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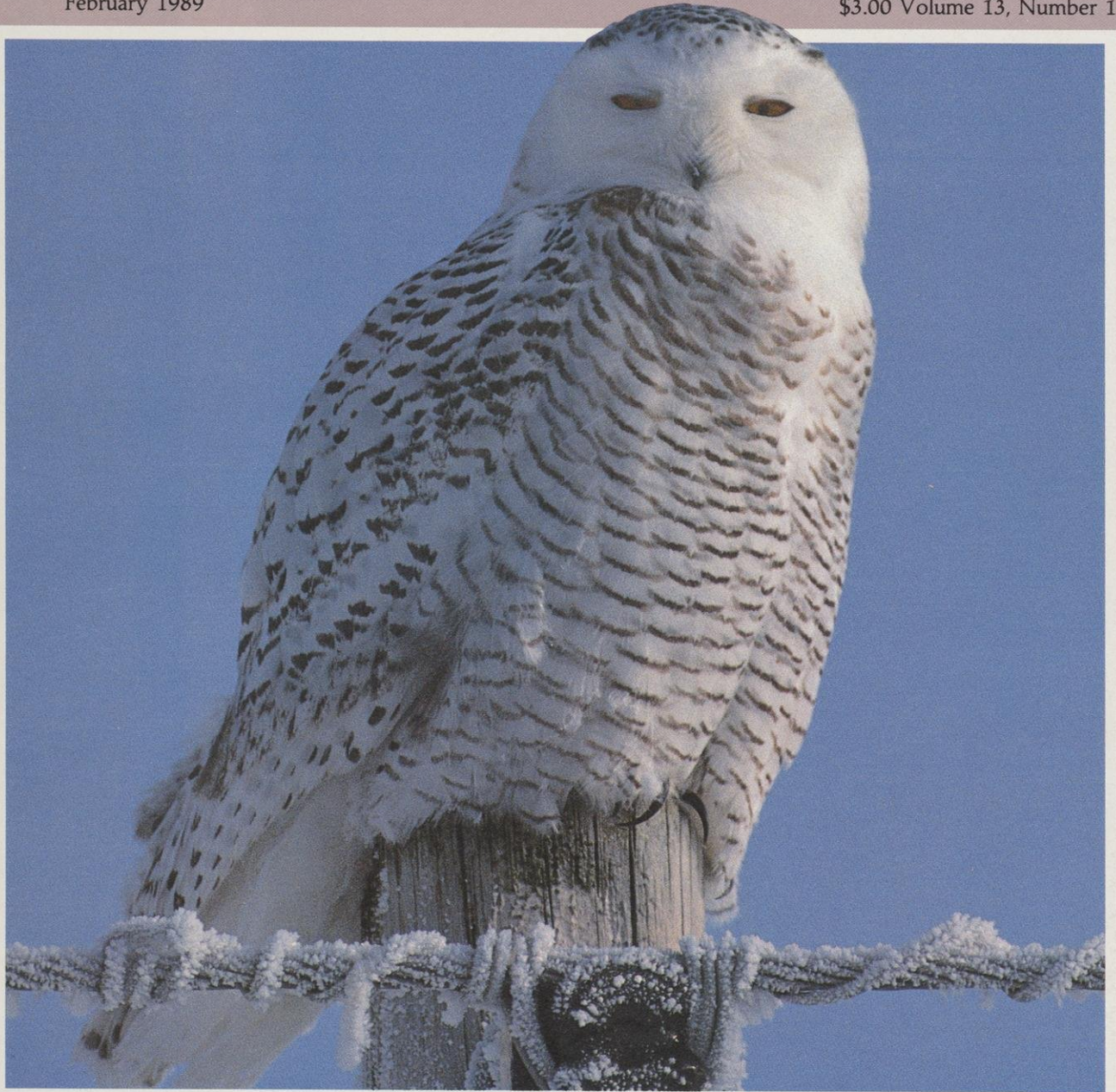
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SPECIAL SECTION: The cleanup game

WISCONSIN NATURAL RESOURCES

February 1989

\$3.00 Volume 13, Number 1



Turned to perfection
Cold-weather musquash
Keep your eye on the ice



Under the white blanket

Anita Carpenter

The accumulation of several snowfalls blankets Wisconsin's wet meadows with an insulating cover of white. All is quiet, but not still. Although I cannot see them, I know that within this white blanket a maze of tunnels bustles with the activities of *Microtus pennsylvanicus* — the meadow vole or meadow mouse.

In summer, this chunky, five-inch brown rodent with beady eyes, small ears and a blunt face maintains inch-wide runways under dead vegetation. By parting, pushing aside and trampling dead blades of grass, the vole forms an elaborate network radiating from the entrances of underground burrows; the crisscrossing runways provide pathways to food, escape routes from predators and avenues to other voles.

When the winter snows arrive, meadow vole activity does not diminish. Seeds, fruits and grasses still need to be found and predators must be avoided. Now the busy mammals tunnel through the protective cover of deepen-

ing snow on their daily rounds.

Although meadow voles are one of the most numerous mammals in Wisconsin, they are seldom seen. However, they do leave characteristic signs on the landscape. Summer clues of active voles include grass-covered runways or neat little piles of grass clippings. On the snowscape, the secretive voles leave quarter-sized holes, often without tiny footprints around the openings that are more typical of the white-footed mouse. There are other clues of unseen dramas under the white blanket. The imprint of a predator's wings in fresh snow shows where, perhaps, a red-tailed hawk zeroed in on a not-so-fortunate vole.

In a few weeks when the snow begins to melt, the roofs of the snow tunnels will collapse and the network will melt into view. Return to the meadow and follow the exposed trails. You may find a nest or a pile of droppings at a crossroad, a small cache of seeds, or even an elusive vole. For now, as you enjoy the refreshing outdoors of a crisp winter day on foot, skis, or snowshoes, remember that just inches below the snowy surface, a meadow vole may be silently crouched waiting for you to pass overhead. ■

Anita Carpenter shares nature observations from Oshkosh. She is a pharmacist, trained biologist and a nature columnist for two northeastern Wisconsin newsletters.

Illustrations by Jim McEvoy

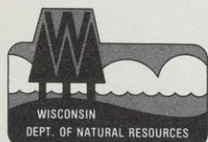


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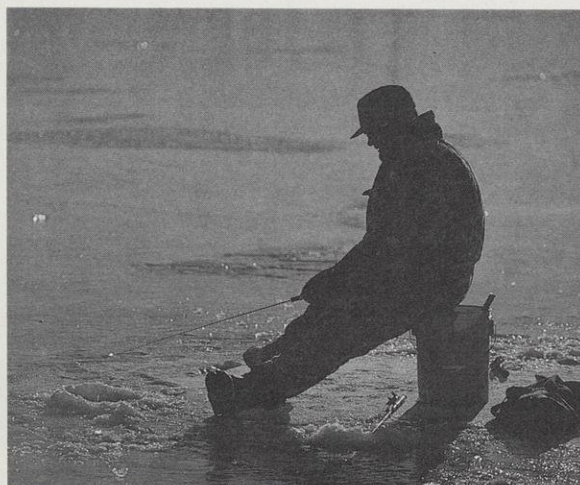
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Robert Queen

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Deann L.
De La Ronde



Deann L. De La Ronde

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KEEP YOUR EYE —ON THE— ICE

It only takes a few precautions to enjoy early-
and late-season ice recreation.

*William H. Blust and
Terry L. Margenau*

Finally . . . after what seemed like an eternity, ice formed on some area lakes. For Jake, ice meant ice fishing: jigging, tip-ups, and fish — lots of them. Jake especially liked fishing when ice first formed; fishing always seemed to be good then. Besides, it had been nearly nine months since he last set foot on a frozen lake. He checked his rigs, honed his auger blades razor-sharp, and picked up a couple dozen minnows. This time of the year, Jake checked the local pond daily to see if the ice would support

William H. Blust is a fisheries technician with DNR's Western Lake Superior Fish Management group. Terry L. Margenau is a DNR warmwater fisheries researcher stationed in Spooner.

him. The first day that it did, he quietly departed immediately after work to one of his secret walleye spots in the southern part of the county.

The lake Jake hoped to fish did not have as much ice as the small pond near town that he had checked that morning. He hesitated for a moment, then decided to give the ice a chance. Jake stayed near the shoreline until he approached the area he wanted to fish; if he encountered trouble he would be in shallow water close to shore.

Jake reached his fishing spot without difficulty and set up his lines. At dusk, the walleyes began to hit. By 6:00 p.m. Jake had a limit and was ready to head for home. His family would be pleasantly surprised when he returned with fresh walleye. (Normally this was the night he played racquetball at the health center.)

Eager to get home with his catch, Jake decided to save some time by

heading straight across the lake toward his car rather than following the shoreline again. He picked a landmark near his car and walked toward a large pine tree that stood out against the darkening sky. Suddenly, with no warning, the ice gave way and Jake plunged into the icy water. At that moment, his enjoyable outing became a dangerous, life-threatening situation.

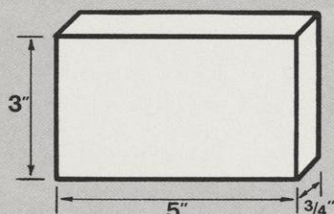
Jake's experience is all too common among ice anglers who are careless when venturing upon frozen water. Ice angling and other winter activities can provide months of enjoyable recreation if participants remember that winter water activities are supported by a variable layer of ice covering a lake or river. Everyone taking to water should take safety precautions, particularly when cold temperatures and wind can become "the big chill" if you fall into the water unexpectedly.

◀ Beautiful lake ice can disguise its danger. Never forget that ice is a frosty, flexible film over frigid waters.

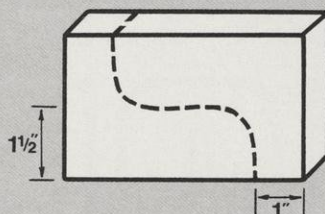
Barbara Mulvaney

Ice Grabbers

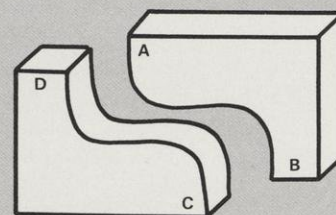
Step by step instructions for
a handy safety aid.



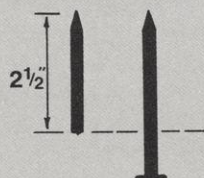
Cut a piece of clear hardwood, like white oak, 3" x 5" x $\frac{3}{4}$ ".



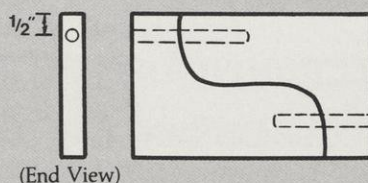
Draw a curved line with the indicated dimensions and cut with a jig saw or coping saw.



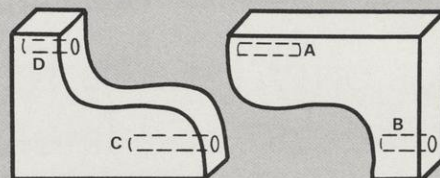
Sand the cut edge and mark the pieces.



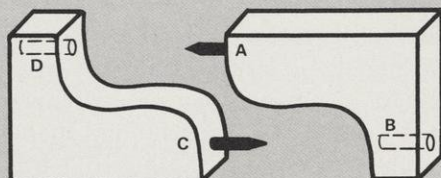
Cut two 16-penny masonry nails $2\frac{1}{2}$ " long. File sharp burs from the cut end.



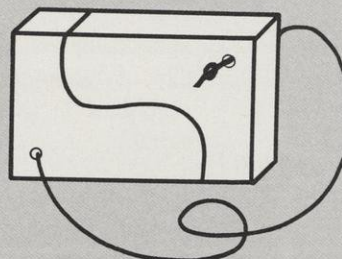
Tape the two pieces together temporarily. Drill holes $2\frac{1}{2}$ " deep about a half-inch down from the top of the grabbers. Hole diameter should be slightly smaller than the nail diameter to ensure a tight fit.



Remove the tape and check that the drilled holes line up.



Secure the nails, cut side up in a vise. Insert the nails into holes A and C. Gently tap the end of the block of wood until the nail is completely seated. If you've bored holes too large, glue in the nails with an epoxy glue. Enlarge holes B and D to the diameter of the nails.



Slide the pieces together. Drill $\frac{1}{4}$ " holes as shown. Thread 1 - $1\frac{1}{2}$ yards of nylon rope through the holes so the completed grabbers will hang comfortably around your neck. Knot cut ends of the rope and sand sharp edges from the wood block until rounded. Consider coating the finished wood with weather-resistant stain or polyurethane.

Ice safety tips

Jake could have prevented this accident by following a few simple rules, carrying some basic equipment and using common sense.

Our advice is framed for ice anglers, but skiers, skaters, snowmobilers and ice boaters should follow the same steps.

Plan to fish, then fish your plan. Before departing for a fishing trip, tell someone the details of your outing. These should include where you intend to fish (the lake name and county) and approximately when you plan to be home. If you decide to stop somewhere after your fishing trip, a simple phone call home is greatly appreciated and notifies people that you are off the ice safely.

Bring along a friend to add to your fishing experience and provide extra help in the event of trouble.

When fishing on early- or late-season ice, always bring an ice bar (ice spud), compass, ice grabbers, and a

length of rope at least 20 feet long.

The ice bar is critical because it acts as your "eyes" on the ice as you feel your way on uncertain terrain. Never assume that ice is uniformly thick over an entire lake. By probing your way with an ice bar you can effectively check ice thickness with each step. One good poke with your ice bar will commonly break through to water if the ice is less than three inches thick.

A compass can save you if an unexpected snowstorm or fog causes a whiteout. Take a reading from shore to your fishing spot and write down the back azimuth as well so you can find your way back to shore and avoid unsafe ice.

Ice grabbers (see insert) are another essential piece of equipment for ice anglers. Sling them around your neck outside your outermost garment so they are readily available.

Ice anglers concerned about safety on suspicious ice should wear flotation devices: A life jacket worn under

Guidelines for ice travel

Thickness	
less than 3"	Unsafe
3"	Travel by foot (anglers should spread out)
4"	Travel by foot, group fishing
5-6"	Snowmobiles
12"	Cars and light trucks

Note: These are only guidelines. All ice conditions should be approached with caution and common sense. River ice is weaker than lake ice.

the normal outdoor gear will keep you warm and may keep you alive in an ice emergency. Flotation coats serve the same purpose by keeping your head above water and aiding your escape.

Life jackets and float coats will help you in an ice emergency. Keep your cool, yell for help and slowly pull yourself out of the water using ice grabbers. A spread-eagle position evenly distributes your weight over the ice. Once freed, seek shelter and warmth quickly to avoid hypothermia.



Terry L. Margenau

Judging the ice

Small ponds and protected lakes generally provide the safest conditions during the early ice fishing season because they freeze more quickly than larger bodies of water. Similarly, bays and shallow portions of larger lakes protected from winds freeze first and can provide fishing opportunities before the remainder of the lake is frozen.

It takes steady, cold temperatures to form safe ice. Once the lake is frozen to a minimum thickness of three to four inches, it should be safe for travel by foot. When walking on three-inch ice, your fishing partners should spread out. New ice is fairly tough and elastic. Even if it cracks in all directions, it can support an average-sized person.

Take precautions even when you think the ice is thick enough to support you. Many factors above and below the ice can affect its strength and thickness. Avoid river bends and underwater stream currents that flow in and out of lakes, thinning the ice.



William H. Blust

Great Lakes ice anglers rig boats with runners so the crafts can be pulled over the ice or will float on water if an ice floe breaks up.

Points, channels, underwater humps, and any narrow constriction within the lake can cause underwater currents that decrease ice thickness and strength. Ice forms later and in a thinner layer over springs bubbling into shallow water; such springs are extremely dangerous because they are not easily noticed. Docks, piers, and patches of emergent vegetation, like

bulrushes and cattails, can also lessen ice thickness and strength. These dark surfaces absorb heat and transmit it into the ice. This is a more common problem during the spring when the sun is higher and days are longer.

Snow cover acts as an insulator and slows down ice formation. Be cautious when ice is covered with snow early in the season and be suspi-

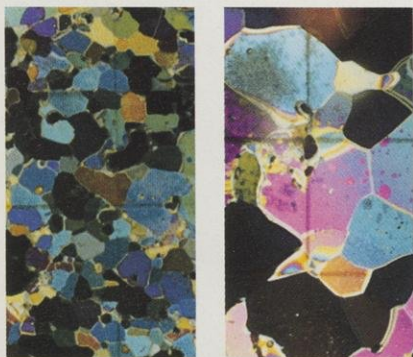
This protected, shallow bay had solid ice at least two weeks before the bigger lake froze over. Anxious anglers should test the ice to avoid "testing the waters."



Robert Queen

cious of scattered snow patches on presumably safe ice.

This is precisely what caused Jake's mishap. He made several mistakes, including not backtracking his original route. He ventured onto a deeper part of the lake which had scattered snow patches; the ice underneath was extremely thin. Jake was lucky: He escaped the frigid water with the help of ice grabbers his wife bought him last Christmas, but he still got the scare of his life.



Courtesy of The Lamp, Exxon Corporation

Stronger ice, composed of finer, small crystals (left) is easy to see in these polarized photos of ice crystals.

Larger lakes tend to freeze in a progressive manner from the edges towards the center. When venturing out on the larger bodies of water, watch for small ridges that may indicate new ice formation. Ice between the shore to the ridge may be safe, but from the ridge to the center the ice may have just formed the night before, and therefore, be unsafe. Always stand nearer to shore and check the ice on the other side of a ridge with your ice bar before continuing towards the center. Later in the season, ice adjoining the shore may become unsafe first because land warms it and waves constantly break and reform lakeshore ice.

River ice conditions are often dangerous. Moving water makes ice thickness extremely variable and can scour good ice into open water overnight. Moving water under the ice can quickly claim victims as the strong currents hinder one's ability to get back onto the ice. Stick with traditional ice fishing spots that people have fished for years. These areas have a history of forming good ice. If



William H. Blust

(above) Notice how melting ice first weakened around this shallow point.

(below) Driving cars and trucks on ice is always a gamble. Exercise caution and judgment. Variable thickness, harmonic vibrations from driving and thawing temperatures can make even a foot of ice unsafe for automobiles.



Dennis Pratt



William H. Blust

Thin ice melts early where currents speed up the water flow under bridges and near constrictions.

you want to be adventurous, don't do it alone.

Large bodies of water, such as Lake Superior, pose problems usually not encountered on inland lakes. Offshore winds are a real danger to big-lake ice anglers. If the ice is not locked in by an island or point, winds have been known to create an ice floe and leave unaware fishers stranded. Because this situation is somewhat common on Lake Superior, experienced anglers pull or push boats set on runners out with them to insure a safe trip. Experienced ice anglers off the Apostle Islands area of Lake Superior use air boats. Due to the lake's large fetch, lake winds can cause ice heaving that looks similar to pressure ridges on large inland lakes. These areas can be crossed, but search carefully with your ice bar to find a suitable safe spot. Remember that ridges are weak spots, and a strong offshore wind could cause the ice to separate at this point.

Pack ice is frequently encountered on the Great Lakes. It forms when large floating masses of ice cakes blow into a bay or shoreline and freeze together. Pack ice is not as strong as a solid sheet and should be approached with caution. Remember: On big waters, watch the winds and bring a boat.

As spring approaches, the warm sun, winds, and above-freezing temperatures can create problems for late-season fishers. Areas that took the longest to freeze during first ice are the first to reopen in the spring. Avoid areas with underwater currents and springs. Also, remember that dark surfaces like piers, docks, bridges and emerging vegetation absorb heat and can cause dangerous late-season ice conditions.

Once the ice starts to thaw, it deteriorates to a stage known as "honeycomb ice." The ice turns black, loses its elasticity and is hazardous regardless of thickness. It should be ap-

proached with caution — better yet, avoided.

To prevent a chilly dunking — or worse — know and watch for signs of variable ice thickness on lakes of various sizes and depths. In general, smaller waters freeze first; colder ice is harder ice; new ice is better than old ice; and piers, humps, currents, rocks, snow and emerging plants thin the ice. When venturing out on ice, especially during early and late winter, take precautions. Ask bait shops and friends where the ice is safest. Know the waters you fish. Tell someone your fishing plans. Always test the ice first. Carry or wear safety equipment, such as an ice bar, ice grabbers, and a float coat. When fishing on large bodies of water, special equipment is necessary to ensure your safety. And finally . . . choose your fishing times and places carefully. Fresh fish aren't worth a person's life.



The moviemakers

Film a captive golden eagle attacking prey?
Well, it sounded easy!



DNR photo

DNR photographers/filmmakers Dean Tvedt and Staber Reese in the early 1970s.

Frances Hamerstrom

I have read of conference telephone calls and I can visualize one. I picture three or more beardless but otherwise important-looking gentlemen sitting by polished, almost empty desks discussing such things as mergers, mortgages, and moratoriums. When I heard our ring on the party line I pushed aside some hip boots left over from the hunting season, moved a basket of apples to reach the telephone on our kitchen wall, and found myself in a confer-

ence call with Dean Tvedt and Staber Reese. One of them asked, "You have a bird?"

There were two pet horned owls on the porch, many pigeons and starlings in the barn, and Joey, a convalescent horned owl, flying free. Looking through the kitchen window I could watch Nancy playing with the tail of the last calf I had cut up for her. I simplified my answer, "Yes, an eagle."

"We would like to make a film. What can she take?"

I admitted most of her quarry had been bagged hares, released for her to get the hang of hunting, but said fox would be a suitable quarry.

"Fox! You think she'd take a fox?"

The conference call lost its fearsome formality. I rested my foot on the edge of the apple basket and suspect the gentlemen in Madison leaned forward a little in their chairs.

"I think she will. You bring the fox. It might take weeks to get a slip at a fox in the wild, with cameras in position and good light."

"And you'll have her ready? We'll set a date."

"Yes, I'll have her ready."

I was not sure how Nancy would react to a fox, especially since I had deterred her from trying for dogs by jerking her jesses each time she looked too interested; but I was sure I'd have her ready.

I planned her feeding schedule with care: full gorge that day; thereafter, till the moviemakers came, two-thirds gorge each day (the equivalent of a good meal but not a Christmas dinner); exercise every day; and then the day before Movie Day, no dinner.

It seemed so easy to say I'd have her ready. Her muscles were firm and strong. She was bouncing, in yarak [topnotch flying condition], and lovely to behold. She always did her best with good appetite on an empty stomach.



Movie Day — everything was in readiness, but anticipation got me up early. The stars were shining, auguring well for a clear day, with a light breeze from the west. I poked the fire, added a couple of chunks of seasoned oak, started the coffee, and looked out of the window. Something was very wrong. The morning half-light was deceiving, but it was plain that Nancy was not on her perch. She was on the ground, and large, dark feathers lay strewn on the snow nearby.

Still barefoot, I ran out to her, snatching up a glove on my way. Joey, the owl, had been careless once too often. Nancy had caught him from her perch and with both feet on his breast, was taking her pleasure on



DNR photo

No vantage point was too obscure or tricky to get good footage.

him. She had finished eating his neck and part of his head and was breaking into the tender, dark breast meat. I made in quickly, seeing to it that she did not swallow another morsel, but I knew that the edge was off her appetite. Nancy was not ready in the way I meant to have her ready, but she was rather sharpset just the same.

There is an especial aura to movie people. They dress with elegance, tell lively stores, and they appear to have all the time in the world for seemingly idle chatter until the right moment approaches and the light is good. It is then that one realizes that the chatter was not wholly idle. They have been sizing up the circumstances and watching the clock, watching the sun, and just like a flock of birds that wheels simultaneously in flight without a detectable signal, the movie

people decide the time has come to take pictures.

Six people were in on this, and it is unlikely that any of us will ever forget what some might deem a fiasco and what others might consider an opportunity to study reactions of released foxes and, for that matter, of people.

Staber set down his coffee cup and said, "Let's go." I took Nancy from her perch and put her in my car. The other vehicles, painstakingly laden with expensive equipment and a fox in a box, followed.

The caravan set out for one of the great open fields of the Buena Vista Marsh. I had already flown Nancy there a few days before at bagged quarry to instill in her the notion that good things emerge mysteriously from this particular meadow. Bob



Davis set the box with the fox where Nancy had made her last kill. The plan was for me to cast Nancy off and when she reached sufficient altitude and got into good position, I'd give the signal for the fox to be released. It was breathtaking. Nancy, cast off into the wind, circled, and quickly gaining pitch, came into perfect position. Three cameramen, two from car tops, crouched over their cameras, and exultantly I gave the signal. Davis opened the release door. Nothing happened. No fox appeared.

Nancy made her second swing over the countryside, and at my repeated and rather frenzied signals, Davis started kicking the box. Again no fox.

By now, Nancy was flying great circles in the wind and then took a perch a half mile away. I ran toward the box shouting, cursing, and imploring, "Get that fox out of there.



DNR photo

Reese often used this blind for field shoots.

Get it out." Davis picked up the heavy box and shook it till the fox fell out. It trotted to the south end of the long snowbank near us and seated itself comfortably, facing the cars and people.

Perhaps it cannot be said that eagles amble on the wing, but after due consideration, Nancy came slowly back and perched on the north end of the selfsame snowbank, waiting to see what I wanted her to do next. It seemed that things had come to a



standstill. But eventually the fox took the initiative by wandering over in an offhand manner to sniff Nancy. Nancy watched it come, at first with curiosity. When it got uncomfortably close and was almost upon her, she panicked and opened up her six-and-a-half foot wingspread to take off.

It is unlikely that the fox had ever before seen a stately and almost inanimate object open up like an umbrella. It ran as only foxes can.

Thus it was that the fox, not I, gave the signal for action. Nancy had a perfectly clear notion of what she was supposed to do: if something was running away and I too was running and shouting encouragement, she was supposed to catch it and bind to it, and I would reward her suitably.

The story almost ended in that way, but after a short and spirited chase the fox took refuge among the people.

We had picked a bare snowfield. To be sure there was a small abandoned shed near the road, but the fox sensibly selected the nearest refuge — a conglomeration of men, cameras, and tripods. There it appeared quite at home and behaved rather like a dog whose owner did not happen to be nearby.

Repeatedly we tried to get the fox out of the crowd. (I know there were only six of us, but with a fox taking refuge among us, we were a crowd.) Occasionally we succeeded in evicting the fox or moved away from it. Several times the fox left this hostile group of shouting people, and Nancy



took wing and stooped, only to be frustrated by losing the fox among us again.

There were periods of relative calm. Good moviemen are practical; if they can't get what they are after, they tend to return with what I believe they call "footage." At one point in the proceedings the fox sat down on an untrampled patch of snow. "Hold it," called a photographer. We were glad to hold it; we were winded. Even Nancy was panting, and only the fox showed no sign of exertion. He sat as though taking



pleasure in the afternoon sunlight. Tripods and cameras took position and the soft whirr of incipient footage could be heard if one turned his head enough to cut out the snarl of the west wind.

A cameraman called, "Get it to move." We had nothing to throw at it — one cannot make snowballs of deep powdery snow. I ran to my car and handed Rodd Friday an almost empty bottle of instant coffee. What a charming scene: fox in sunlight, sitting at rest; coffee bottle flying past his nose missing it by inches; fox get-

ting up slowly and going over to sniff the bottle. It is sad to realize that editorial scissors probably cut this footage.

At any rate the coffee bottle precipitated the next scene.

The fox was moving again and outside the crowd. With one intent we all took off in full pursuit, so the fox took to the second best cover in the vicinity, namely the abandoned shed by the road. Davis by now had come to the conclusion that this was not a wild fox but somebody's pet. He wanted it, and with presence of mind, he grabbed a big net out of his car.

It was at this moment that Frederick drove up to see the great fox hunt. Having seen Nancy make some magnificent flights, he undoubtedly scanned the sky as he approached the appointed place and let his eyes rove over the marsh hoping to spot my eagle stooping at a running fox. Instead he was astonished to see a fox shoot around the corner of the shed. It was followed a moment later not by a golden eagle but by a man in hot pursuit. A man with a net who lunged and barely missed the fox, who fell headlong in the snow, gathered himself up and took up the chase again. Round and round the shed they went, and each time the man took a swipe with the net, he missed and fell, and the fox waited at a discreet distance. At length man and fox paused with the shed between them.

Not only in the Keystone Cops is an idea born. Moving slowly and clutching his net carefully, the man started around the shed in the opposite direction. It's impossible to tiptoe



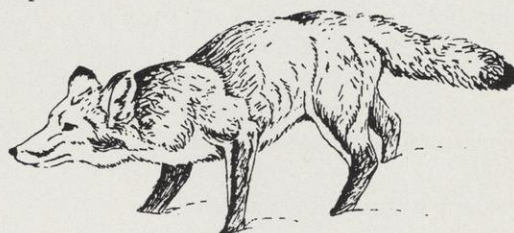
in the snow, but he moved carefully, stealthily, ever so slowly. The fox, too, moved slowly — also in the opposite direction. Picking his footing carefully, the man moved a little faster. So did the fox. He increased his speed. So did the fox. He ran. So did the fox. Again the spectators were treated to the sight of man pursuing fox around shed — this time counterclockwise.

Nancy sat majestically on a snow-bank watching. From time to time some of us helped with the chase, while all the movie cameras stood unmanned, failing to record this episode.

Frederick had the bad grace to stand by his car laughing. But I had learned something about hunting. ■

*For many years, Frances and Frederick Hamerstrom researched prairie chickens and birds of prey for the Wisconsin Conservation Department. Her popular book, *An Eagle to the Sky*, © 1970 has recently been republished in paperback (\$10.95) by Nick Lyons Books, 31 W. 21 Street, New York, NY 10010. Permission for excerpt and illustrations granted by the publisher.*

Illustrations by Deann L. De La Ronde





DNR photo

Fran Hamerstrom and Nancy, 1965.



Reducing our exposure to hazardous wastes is serious business. This site was used as a playground. At Brown

Endangered Resources '88



by Paul Holtan

Saving more than the glamorous species

A group of canoeists paddling down a northern Wisconsin river spot an adult bald eagle taking off from a tall white pine tree. There, on a branch, they see a nest with a small greyish head poking up.

On the University of Wisconsin-Madison campus, a student walking to class looks up and sees a peregrine falcon land on top of a towering building.

From the most isolated spots in Wisconsin's Northwoods to the heart of its major metropolitan centers, you can see successful efforts to preserve, protect and restore the state's endangered resources.

In 1988, peregrines — missing from Wisconsin skies from 1964 until they were reintroduced in 1986 — flew over Milwaukee, Madison and along the Upper Mississippi River.

Populations of bald eagles have grown so plentiful that the Department of Natural Resources believes eagles may need less human protection — their status will change from "endangered" to "threatened" this year.

More than 200 endangered and threatened species live in Wisconsin. Yet, few people have heard of, much less know of efforts to protect, species that are out of the limelight like Higgins' eye mussel or Fassett's locoweed.

"Protecting endangered resources involves more than saving the glamorous species like eagles and falcons," says Signe Holtz, an administrative specialist with the DNR's Bureau of Endangered Resources (BER).

The Higgins' eye is a freshwater mussel considered endangered by both state and federal laws. In 1988, researchers surveyed state rivers and

discovered that the Higgins' eye's range extends into the lower Wisconsin River.

Fassett's locoweed is a legume native solely to Wisconsin. It is named after Norman C. Fassett, the

awareness of endangered resources. That has helped increase public funding to ensure lesser known species, like Higgins' eye mussels and Fassett's locoweed, will be carefully watched over by biologists, if not the public eye.



Fassett's locoweed

University of Wisconsin-Madison botanist who identified it as unique to the state. Last summer, botanists began studying one of the last sites where Fassett's locoweed seedlings still grow.

More visible programs like bald eagle and peregrine falcon recovery have generated greater public

Tallying records of rare species

Since 1985, BER has worked with The Nature Conservancy (TNC) on the Wisconsin Natural Heritage Inventory (NHI), a computer record of rare plant and animal species throughout the state. To date, 1,680 rare plants, animals and communities have been recorded. BER added over 1,300 entries in 1988, bringing the total inventory to more than 14,000 locations in Wisconsin. TNC is helping compile similar inventories in 48 states, allowing BER to track nationwide occurrences of the state's rare species.

The NHI provides important information for environmental review procedures to prevent the destruction of rare species and habitat. Over the

last year, NHI staff responded to an average of two requests a day from private individuals and other state and federal agencies that wanted information on rare resources.

These efforts identified endangered resources early in the planning stages of more than 200 projects. In one instance, a



telephone company changed the route of a buried cable to avoid disturbing several remnants of native prairie.

Updated list

BER researchers used the NHI in 1988 to evaluate 363 species that may need legal protection. As a result, BER recommended adding 26 species to the endangered list and 32 species to the threatened list. Three species which have become rarer should be better protected by changing their status from "threatened" to "endangered."

Most of the proposed additions are plant and invertebrate species — mussels, butterflies and insects. According to NHI Section Chief Bill Smith, the proposed revisions reflect

better field information on the species rather than sudden population declines.

Ecological scorecard

Using the NHI, the bureau again teamed up with TNC to establish a priority list for preserving areas that are home to endangered species and communities. The scorecard ranked 120 sites statewide that need protection. BER has already prepared proposals to protect 39 high-priority sites.

Protecting habitat

The State Natural Areas (SNA) program protects rare plant communities by dedicating or designating land as natural areas to

preserve the property from future development.

While both classifications help preserve habitat, Natural Areas Section Chief Paul Matthiae says dedication provides the strongest legal protection, similar to a conservation easement.

Under the Natural Areas Match Grant Program, the state will match dollar-for-dollar donations of money to the SNA program or match the equivalent value of donated land that qualifies for dedication as a natural area.

In 1988, BER designated 721 acres in the natural areas system, bring total land to 45,000 acres. Ten new areas were dedicated which released \$500,000 in match-grant funds.

Restoring species

Six peregrine falcons were successfully released from a hack site on top of Van Hise Hall on the UW-Madison campus in 1988. All six survived their first summer and migrated south.

A pair of peregrines made history at the First Wisconsin Bank building in Milwaukee by nesting at a former release site and producing two peregrine chicks. It was the first time one-year-old peregrines have been known to nest and produce young.

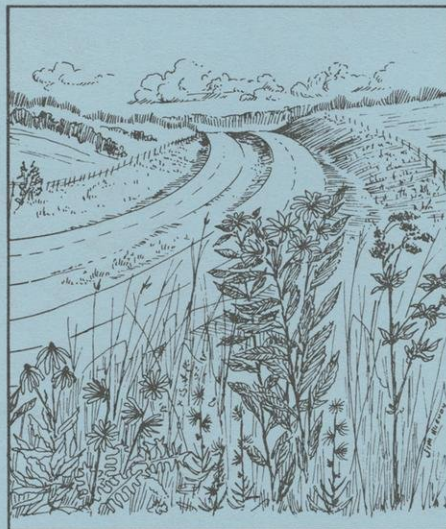
Peregrines also nested along the Mississippi River north of La Crosse, though the falcon chicks were lost to predation.

BER continued recovery work on trumpeter swans, increasing their numbers through purchase and donations to 44, 33 more than last year; continued radio tracking the estimated 25 timber wolves in six different packs within Wisconsin; and released 34 pine martens in the Chequamegon National Forest.

Sowing seeds

With support from The Natural Resources Foundation, BER and the state departments of Transportation and Health and Social Services started a Wisconsin Prairie Seed Farm program to grow native prairie plants at state prison farms.

The program aims to promote public awareness and appreciation



for native prairie plants while meeting a growing demand for prairie seed to plant along state highways and at restored prairies on state lands.

Many helping hands

BER trained skilled volunteers in 1988 to serve as stewards for State Natural Areas. Stewards conducted prescribed burns, constructed fences, built boardwalks and assumed other tasks to enhance and protect endangered resources.

Thousands of state residents took an active interest in endangered resources during 1988. Volunteers helped with species surveys, watched eagles, viewed peregrine falcons and visited trumpeter swans at the Milwaukee Zoo.

Most importantly, people contributed over \$533,000 in 1987 through the endangered resources checkoff so work to preserve the state's rare resources can continue. More than 230 sponsors contributed over \$24,000 to the Adopt an Eagle Nest program.

Much more to do

Thanks to the dedicated staff of the Bureau of Endangered Resources and other DNR bureau and district offices, support from university, federal and independent researchers and contributions from citizens, organizations and corporations, Wisconsin has made considerable progress in protecting its endangered resources.

The eagles and falcons flying overhead prove we can restore and preserve endangered species, including hundreds of other species that need protection. You can help with a donation to the Endangered Resources Fund through the state checkoff or to the Wisconsin Natural Areas Grant Program.

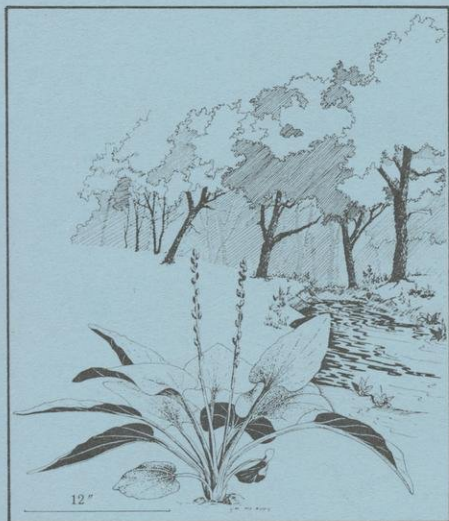
Your support will not only improve the chances of seeing eagles and falcons overhead, it will help ensure that Higgins' eye mussels will remain in state waters, Fassett's locoweed will grow on our sand beaches and many other rare species will continue to make Wisconsin a richly diverse place to live.



On the road to recovery

Plants

BER surveyed more than 20 sites in the central sands region where Fassett's locoweed was known to or likely to grow. Changing water levels and shifting sands reduced the endangered plant's population this year, but four sites were documented, including one with hundreds of seedlings where BER set up a permanent study plot.



heart-leaved plantain

In other areas, botanists found significant populations of several other endangered plants, including the heart-leaved plantain, New England violet and seaside crowfoot. BER also helped transplant the endangered forked aster from a proposed state highway right-of-way.

Amphibians and Reptiles

Of Wisconsin's 55 species of amphibians and reptiles, more than half are endangered, threatened or of special concern.

BER continues to cooperate with the Milwaukee Public Museum on the Wisconsin Herpetological Atlas, a computerized record of amphibian and reptile populations found in the state. This year's research verified the presence of the hognose snake in Wisconsin.

BER organized more than 100 volunteers to conduct an annual state frog and toad survey and helped fund UW research on the ornate box turtle, whose population continues to decline.

Mussels

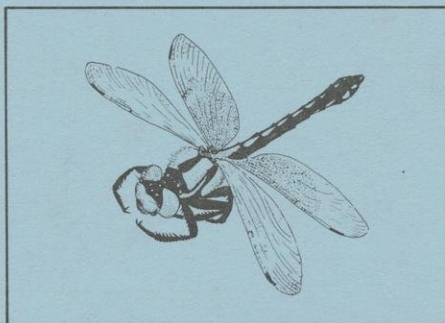
BER worked with the U.S. Fish and Wildlife Service and National Parks Service to survey the Mississippi, Wisconsin, St. Croix and Wolf rivers for freshwater mussels. Researchers discovered healthy populations of the Higgins' eye and three other rare mussels, but they also found populations of the endangered winged mapleleaf mussel had decreased. A Wisconsin site is one of two known populations of the winged mapleleaf in the world.

Of the 52 native species of freshwater mussels, nearly two-thirds are endangered, threatened or their population status is unknown. The BER has proposed adding 20 mussels to the state threatened and endangered species list.

"Mussels are excellent indicators of environmental quality," says BER Director Ron Nicotera. "Large scale decline in many of these species says a lot about what is happening to our natural heritage."

Insects

BER researchers found the rare Northern blue butterfly at two sites in 1988 and discovered endangered dragonflies in two areas — Howe's snaketail dragonfly and the extremely rare anomalous snaketail dragonfly.



Howe's snaketail dragonfly

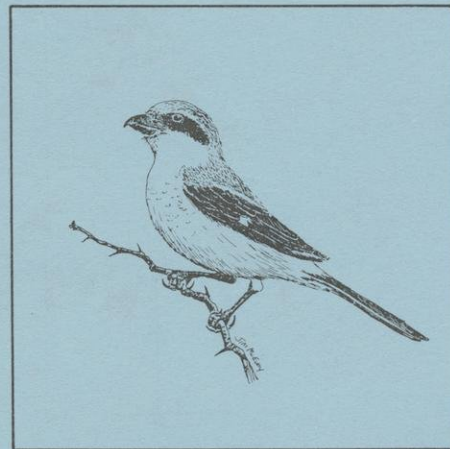
Birds

The threatened Cooper's hawk has continued to breed successfully and BER believes the hawk has reached optimal nesting density, no longer needing protection under endangered species laws.

In 1988, bald eagles occupied 325 territories throughout the state,

well on the way to the BER goal of 360 territories by the year 2000. Ospreys occupied 271 active territories producing 300 young. This successful nesting program is approaching the BER goal of 300 active territories by 1990.

BER believes both species are no longer endangered and is proposing to list them as threatened species, which need less stringent protection.



loggerhead shrike

A BER survey of endangered Forster's terns found 1,200 pairs nesting at 12 sites in 1988. If this population level is maintained, the species should reach the recovery goal of 800 pairs sustained over a 10-year period.

Another survey identified five sites where Kirtland's warblers spent the summer. It was the first survey in 10 years for this federally-endangered species.

The bureau prepared recovery plans for four other bird species in 1988: the common tern, loggerhead shrike, red-necked grebe and great egret. Populations of all these rare species have continued to decline in recent years.

Paul Holtan writes about endangered resources issues for DNR's Bureau of Information and Education.

*Illustrations by Jim McEvoy.
Map and layout by Bob Lehrman.*



Charting progress for endangered resources

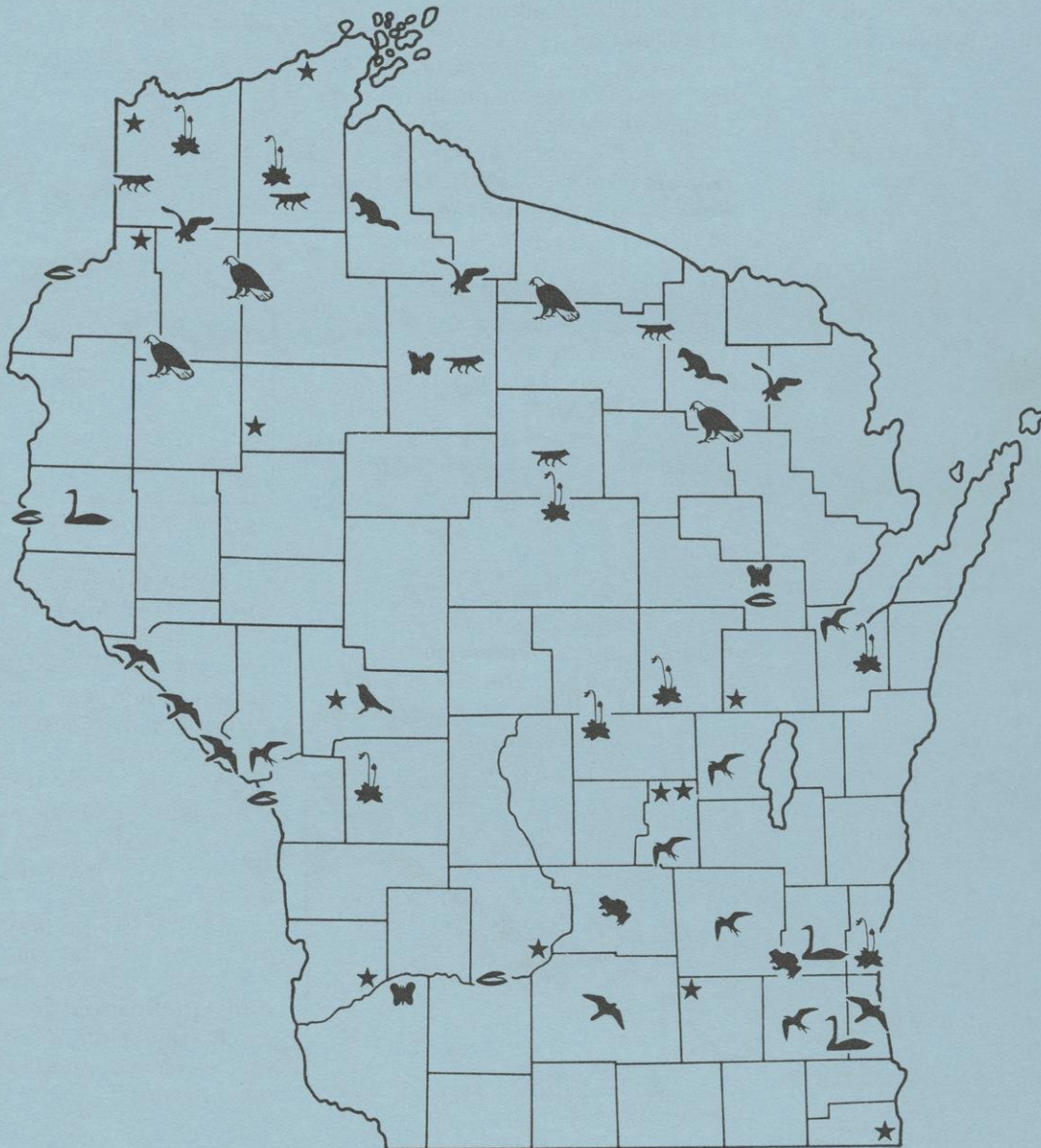
During the last year, the Bureau of Endangered Resources, DNR wildlife managers, fish managers, foresters and other cooperators took on many projects to protect and restore endangered resources across Wisconsin. This map highlights some of the year's most important projects, including new purchases and














improvements that enhanced the State Natural Areas system, but it's by no means a comprehensive listing. Map symbols show general locations where rare and endangered species were protected.

Your continued contributions to the Endangered Resources Fund,

either by mail or through convenient donations on the state income tax form, will help ensure this important work continues.

Contributions and inquiries should be forwarded to the Bureau of Endangered Resources, P.O. Box 7921, Madison, WI 53707.



- | | | |
|---|--|--|
|  eagle |  Kirtland's warbler |  plants |
|  osprey |  wolf |  amphibians/reptiles |
|  peregrine |  pine marten |  insects |
|  trumpeter swan |  mussels |  State Natural Area acquisition |
|  Forster's tern | | |

COLD-WEATHER MUSQUASH

A small, ice-covered world is the muskrat's
wetland wonderland.

Story by Robert Bluett



Photo by Tom Ulrich, West Glacier, Mont.



Mark Wallner



Mark Wallner

The most sought-after fur coats will not adorn fashionable dressers and bon vivants this winter. They will scurry along dark, icy marshlands and dive into inky waters on the backs of Wisconsin's most plentiful furbearer, the muskrat.

This 18- to 25-inch long aquatic rodent is the bread and butter for Wisconsin trappers and fur buyers, who sing the praises of the marsh hare or musk beaver: Muskrat pelts brought a cool \$2.9 million last year to winter trappers. Fur buyers still find eager markets in Europe, where muskrats were once marketed under the label "Hudson Bay Seal."

The muskrat's rich, brown fur consists of outer long guard hairs and a dense, soft furry underlayer which is waterproof and buoyant. The fur insulates the muskrats and the people who wear muskrat hats, gloves and coats. Guard hairs, which give the fur a lustrous sheen, grow thicker and longer on muskrats that endure our harsh winters than on muskrats raised in milder climates.

Hair plays an important role in muskrat locomotion. A muskrat's hind feet are partly webbed, but all four feet are fringed with short, stiff hairs to help them paddle through the water and stay warm on shore. The muskrat's tapered body and rudder-like tail make it an efficient swimmer.

The muskrat, derived from the Cree Indian word "musquash," was named for the two musk glands found on either side of its tail. During the breeding season, muskrats ooze a greasy substance from these glands,

Robert Bluett is a research associate at the Caesar Kleberg Wildlife Research Institute located on the Texas A&I University campus in Kingsville, Texas. His current projects include reestablishing brush habitat for ocelots, summarizing Texas bobcat harvests and testing the effectiveness of dog-proof raccoon trap sets. Bluett formerly worked with Wisconsin DNR's furbearer education program.

(left, top) Muskrats find food, shelter and protective water at the edge of wetlands. (left, bottom) Roots, leaves and stems of marshland plants are favorite foods.



DNR photo

A winter lodge on the left blends into the frozen wetland.

leaving a calling card as they travel. The musky-smelling grease is prized for use in perfumes and trapping lures.

Other animal adaptations particularly help in winter. Muskrats can close their lips behind their front teeth without opening their mouths — a real benefit when chewing on roots and basal stems under water. Like beavers and a few other aquatic mammals, muskrats can slow down their heart rate, store extra oxygen in their muscles and remain under water for up to 15 minutes. This provides ample time before ice forms to search for food and escape predators like mink, foxes, great horned owls or hawks.

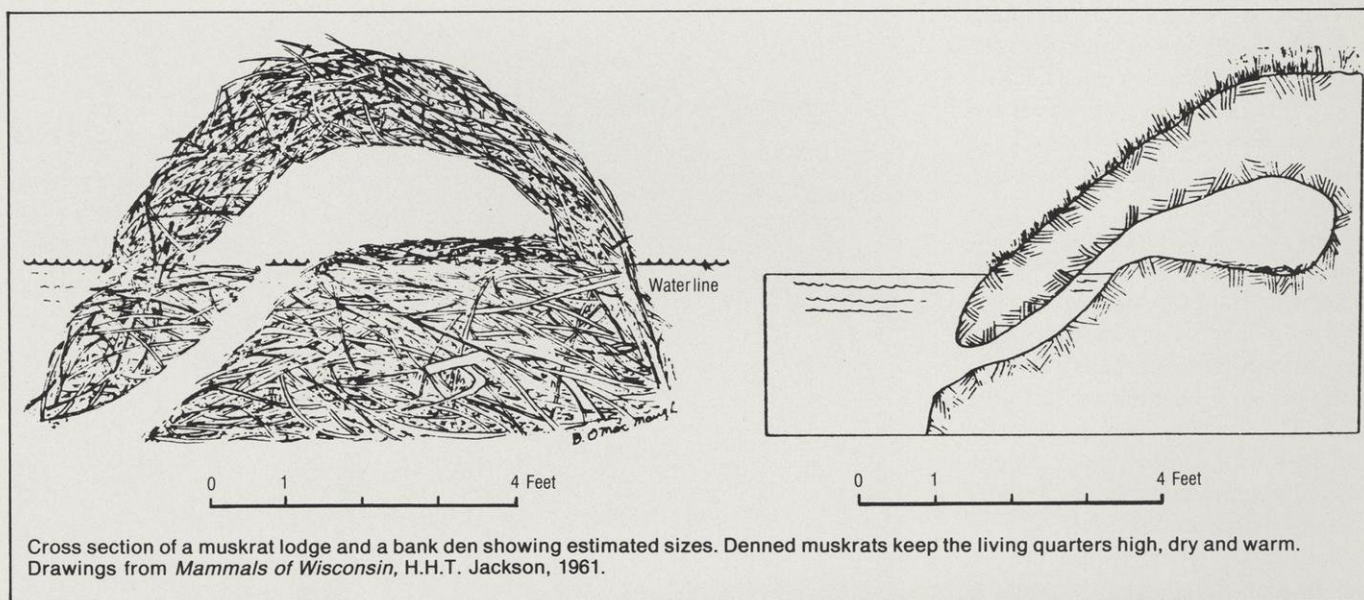
A muskrat in winter is an adapter and a survivor. During the thawed-out seasons, muskrats are primarily plant eaters preferring the roots, leaves and stems of wetland plants like cattails, bulrushes, arrowhead, sweet flag, pickerel weed and reeds. During winter when deep, bleak snows cover shoreline vegetation, muskrats stay close to their lodges, following a strict route from shelter to feeding and resting areas then back. Under the ice, plant roots, tubers and pondweeds are important

sources of sustenance. When other foods are less abundant, muskrats will eat clams, crayfish, frogs, rough fish, or carrion. Muskrats near farm fields are opportunists who will occasionally eat corn or other farm crops if more desirable foods are unavailable.

"Rats" thrive in almost all wetlands where water is shallow enough to grow lots of food plants, but deep enough to prevent complete freezing from the surface to the lakebed. In Wisconsin, most muskrats build lodges where the water is two to four feet deep. In rivers and streams, muskrats prefer the slow-flowing water of oxbows, backwaters and pools.

In waters where the shoreline slopes gently, muskrats build lodges each autumn, cutting emerging vegetation and loosely piling plants and mud near an anchoring base of logs, branches or cattail clumps. Small, single-chambered lodges may measure two to three feet high and about three feet across. Larger, multi-chambered lodges may reach four feet high and eight to ten feet in diameter.

The doormat to this waterfront home would be placed underwater: Muskrats burrow several entrances or "leads" up from the bottom of the



Courtesy of University of Wisconsin Press

lodge to an area above the water line near the center of the mound. Like a well-built home, a muskrat lodge has escape routes and a series of nest chambers, resting areas and tunnels. Compared to summer lodges, winter lodges have thicker walls and larger nest chambers. This keeps out the cold and provides more room. Several muskrats may occupy a single chamber; their combined body heat keeps the chamber much warmer than the outside air and keeps the underwater entrance ice-free.

Along many ponds, rivers and drainage ditches, where the shoreline is steep and aquatic vegetation is more scarce, muskrats excavate burrows into the banks with two or three entrances that lead into chambers. More than one golf course grounds keeper or property owner has been surprised in the spring when a muskrat burrow collapsed under the weight of thawing soil.

For reasons not well understood, muskrats rarely eat in their lodges, preferring to "dine out." Within a five- to 30-foot radius of the lodge, muskrats build a simpler, smaller dwelling called a feeding house. Feeding areas are close to ample food supplies and they provide winter cover. Before ice-up, muskrats continue to forage near shorelines and carry food back to feeding houses for protection.

Muskrats build a third, even sim-

pler, kind of structure called a "push-up." Shortly after the water freezes, muskrats will chew holes in ice cracks within swimming distance from the winter lodge. They wedge mud and plants into the smaller holes to keep them from freezing over. Later, the muskrats push these muddy mounds up from underneath to form resting places and feeding stations along their extended underwater foraging routes.

For the most part, muskrats are nocturnal and they're homebodies under the thick winter ice. Starting in late afternoon dusk, muskrats move from feeding areas and push-ups within 30 yards of the home lodge or burrow. Muskrats follow this routine year round except during the seasonal breakup of muskrat families during spring and fall or during natural muskrat catastrophes like flooding, snowmelt, drawdown or drought.

The number of muskrats inhabiting an area is determined by the quality of food and cover as well as the disposition of neighbors. In prime habitat, as many as 25 muskrats can live in an acre of marsh; in shallower marshes, 15 to 20 per acre; along rivers and creeks, 15 to 16 per mile is more typical. If muskrat populations become too large and overcrowd an area, the rats denude too much vegetation. This "eat-out" exposes hungry animals to three dangers. First, they

are weaker from lack of food. Second, they may have to take overland treks in search of food and shelter. Third, lack of cover in the marsh makes muskrats very vulnerable to predators like mink and hawks.

Aside from the elements and overpopulation pressures, muskrats must contend with people pressures. Muskrats are trapped during a variable season in five statewide zones which often last from mid-October through March. Thick, lustrous winter pelts, plentiful populations and high market prices have made muskrats a prime target for Wisconsinites who trap for sport and profit.

The trapping season is relatively long and there are no bag limits because muskrats are prolific breeders in the spring. In most years, as much as 75 to 80 percent of Wisconsin's muskrats could be trapped without significantly disrupting total sustained populations. In truth, muskrats are underharvested in many portions of the state.

Trapping is especially important in wetland areas intensively managed for waterfowl. Muskrat populations flourish on these marshes and pothole lakes, but must be controlled to prevent eat-outs that can destroy duck and goose habitat. By cropping populations, trappers lessen population pressures on overwintering muskrats, reduce the likelihood that crowded

muskrats will spread disease and reduce food competition among muskrats born each spring.

When trapping rights for Wisconsin's premier muskrat trapping area, the Horicon Marsh Wildlife Area, are auctioned each fall, trappers pack together almost as tightly as the rats themselves.

On an early October Saturday morning, DNR wildlife managers swing open the doors on a two-story shed, a pickup truck pulls in, wildlife managers lower the tailgate, jump up on the pickup bed, 100 to 200 trappers and their friends crowd in and the bidding begins. This year, most of the 17 state units sold for about \$25. A few went as high as \$400. In peak years, trapping rights on the state wildlife area sold for as high as \$6,000 and \$11,000 on the federal refuge. Auction proceeds are added to the State Conservation Fund.

The auction is a real gamble for



trappers who must inspect the property; judge the quality of food, water and cover on a particular parcel; estimate potential muskrat populations; guess what price fur buyers will offer for prime pelts; and pray for good trapping weather while forming their bids. The experienced, smart trapper who invests a lot of hard work and gets a little luck can turn a profit from this demanding sport.

The Department of Natural Resources, the Wisconsin Trappers Association and other volunteer instructors annually lead trapper education sessions to interest more people in this traditional sport. Students learn about animal habits, buying and setting equipment, cleaning, handling and selling furs. Potential trappers might also find good reading in the *Muskrat Trapper's Guide*, a new book by Mitchell S. Ricketts, published by Elk River Press of Independence, Kan.

To further entice young and old people to learn trapping skills, the Department of Natural Resources reserves trapping rights on two units at Horicon for youngsters and one unit for senior citizens free of charge. Also, each contract trapper can have an assistant and an additional young trapping student along on the cold winter treks in search of the elusive musquash. ■

In prime habitat, as many as 25 muskrats call an acre of marshland home.



DNR photo



Courtesy of Smithsonian Institute traveling exhibit

Turned to perfection

Rekindled interest in hand-turned bowls celebrates artistry, human spirit and the natural beauty of wood.

The joy of discovering something brand new arrived in our office in the same brown envelopes that normally carry press releases, potions and policies. Here, in a plain wrapper, was an invitation to a celebration of the subtle, delicate qualities of one of our most durable products — wood.

As part of a traveling exhibit last summer, The Leigh Yawkey Woodson Art Museum in Wausau shared the artistry of American craftsmen and women who form fine, turned-wood bowls.

Exhibit notes explained that wooden bowls and plates, commonplace housewares in Colonial America, were called turner's ware and the lathe workers who produced them were referred to as dish turners. They were respected craftsmen whose skills, like those of the barrel coopers, wheelwrights, spindle turn-

ers and blacksmiths, were largely lost as society mechanized and technology and industry changed our expectations and lifestyles. The woodturner's art was preserved in the late 19th century with resurging interest in quality, handcrafted goods, but relatively few practitioners had the patience, skill or endurance to hand operate lathes when ceramic, metal and glassware could be mass-produced inexpensively. Fine bowls and turned woodwork found a home in expensive art galleries or as architectural ornamentation in mansions and museums.

The combination of post-World War II factories looking for products to manufacture and increasing leisure time for the work force gave birth to the home workshop. Hobbyists built bird houses, patio furniture and rec rooms; art schools rekindled broader

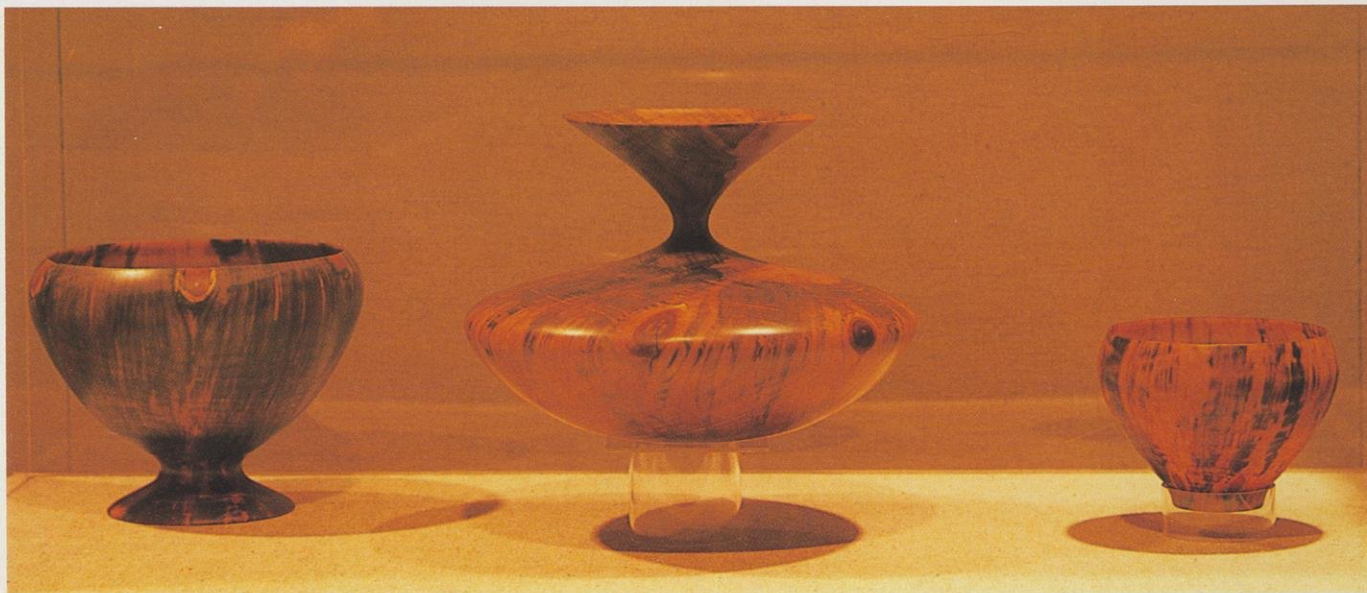
interest in ceramics, sculpture, metal jewelry, weaving and woodworking, including bowl turning.

The artisans' works displayed in this exhibit explore exciting qualities of wood — texture, grain, unusual patterns, natural flaws, natural colors and even spalted wood that is penetrated with blackening decay. The variety of woodturning techniques also stretches the imagination from delicate, hollow-turned vessels to rough-hewn, chunky, nearly immovable forms. Enjoy these works, visit museums and galleries to get a closer look at burgeoning arts, and seek out a growing number of Wisconsin artists who are crafting beauty from natural resources like wood. ■

Tapering Bowl, 1983 by Hap Sakwa of Baywood Park, Calif. Made of buckeye. ►



Jean B. Meyer



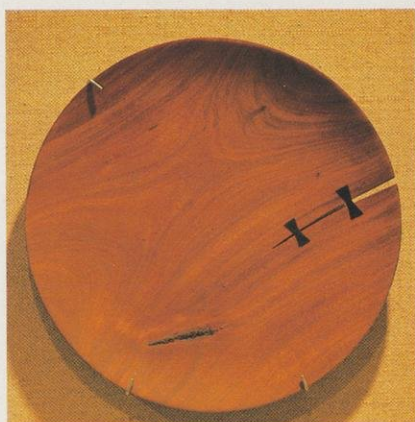
Jean B. Meyer

(above) Perfect Chalice, 1984; Trumpet-mouthed Bottle, 1983; Translucent Bowl, 1984 by Ronald E. Kent of Honolulu, Hawaii. All made of Norfolk Island pine.

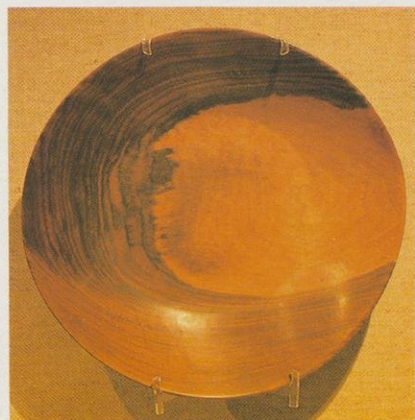
(right) Rus Hurt of Port Wing, Wis. demonstrates hollow vessel turning at the museum.

(below) Large Plate, 1982 by Todd Hoyer of Bisbee, Ariz. Made of acacia and ebony.

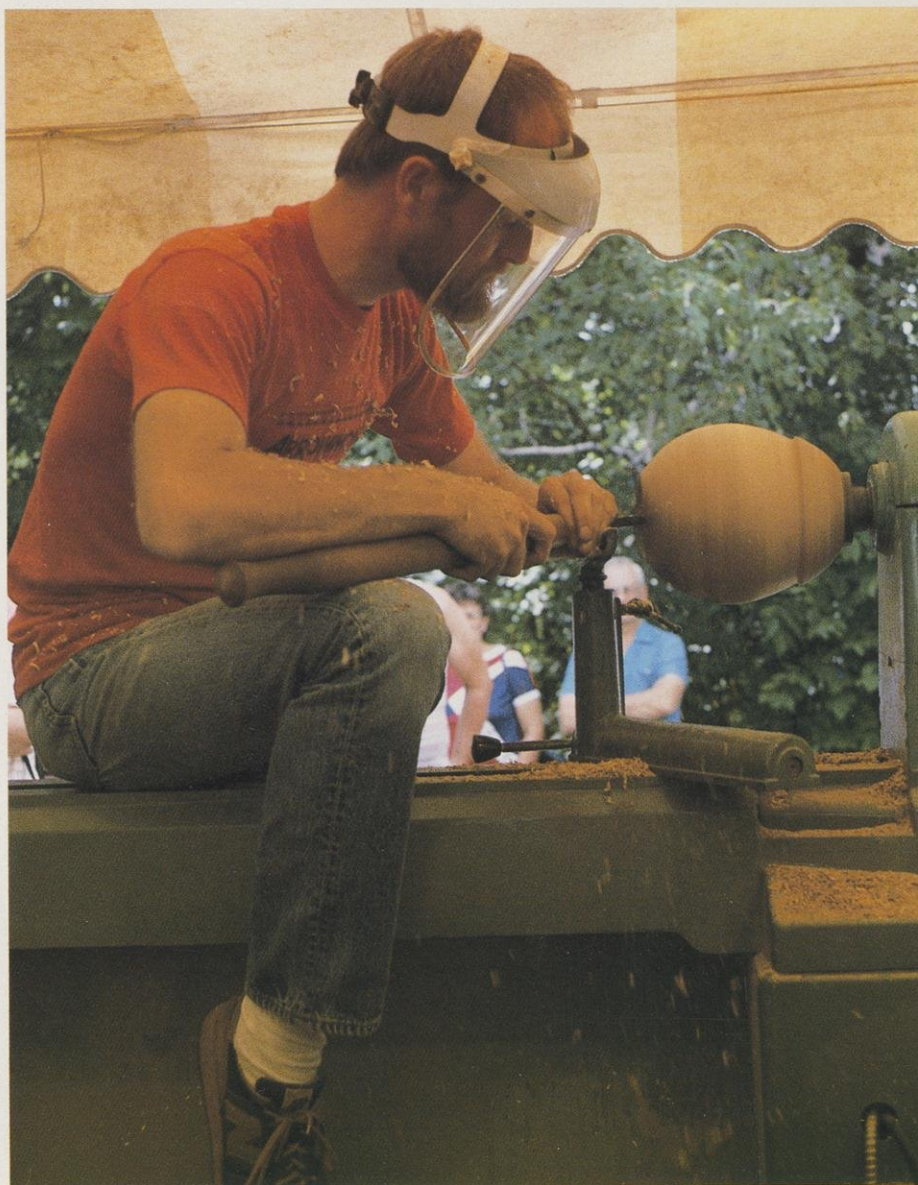
(bottom left) Wide Shallow Bowl, 1981 by David Lory of Platteville, Wis. Made of black walnut.



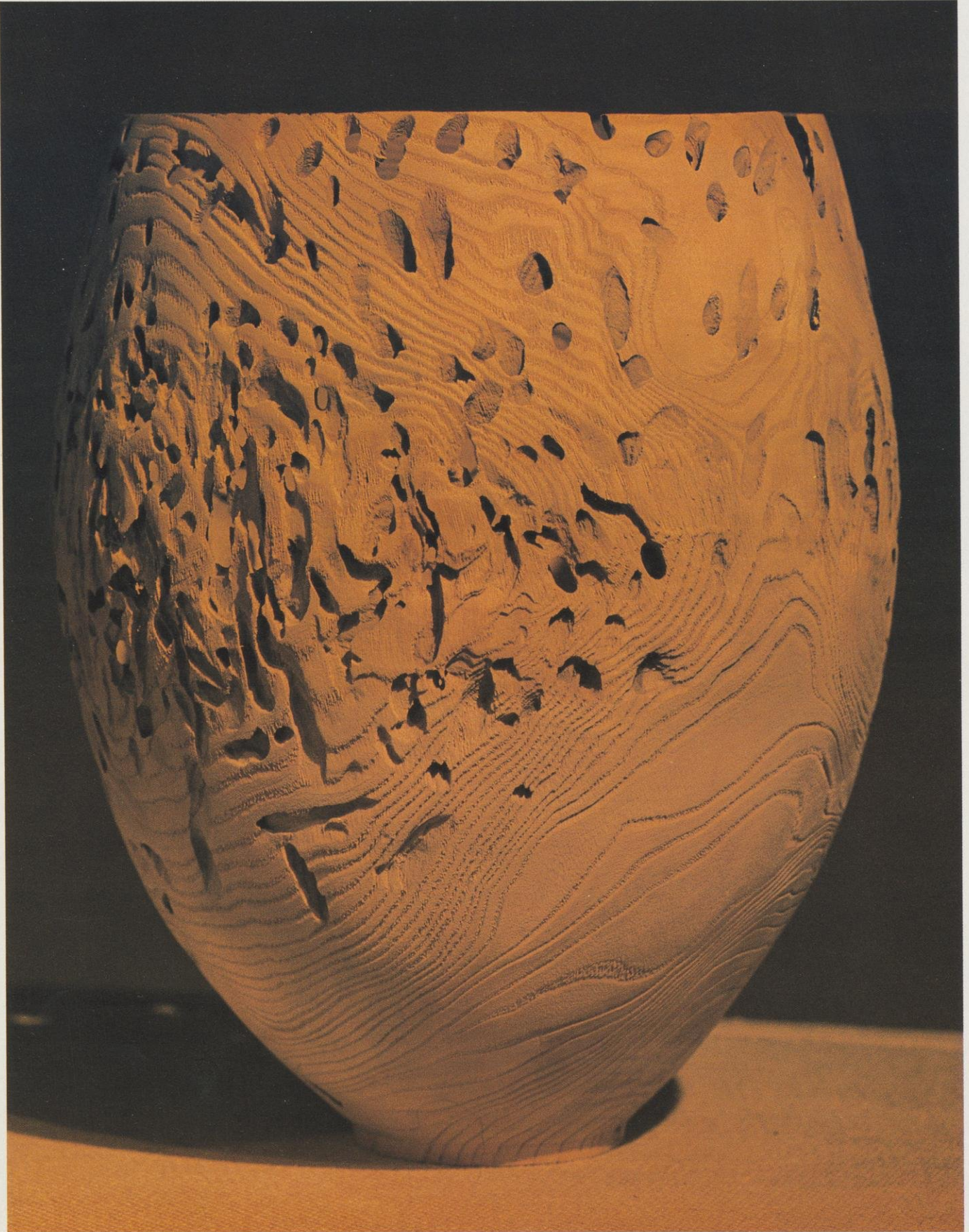
Jean B. Meyer



Jean B. Meyer



Jean B. Meyer



Jean B. Meyer

Ellipsoid "Sponge" Bowl, 1984 by Dale L. Nish of Provo, Utah. Made of wormy ash.



Jean B. Meyer

Flower-shaped Bowl, 1982 by Hap Sakwa of Baywood Park, Calif. Made of wild lilac.

Readers Write

GAME FARMS

Your November/December issue talked about game farms. Can you tell me where I can find a listing of such farms in Wisconsin? I think it would be a great experience to visit such a place with my grandchildren.

C. Huek

South Milwaukee, Wis.

The magazine office can provide a free eight-page list of game farms licensed for hunting purposes. Our address is P.O. Box 7921, Madison, WI 53707.

DEER SEASON WITH A WARDEN

I commend you and staff for the November/December issue. The TV went mute while I read "Deer Diary" to my wife. For this 74-year-old retired waterfowler and subscriber until February, 1995, there's much to read and enjoy in your magazine. Our farm family and our neighbors also praise the variety of features from staff and contributors.

Walter Mager
Havana, Ill.

HUNTING BEAR WITH DOGS

Your November/December article on bear hunting with dogs only told one side of the story. Many landowners, like me, dislike the trespassing and property damage that often occur with this type of hunting. Much bear-producing habitat is privately owned, yet landowners receive nothing for providing this resource.

I'm thankful for the many fine things the DNR is doing in Wisconsin, but landowner/hunter relations need more attention. I

question when the last time a bear taken on private property was shared with the landowner or a property owner was paid when someone used his property for bear hunting.

The story stated "Don't be surprised when you see an old pickup alongside the road with coveralled hunters" Let me assure you, we know exactly what's going on, and a lot of people don't like it one bit.

Robert Halser
Eagle, Wis.

No one condones trespassing or property damage, and hunting organizations like the Wisconsin Bear Hunters encourage members to build positive, fruitful relationships with landowners. Hunting on private lands is not a right, it's a privilege which is earned.

THE FALL FLAVOR OF HOME

My husband's job is with the military, so we have moved several times in the past few years, always further away from our Wisconsin homes. We miss our home state very much and I'm writing to tell you how your magazine makes us feel "a little closer to home." We especially miss the beautiful fall colors and your September/October back cover really lifted our spirits.

Wendy Jacobson
Eielson Air Force Base
Fairbanks, Alaska

PHEASANTS

I have always liked animals and had birds, bunnies and fish as pets. Your articles about conserving wild species, such as your pheasants article in the September/October issue, make me want to go out into the field and make my personal contribution.

The recent articles on water treatment also gave me a historical sense of our need to take more responsibility for cleaning up and

preserving resources.

We enjoy the magazine. The typeface and layout are attractive and the high quality photos make my whole family want to drop everything, jump in the car and take a look for ourselves. I'm young now, but I hope to still enjoy your exposition of our state when I'm too old to leave my easy chair.

Jeff Boucher
Oak Creek, Wis.

TRANSITIONS

Eagle-eyed readers will catch a few changes in the magazine this issue. We thought the new year was the right time to try new ideas.

First, you may notice that your magazine is dated February instead of January/February. We are still publishing six times a year in February, April, June, August, October and December as we have for the past several years. Our previous issue was dated November/December but reached most of you in early December. By only listing the second month on the cover, we can give the magazine a longer "shelf life" on magazine racks. We're trying to attract new subscribers through newsstand sales and this small change keeps our stories fresher for a longer period of time while maintaining our present schedule.

Second, Maureen

Mecozzi joins our small staff as associate editor. You've enjoyed Maureen's sprightly copy in our recent article about Hmong hunters and in our tire recycling supplement — "Making Tracks." She will oversee production of our special supplements and reports as well as a new feature we hope to unveil next issue. We wish our departing editorial assistants, Rick Mulhern and Kendra Nelson, well in their new ventures.

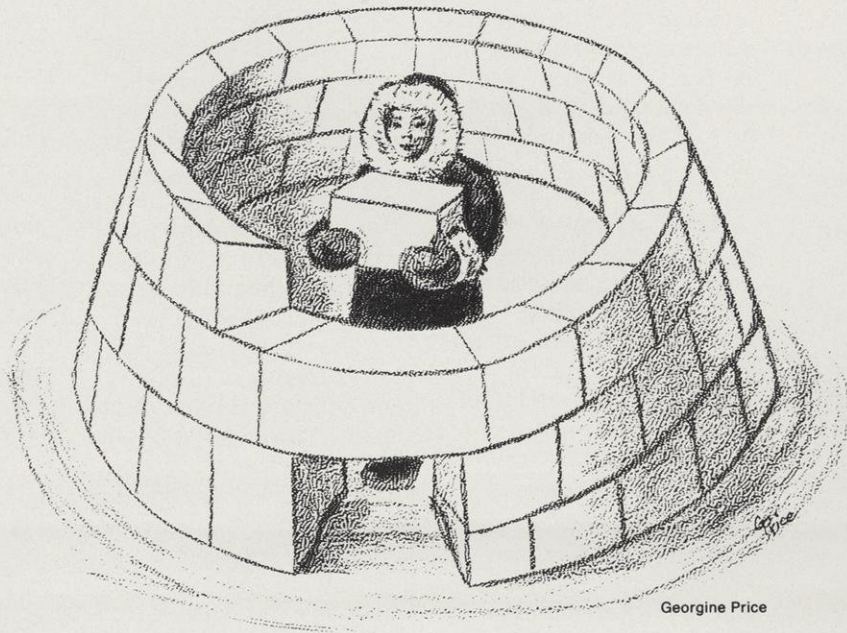
Writers, photographers and illustrators are always encouraged to submit ideas for our consideration. Many of our popular features started with a short note or letter.

Stay with us as we keep delving into adventures, challenges and fun-filled experiences exploring Wisconsin.

David L. Sperling
Editor

NEXT ISSUE:
Building backyard ponds
Wisconsin's rain forest
connection
A sturgeon's first days





Georgine Price

There's no place like dome

Building a winter igloo with kids is hot fun on a cold day.

Tom Hollatz

"It's really cool!"

That's how a Lac du Flambeau fourth grader described the igloo slowly taking shape on the elementary school grounds in the heart of this Northwoods Indian reservation.

Despite bone-chilling winds off Flambeau Lake, the igloo rose in a lazy spiral as large blocks of snow were carefully sawed out of a nearby snowbank.

Ernie St. Germaine of Lac du Flambeau got the idea to build an igloo after reading a magazine piece on American Indian heritage. He promptly drafted Ferdy Goode and Chip Wolfe of Minocqua and Jack Ward of Oconomowoc to round out

the construction crew.

Ward, who operates an arts and crafts shop, envisioned the igloo as an ice cream store that only served one flavor — vanilla!

St. Germaine, an artisan who handcrafts birchbark canoes, smiled as he enthusiastically explained the one-day project.

"We thought it would be a good idea to show Northwoods children how like the Eskimos and Indians like the Aleuts lived," St. Germaine said as he hoisted another block onto the growing dome.

There's a popular misconception that Eskimos lived in igloos year-round. Not so. The snow house — not an ice house — was used exclusively in the central Arctic as a temporary base during the winter seal hunting season.

Constructing a snow house is an

engineering project, much more like building a house than hollowing out a heap of snow. It's a testament to the skill of the Eskimos that they could perfect a practical architectural method using few tools and readily available materials to stave off the brutal Arctic weather.

To begin, the Eskimos found a slightly protected area near a snow-drift composed of the proper kind of snow. (Eskimos and Indians became keen observer of snow types; they have many colorful terms to describe the different snows and their uses.) For snow houses, the Eskimos searched for solid drifts that would contain snow of even density, hardness and thickness — dense enough to withstand wind stress and shear stress, hard enough to stand cutting and moving, thick enough to provide good insulation.

Tom Hollatz, writer and raconteur, lives in Boulder Junction.

Next, they cleared away a solid snow surface with a shovel or scraper. Using an ivory snow knife, they drew a circle between nine and 15 feet in diameter to outline the house. Snow blocks approximately 20-30 inches long and 12-18 inches wide were carved from the snowdrift with the knife.

This first row of foundation blocks was placed in a row along the outside edge of the circle. Once the circle was formed, the blocks were shaved or beveled in two directions — first, the tops of the blocks were shaved in an upward spiral so the igloo would gradually rise into a sturdy structure. Second, these blocks were beveled on the top at a slight inward angle so that the next layer of blocks would nest tightly, interlocking like a dove-tail joint, and would slant inward to form a sloping wall/roof combination. Each layer of snow blocks was slightly smaller than the layer below to minimize structural stress while forming the characteristic dome-like shape.

While one worker placed the blocks in place, a second person, typically the Eskimo wife, carefully plastered the exterior with a softer snow that acted like mortar between the snow blocks. When the last small beveled block had been placed near the top like an interlocking keystone, the Eskimo builder cut a hole about two feet from the bottom of the igloo on the south-facing side. The Eskimo wife entered the igloo, chinked the inside blocks, dragged in the family belongings and prepared a few platforms. Snow blocks about two to three feet off the floor served as sleeping platforms, sitting and eating space; blocks on the opposite side were used as a cooking and heating area. Igloos were typically heated with animal oil lamps and later, kerosene stoves.

While the inside was being prepared, the Eskimo builder would craft a long, low tunnel of snow blocks that slanted downhill from the entrance on the south side. Tunnels faced south to escape drafty winds, and were slanted downhill to keep



Happy helpers struggled to lift big foundation blocks for a Northwoods snow house.

Tom Holatz

warmer air inside and drain moisture. The end of the tunnel was covered with an animal skin to prevent drafts. This chamber served the same function as a vestibule in a contemporary house.

Sometimes, the builder would remove a snow block near the top of the igloo and cement in a clear block of ice with soft snow. This window trapped warmth while allowing some light to filter into the snow house.

Without a stick of wood, stones, brick or clay, the Eskimos fashioned comfortable and warm shelters in the worst climates.

Modern technology entered the demonstration igloo and it still took the industrious four and their helpers the better part of a day to build a snow house. The instructors cut 20 by 24 by 4 inch blocks from a layer of snow that had fallen in a single storm and frozen into a solid sheet. St. Germaine used a small gas hand torch to melt the snow block seams together.

Goode used a crosscut saw to trim the block tops. Schoolchildren rolled up their sleeves and donned mittens to carefully chink the exterior cracks with snow. Older students worked in twos to carry over large chunks of snow to the builders. Later, a piece of clear lake ice was sawed from Lake Flambeau to make a large picture window for the igloo.

It wasn't exactly a Wausau Home, but it was a place the builders and children would be happy to hang a seal pelt or two.

Goode shared a few interesting facts with his ice-packing comrades over a steaming bowl of soup later that afternoon. It really impressed the children that the expert, resourceful Eskimos could construct a snow house in about an hour and might build as many as 100 of them during a season tracking the seal herd. ■

(top left) An igloo is an architectural marvel. Even modern tools like hand saws for cutting blocks and gas torches for sealing seams cannot replace a delicate, deft hand. Here, builders carefully smooth snow to chink in the cracks between blocks. ►

(top right) Recess at this Lac du Flambeau grade school was never more fun. Everyone pitched in to haul snow blocks to the hilltop building site. ►

(bottom right) The spiraled dome slowly took shape throughout the day-long demonstration. ►



Eskimo snow: from *aput* to *aputaitok*

Eskimo and northern Indian tribes like the Chippewas (Ojibwas) enriched their language with many words for snow — each describing a different aspect or quality.

Chippewas distinguished between fluffy snows, deep snows where snowshoes were needed and places blown bare of snow. Warm, Chinook winds were called "snow eaters."

* Eskimo and northern Indian snow terms include:

the general term for a spread of snow — *aput*
a snowflake — *sasaq*
the first falling snow — *apingaut*
the falling snow — *kannerk*
the current snow — *kannertok*
a covering snow — *apiyok*
drifting snow — *perksertok*

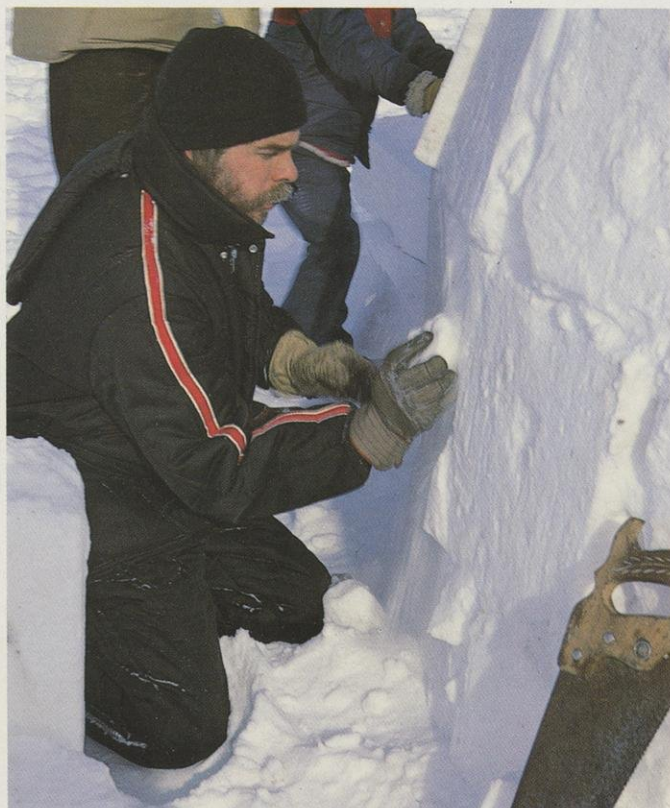
newly drifted snow — *akelrorak*
a snowstorm — *dux*
a violent snowstorm — *igadug*
beating snow — *tiluktortok*
sharp snow — *panar*
salty snow — *pokaktok* (*pokak*)
watery snow — *massak*
hard snow — *sitidlorak*
soft snow — *mauyak* (*mauyaolertok*)
soft snow for traveling — *mauyasiorpok*
soft deep snow where snowshoes are needed for travel — *taiga*
snow that collects on trees — *qali*
snow in the depressions around the base of trees — *qumaniq*
bottom layer of coarse granulated snow — *putak*
snow on ground — *api*
snow that a dog eats — *aniusarpok*

snow for melting for water — *aniuk* (*anio*)
snow for building — *auverk*
snow on clothes — *ayak*
much snow on clothes — *aputainnarowok*
snow beaten from clothes — *tiluktorpok*
cleaned off snow — *aputaerpok*
no snow — *aputaitok*

In fact, Indians and Eskimos had such respect for winter that they measured their age by recounting the number of snow seasons they had survived, just as they named each month's moon.

* From *The Aleut Language*, U.S. Department of Interior, 1944 and *English-Eskimo, Eskimo-English Dictionary*, Canadian Research Centre for Anthropology, 1970.





Tom Hollarz



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