polytechnic Institute and State University. □

## Snowy Owl

Thomas L. Carrolan

*She insists on eye contact:  
glaring  
wild yellow eyes  
searching.*

*He is reminded of a time:  
long  
snowy moist nights  
coming.*

*Three prayers:  
Delicate talon death  
snow bunting.*

*Swept up from below  
kestrel.*

*Extinguished with a awe-full  
blow brant.*

*He makes these first offerings  
to Her.*

1987



# SCIENTIFIC NAMES . . . WHY?

Dr. Richard Baldauf

The scientific name of a species is almost always in the Latin or Greek form, and it appears in that form in any language. Such consistency does not occur with common names like the American Toad, Bluegill Sunfish, or Black Snake. Such names would appear in the language of the publication. To complicate the matter, common names vary from place to place and with different groups of people. A good example of this inconsistency is found in the name of the gamefish called Largemouth Black Bass. The scientific name for this species is *Micropterus salmoides*. A survey shows over 50 different common names used in referring to this species, the common names having their origins in different parts of the United States.

A scientific name makes it possible for anyone to know the species in question. And the name for a species is a two-word name. The scientific name of the bluegill sunfish is *Lepomis macrochirus*. Humans belong to the species *Homo sapiens*.

The first word of the two-word name is the name of the genus to which the animal belongs. Thus, the generic name of one kind of snake is *Boa*. It is the name of the genus. The first letter of a generic name is always capitalized when the word appears in text form. The second name of the two-word name is the specific epithet. In the case of the same snake the specific epithet is *constrictor*. The scientific epithet is always written in lower case letters when the word appears in text form. However, to write *constrictor* by itself has no meaning to the scientist. The specific epithet must always be accompanied by the generic name, thus *Boa constrictor*.

Scientific names appear to be difficult, but you would probably be surprised to learn how many generic names you already know — like *Gorilla*, *Alligator*, *Nautilus*, *Lynx*, and *Magnolia*, and we all know the species name of one snake, *Boa constrictor*.

Scientific names usually refer to some special feature of the organism, although some of these references are somewhat fictitious. The word "alligator" is derived from the Spanish *el lagarto*, which came from the Latin *lacerta* meaning lizard. The name *Alligator mississippiensis* rings a familiar tone, perhaps because the specific epithet refers to the fact that the first specimen ever seen of this species by a scientist was observed along the Mississippi River.

The opossum's scientific name is *Didelphis marsupialis*. The generic name is derived from the Greek words for "two + womb," referring to the two distinct uteri in this animal. The specific epithet *marsupialis* is derived from the Latin word for "pouch," the structure in which new-born opossums are given protection and nourishment.

Scientific names may be based on personal and geographic names. Thus, *Alligator mississippiensis* is based partially on a place-name and *Scaphiopus holbrooki* is named to honor John Edward Holbrook, an early American herpetologist. All words used in scientific names of animals and groups of animals must have an ending that conforms with Greek or Latin declensions.

Animals and plants receive scientific names by experts. It is often necessary to document and retrieve information on the scientific name of an organism. For this, it is necessary to know who first named it. You will see scientific names followed by the name of a person + date. This reference is permanent. With proper reference material, it is possible to trace how a particular species got named, who named it, and when it occurred.

Taxonomy is the science of arranging organisms in logical and natural groups according to strict International Rules of Zoological Nomenclature. These Rules are approved by the International Commission of Zoological Nomenclature and are reviewed and modified as necessary at meetings of the International Zoological Congress.

As you can imagine, anyone might invent a common name, but only a scientist can propose a scientific name according to special rules.

The Rules recommend that the scientific name of a species, or any part of that name (i.e., genus, specific epithet), should be printed in a type-face different from that used in the text. The use of italics usually satisfies this recommendation. Because of typewriter limitation and for ease in writing and typing, the generic name and the specific epithet are often underlined. Underlining is a printer's instruction to set the word in italics.

The Rules do not require italicized generic names and specific epithets in headlines and similar printing formats. The rule for italics pertain to body copy, or when manuscript instructions from a publisher indicate otherwise.

The scientific names of other taxonomic categories (such as families, orders, phyla) are usually never set in italics, except when this is necessary to conform to a publisher's style.

A good rule, then, is: generic names and specific epithets always in italics; all other group-names non-italicized.

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# Naturalist's Notebook

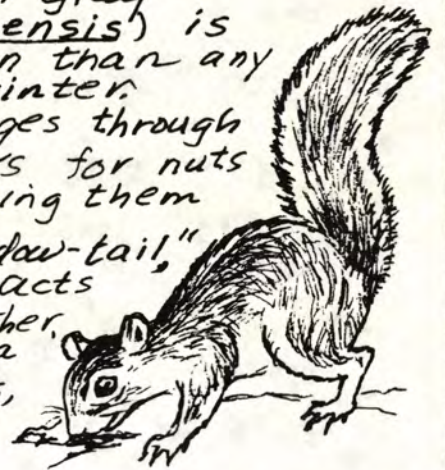
## Gray Squirrels in Winter



Wherever it lives, the eastern gray squirrel (*Sciurus carolinensis*) is probably seen more often than any other wild mammal in winter.

Active and bold, it forages through back yards and city parks for nuts it buried last fall, locating them by smell.

*Sciurus* means "shadow-tail," and the fluffy banner acts as a blanket in cold weather, an umbrella in the rain, a balancer in the treetops, a parachute when leaping, and a rudder in the water.



The winter home may be in a hollow tree, or a bulky leaf nest high in a tree. Given the chance, it will move into your attic if it finds a loose shingle or a tiny hole that it can enlarge for an entrance. (I know!)



The winter coat is grayer and thicker than the summer coat, and sports white woolly patches behind the ears.

The alarm call is a loud, staccato Kut - Kut - Kut!



Courtship chases and mating occur in December and January. The first of two yearly litters arrives in late March or April, after 40 days gestation.

Noted acrobats and tightrope walkers, gray squirrels are hard to foil at bird feeders.

Baffles sometimes help. Good luck!



RM

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