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Wisconsin NATURAL RESOURCES

SEPTEMBER - OCTOBER 1979 • VOLUME 3, NUMBER 5 $1.00

The Iowa darter

DON FAGO, Project Leader, Fish Distribution

There are a lot of little fish nobody ever sees. If we do notice, they're usually lumped in a big category called minnows or baby gamefish. Actually, Wisconsin waters teem with distinctive small species like these Iowa darters *(Etheostoma exile)* that never grow longer than three or four inches. Many are stunningly beautiful and they outnumber the big ones in geometric proportion.

When freshly taken from the weedy lakes and quiet creeks that are its habitat, Iowa darter colors are brilliant. But the bluish back, green cheek patches and blue-green and rust-red sides quickly fade in an aquarium. These fish came from Booth Lake in southwest Walworth County.

Like birds (and guppies) it's almost always males in these little fish that wear showy colors. At their height in breeding season, many are so bright even the Iowa darter's beauty is drab next to relatives like the rainbow, crystal or gilt darter. Other kin are the walleye, sauger, yellow perch and about 40 other members of the perch family.

There are 153 species of fish in Wisconsin and a little less than half never grow longer than a few inches. Next time you spot what you think is a nondescript minnow, take a close look. It might be an Iowa darter, a ninespine stickleback, banded killifish, spoonhead sculpin or hornyhead chub.

To find out how many kinds of these little fish there are in Wisconsin, how rare they are and where they're located, DNR is now surveying all 29 state drainage basins. A report on the findings is expected next year.

Rules for taking minnows for bait in Wisconsin are still fairly liberal and are published in the DNR fishing regulations pamphlet.

Photos by Leo Johnson, Milwaukee Public Museum

Contents

Special supplement

Wisconsin Natural Resources
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"Cormorants nesting" by Don Richard Eckelberry, this year's master artist at the International Bird Art Exhibition in Wausau. Free to the public from September 8 through October 21, this outstanding show is held annually at the Leigh Yawkey Woodson Art Museum. For more about cormorants and their endangered status see the special supplement at page 12.

Front cover:
The Canada lynx, one of three endangered mammals in Wisconsin. For more on other endangered species in the state, turn to the special supplement at page 12. Painting by Richard Timm, courtesy of Nature House, Inc., Griggsville, Ill. 62340.

Back cover: '79 Waterfowl Stamp
"Buffleheads" by Rockne A. Knuth, Fond du Lac, won the 1979 Wisconsin Waterfowl Stamp Contest. Sales last year ($3.25 each) brought in a total of $385,000. Funds are used here and in Canada to purchase and improve waterfowl nesting and feeding habitat. Second place went to William J. Koelpin of Hartland and third to Linda Carlson, Marathon.

WISCONSIN DEPT. OF NATURAL RESOURCES

Photos by Jim Escalante unless indicated.

Sand reed *(Calamovilfa folia var. magna)* A typical dunes plant that thrives almost from the water's edge to where the woods begin. At mid-beach it is sometimes the dominant species.

Whitefish dunes

J. WOLFRED TAYLOR

Stand alone on the beach at Whitefish Dunes State Park in Door County. You can sense eternity all around. It is a place that seems everlasting— dolomite cliffs and sands that stretch south, almost forever, along Lake Michigan. There is a feeling of immutable earth. Endless. But do not be deceived. The dunes are really an hourglass of years. A long and careful look reveals change happening everywhere.

Continued page 9.

American redstart
(Setophaga ruticilla)

Black-throated green warbler
(Dendroica virens)

Colorful warblers nest in the forested dunes. Among the abundant ones are the American redstart and the black-throated green warbler. The ovenbird is the most plentiful bird, but there are also piliated woodpeckers, barred owls, ruffed grouse, red eyed vireos, wrens, chickadees and many, many more. Photos by Steve Lang

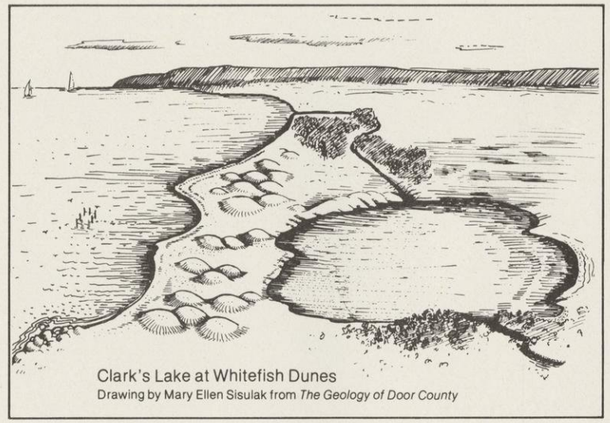
Background photo
Creeping juniper *(Juniperus communis var. depressa)*
Soil stabilizer that often grows in conjunction with bearberry.
Inset:
Bearberry (*Arctostaphylos uva-ursi)*
A member of the heath family, common in droughty woods, on dunes, and on rocky exposed sites. It spreads through underground runners. Photo by John Kohout

Top left:
Dune goldenrod *(Solidago spathulata var. gillmani)*
In Wisconsin grows only on open sandy dunes, sand ridges and swales along Lake Michigan. It is found on other dunes all over North America, but here it is a threatened species because of the rarity of coastal dune communities.

Top right:
Seaside spurge *(Euphorbia polygonifolia)*
Grows in Wisconsin, only on the wet sand of Lake Michigan. It has a milky, acrid juice. Photo by Kitty Kohout.

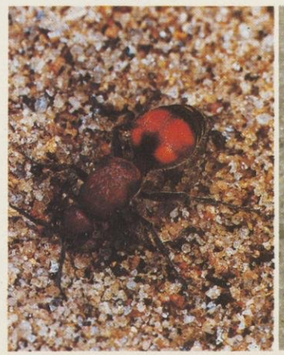
Bottom left:
Thimbleberry *(Rubus parviflorus)*
Likes cool, northern conifer hardwood forest, particularly along sunny openings and edges of Lake Superior and northern Lake Michigan. The berries are delicious.

Bottom right:
Dame's rocket *(Hesperis matronalis)*
A European species that escaped to the wild. It really doesn't belong on the dunes but blooms bounteously there.

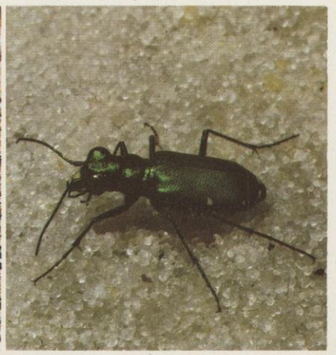


Clark's Lake at Whitefish Dunes
Drawing by Mary Ellen Sisulak from *The Geology of Door County*

Velvet ant *(Dasymutilla biocilata)*
Temperatures on the dunes go as high as 150 degrees and life there has learned to adapt. Hair on this velvet ant (really a wingless wasp), provides insulation and enables it to hunt on the hot sand.
Photo by Charles Koval



Tiger beetle *(Cincindela sp.)*
Tiger beetles that live on dunes are light in color for camouflage and heat protection. Further inland, where the beech forest starts, colors change. This is the domain of the green tiger beetle. Tiger beetle larvae dig deep burrows and wait at the opening to ambush passing insects. Photo by John Baker



Dunes build and dissolve. Wind, wave and people move them. Vegetation takes root and is covered, multiplies underground, then springs up again. New dunes, like snowdrifts, start on some shrub's leeward side. When threatened, plants fight the beach for survival. Specially adapted brush and grass anchor the sand and trees take hold to make the dunes grow stable. Where man has moved them, claws of erosion leave quick scars.

As a natural area, Whitefish Dunes State Park has everything. Its geology, wildlife and plants are diverse and special. Inland, behind the dunes is 825 acre Clark's Lake, formed only a few thousand years ago when glacial lake levels dropped, sealing a bay. There is a beech forest, a cedar swamp, an alder thicket, a bog and a pine plantation. And nearly all have had encounters with the dunes.

How do you care for a place like this? A place with a beautiful beach that attracts crowds, but where change is chronic and must work its magic if the peculiarly adapted life it supports is to endure?

DNR has responded to Whitefish Dunes unique qualities by making preservation the principal management objective there. It is one of only a handful of parks so designated. Development and use will be strictly limited. The finest dunes in Wisconsin, dynamic and different, and the biota associated with them will be saved. This kind of management is difficult to do but it was the only choice.

Data on plants from DNR botonists William Tans and Robert Read

Top left:
Shifting sand
Only the hardiest, best adapted plants can grow on sand dunes. Genetic resistance to burial, drought and abrasion by blowing sand are prerequisites. Dune plants exist in one of three zones: wet sandy beach under the daily influence of wave and spray; the middle beach, dry for much of the time but modified during each storm; and the upper beach where shifting sand is most pronounced.

Further back the Whitefish Dunes are completely covered by a sugar maple and American beech forest. There is exceptional species diversity in this continuum from wet sandy beach to moist forest.

Dune thistle (*Cirsium pitcheri)*
This native thistle has cream-colored flowers and looks silvery because it is covered with hair. In Wisconsin it lives only on dunes in Sheboygan, Manitowoc and Door Counties and is a threatened species.

Sand cherry *(Prunus pumila)*
Fruit of the sand cherry — a member of the rose family. Photo by Kitty Kohout

Bottom left:
Marram grass *(Ammophila breviligulata)*
Marram grass is the true architect of the dunes. Sand buries it but a special adaptation grows underground rhizomes. Roots and stems then sprout to create a colony of new plants. Even a single rhizome can start a colony to help anchor the sand.
Photo by Kitty Kohout

Top:
Fragile
Repeated footfalls kill dunes plants. Wind then scoops out the unanchored sand and steep sides develop alongside the path. Grains of sand measure about 1/100th to 1/50th of an inch in diameter and were sifted out of heavier material by the wind.

The septic lady of Sauk County

There are about 75,000 failing septic systems in Wisconsin and grant-in-aid money is available to fix them up. But it takes people who care and a little paperwork, PR and dedication.

GARY KNOWLES
Public Information, Water Grants

It sounds like some fairy tale out of a 7th grade civics text—the kind of story you'd expect from Charles Kuralt "On the Road." It's a story of a dedicated, hard working court house civil servant who grabbed hold of a state grant program and turned it into dollars for local residents and cleaner water for a whole county. It's a true story and it goes like this:

Wisconsin is a beautiful state that has a little of everything people desire. It has a lot of lush rolling country that over the years has fired dreams of folks who yearn for a pastoral life in their own little bungalow, with maybe a couple chickens, a garden, and lots of fresh air and clean water. A good number of people have pursued this vision and now Wisconsin "places in the country" are everywhere. But as you might suspect, there's a problem. The problem is to keep the water clean so people can use it for fishing, swimming, drinking. Most places out in the country are not connected to any sanitary sewerage system so they've had to rely on septic tanks. And septic tanks, unless properly built and carefully maintained, have a lot of problems. They pollute ground water. They can cause health problems. Sometimes they stink.

Dorothy Berlin. Photo by Gary Knowles

Sauk County is one of the beautiful places and it has a lot of people who have built their dreams in its rolling hills and along the shores of its sparkling waters. And too bad, but it also has its share of septic systems with problems. As they say, it has its share of stinkers.

In 1978 the State Legislature passed The Wisconsin Fund. It sets aside a certain amount of money from general revenue sources every year for 10 years (through 1987) to finance construction of systems to clean up wastewater and make it "fishable and swimmable" again. Among projects the Wisconsin Fund was designed to pay for are construction of sewer systems, sewage treatment plants, "non-point source" clean-up projects, and yes, the rehabilitation and/or replacement of septic systems. This septic system portion of the Fund receives about $2 million per year. There are about 450,000 septic systems in Wisconsin and an estimated 75,000 are failing.

The Legislature was concerned that the money be spent prudently and wanted to be sure that once a septic system had been fixed it would be properly maintained. They assigned the responsibility for administering the Fund to the Department of Natural Resources. (Yes, this is a story about Sauk County, but we're getting to it...) The DNR, in carrying out the orders of the Legislature, established a number of rules and regulations for distributing the money:

(1) The money would be granted to counties who would apply in behalf of individual property owners.
(2) Counties would arrange to pay the money to the property owners.
(3) The Fund would pay 60% of the cost of projects up to $3,000.
(4) The County had to agree to establish a regular inspection system to be sure that the systems were being properly maintained.

Photo by Gary Knowles

"I was a little skeptical when Dorothy told me about the Wisconsin Fund," said Mrs. Wollum, whose septic system quit. "Other agencies promised they would help, and after months of waiting they'd say, 'Oh, you don't qualify!' But Dorothy stuck by me and now it's going to be fixed."

As you might guess, a number of forms were developed to keep track of information and keep everything legal. Some people call these forms "Application Materials." Others call them "Red Tape."

Word of the Septic Tank Fund went out across the state. Television and radio stations mentioned it. Big papers carried the news and weeklies ran feature stories. Some people who heard about it got excited and called DNR—and then got frustrated when they heard there were papers to fill out and inspections to do. They decided not to get involved. They found something else to do. But in Sauk County they saw things differently.

Dorothy Berlin, a Sauk County Zoning Commission Special Projects Assistant, read about the fund and said, "There are a lot of people in this county that could use $3,000 to fix their septic systems. A lot of people might not be able to afford it without that help." So she called DNR, and spoke with Duane Hinderman, the chief of the section in charge of special projects construction and inspection. Duane explained the program to her and sent her the forms necessary to get things moving in Sauk County. Dorothy remembers that when she looked at everything for the first time she thought, "Oh my Lord, what am I getting into now!"

But then she thought of the people she knew, like Mrs. Thelma Wollum, rural Baraboo,who had septic systems that were failing. Some were unable to pay $5,000 for replacement or repair. Some had systems that would only stand for one flush per day. Others had systems that were already backing-up into their basements, forcing them to carry out sewage in buckets. Dorothy resisted the temptation to do something else. She began to study the requirements of the grant program. "After I studied the papers I realized it wasn't so bad," she said.

She visited the homes of people with failing systems. She sent letters to plumbers explaining the program. She got invited to appear on local radio call-in programs to explain the way the grants would work. She held explanatory sessions for people with problems and

Sometimes homeowners arrive at ingenious (and illegal) ways to empty a failing septic system.

for plumbers. She had articles in the local papers. Dorothy began to get a reputation. For caring. For working hard. For not giving-up on difficult problems. People began to talk.

Steve Blakeslee, a plumber, says "In some places people feel that the courthouse is a place to avoid—that there are two opposing sides and you have to stay away. Here people feel that the person at the courthouse is there to help them. Now when people think of the county they feel 'well, they're down there to help'..."

Another plumber, Art Bieseck, says "She really cares about people. She will work with you to find a solution to your problem, she just doesn't give up. I'll bet she puts in two weeks work at home every week—people call her at all hours because they know she'll listen. She's a person people can trust."

When the time came for submitting grant applications, Dorothy had 50 individual property owners signed up—more than any other county. The first set of grants was awarded in March of 1979. And she's still finding people to be funded for the next grant cycle.

"People sense that she'll cooperate with them and work for them," says Blakeslee. "Dorothy is a rare employee—you know that if she says "no," she's tried everything in the book and some other things too just to try to solve your problem. She doesn't quit until she gets everybody involved in trying to make things work. I think the reason this Wisconsin Fund has worked so well is that Dorothy has helped bring a big program down to a small scale—she's personalized it—that's the key—and she cares."

The Wisconsin Fund Septic Tank Program will continue for another eight years. Dorothy Berlin will probably be signing up property owners with failing systems right up until 1987. The people of Sauk County will have cleaner, safer water. And all across the beautiful state of Wisconsin county administrators will be looking for someone like Dorothy Berlin. Someone who takes the interests and problems of the people to heart. Someone who cares.

It would make a nice ending to this true story to say that she's now called "The Septic Lady of Sauk County," but that's not true. In the Baraboo Range the people still call her what they always have, just "Dorothy." That is true, and that's a *better* ending to this story. □

For more information on the Wisconsin Fund Septic Program in your county call your local county sanitarian. For a brochure contact your District DNR Office or write Department of Natural Resources, Wisconsin Fund Septic Program, Box 7921, Madison, WI 53707.

County officials who have questions regarding the program should call Edward Bergman, Section Chief, Wisconsin Fund Septic Program, (608) 266-5890.

National Hunting and Fishing Day

ROB IRWIN,
Editorial Intern

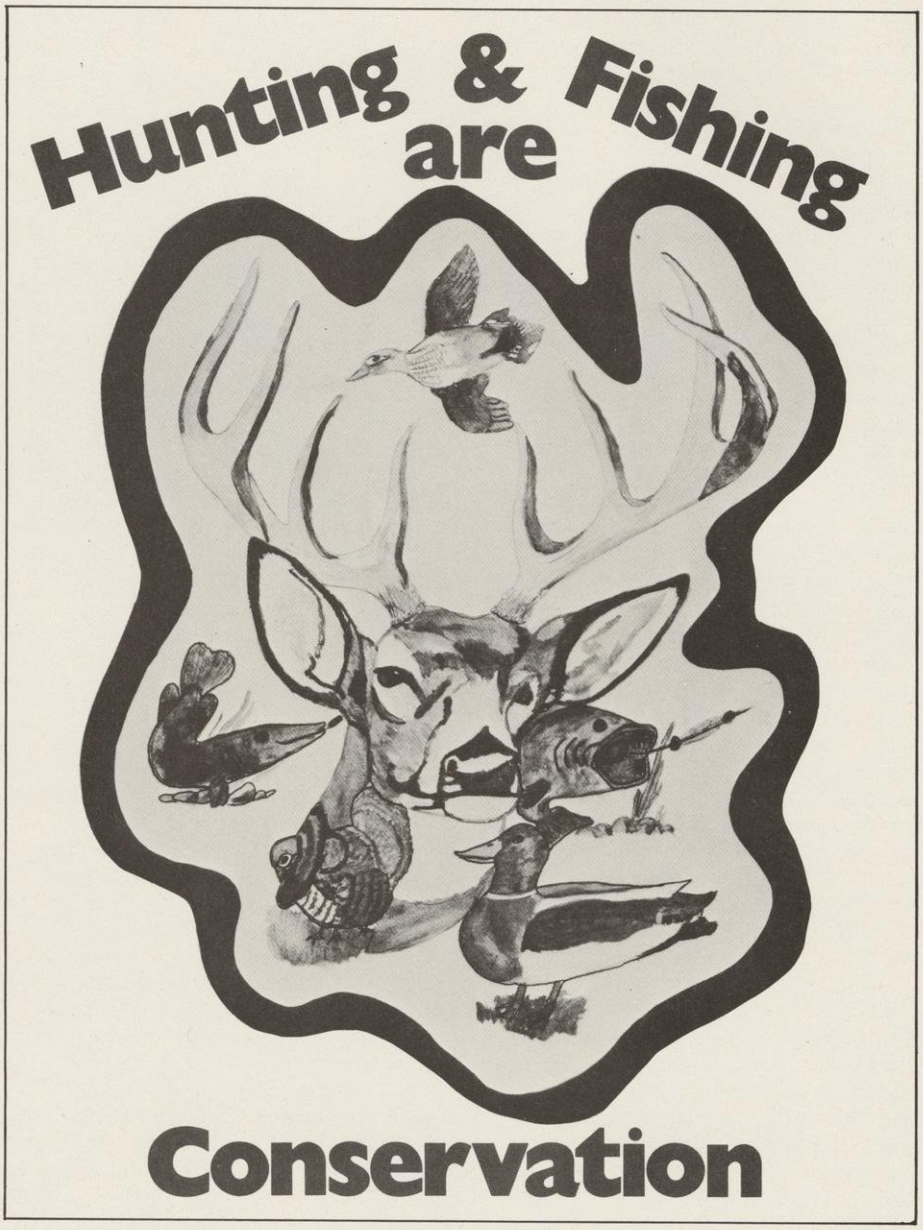
Sportsmen and women and environmentalists share most of the same goals, but all too seldom neither realize it. Saturday, September 22nd, National Hunting and Fishing Day, they can discover what they have in common.

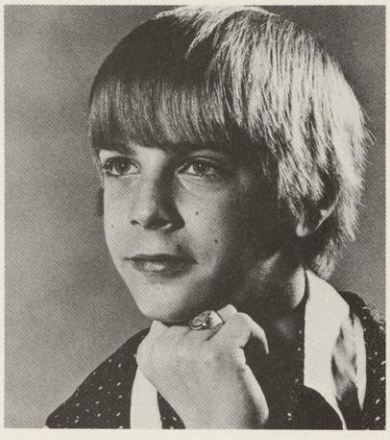
Concern for the environment, for whatever reason, results in a better life for many creatures, including us. Water cleanup that saves a rare fish or mussel helps other species, too. It also protects drinking water and health, and benefits industry and recreation. Plants, animals and people all do better if they breathe clean air.

The switch to steel shot will not only protect huntable ducks and geese from lead poisoning, it will save other wetland inhabitants, too. Snakes, turtles, field mice and songbirds live in public hunting grounds. Hunting and fishing license money can create a Horicon Marsh and at the same time finance Four Mile Rookery for cranes and egrets within its boundaries. The marsh helps cleanse the Rock River and modify its flow.

Controls placed on chemicals like PCB's and DDT transmit good vibrations through plant and animal communities across the world. Chances are that defiling the environment in any way hurts hunting and fishing and vice-versa.

Hunters, anglers and environmentalists need to know each other better. They're really the same people. On National Hunting and Fishing Day they should get together in their neighborhoods and find it out. □





Roger Scholbrock, 14, Hazel Green, won first prize and a $500 savings bond for this Junior Division National Hunting and Fishing Day Poster. He is in the eighth grade at Southwestern Junior High School in Hazel Green. The contest is sponsored by the National Shooting Sports Foundation.

Someone is watching you hunt

Preliminary research shows that 20% of Wisconsin waterfowl hunters violate game laws and 30% commit ethical lapses. Some of the most dedicated and successful are the biggest lawbreakers. On the other hand, 55% perform notable acts of good sportsmanship. Statistics were gathered while observing hunters in action. The authors have some ideas on what it all means.

ROBERT JACKSON AND ROBERT NORTON, UW-La Crosse

How good or bad are hunter ethics in our state? To find out, the U.S. Fish and Wildlife Service and DNR have jointly financed a Wisconsin Hunter Performance Study by a UW-La Crosse research team. In it, trained observers watched the behavior of more than 600 waterfowl hunters. Afterwards hunters were interviewed in the field (583 of them representing 596 hunts) and this was followed up by a post season interview at home.

The study reveals that most hunters are deeply bothered by irresponsible acts. Asked about dissatisfying experiences, three out of four cited behavior of others toward wildlife or hunters. Increased posting of land carried a strong message to them about attitudes of landowners and also about hunter behavior.

The observations indicated that 55% showed good sportsmanship, but 20% were observed violating a game law and 30% did something unethical. These figures are surprisingly high, but hunters are aware of the problems and now seem ready and motivated to do something about them.

The study took place during the 1976 and '77 seasons and covered five representative waterfowl hunting areas around the state.

One important dimension of the research is the comparison of attitudes, personal attributes and hunting conditions associated with observed good sportsmanship as compared to illegal or unethical behavior.

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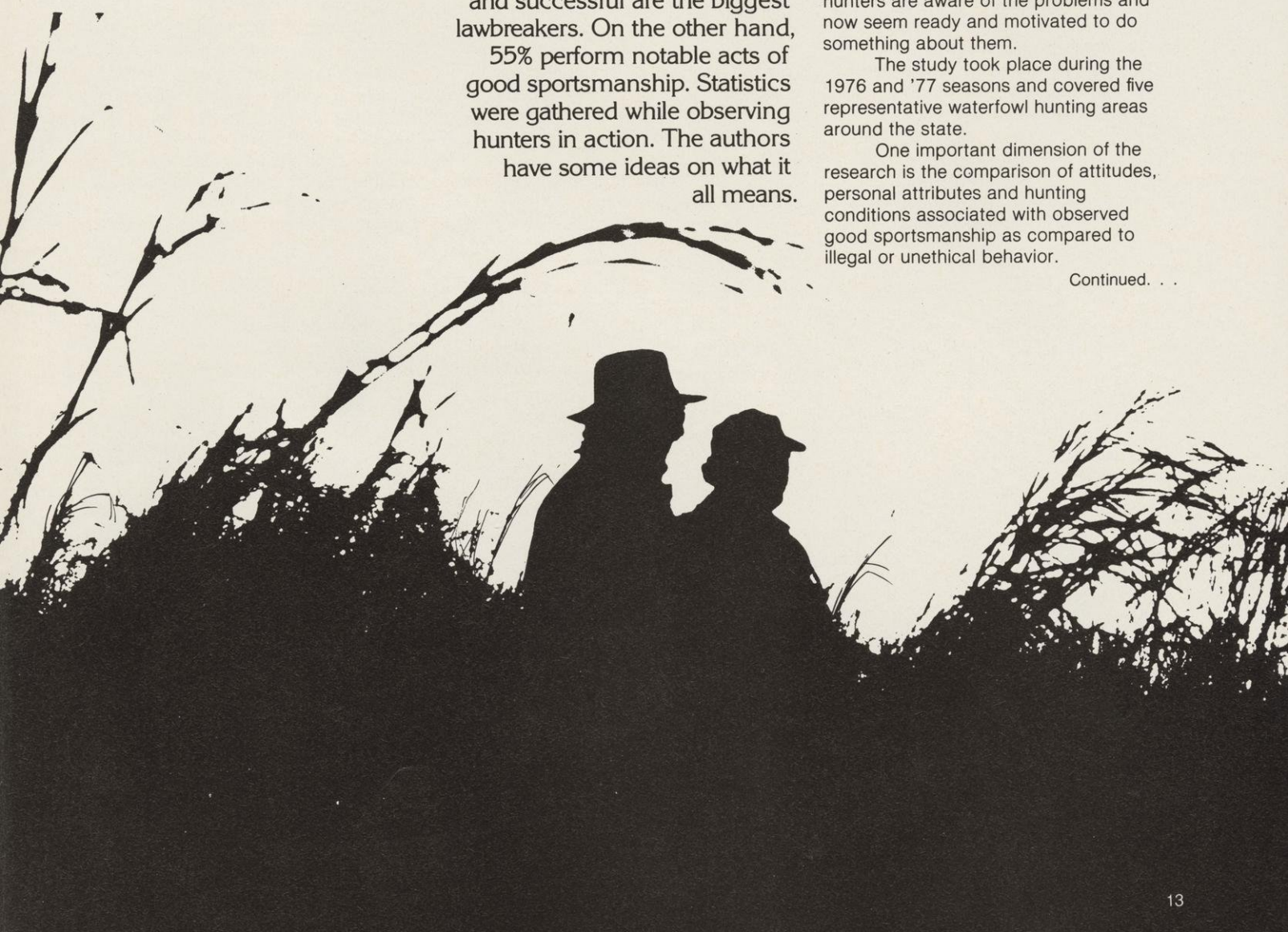


OPPORTUNITY TO VIOLATE - Obviously, in order to violate the opportunity to do so must be present. Hunters seen violating or behaving unethically had more opportunities to do so. Twice as many flights of birds passed within shooting range of them, they took more than twice as many shots, and killed greater daily and seasonal bags. And they didn't hunt any more days or hours over the entire season than the law abiding.

HUNTING CONDITIONS - Many local people blame outsiders or city slickers for hunting violations but the study shows the hometowner is the one to watch. Of the hunters less than 25 miles from home, 25% were violating. In comparison, the rate dropped to 17% for those 25 to 150 miles from home and fell to 9% for those who traveled more than 150 miles. While the proportion of violating was higher on weekends than weekdays, the highest percentages were on Friday. More locals were out on Fridays and their interviews revealed that they try to get a jump on the non-locals who have to drive long distances for the weekend hunt. Higher rates of violation were also associated with the early season (before the split) and among those hunting the Mississippi or central Wisconsin wildlife areas. In general, state wildlife areas had fewer violations.

HUNTING METHODS AND EXPERIENCE - Duck hunters 20 to 40 years old violate most. The percentage is low for beginners and also drops significantly for those over 40 and for those with 20 or more years experience.

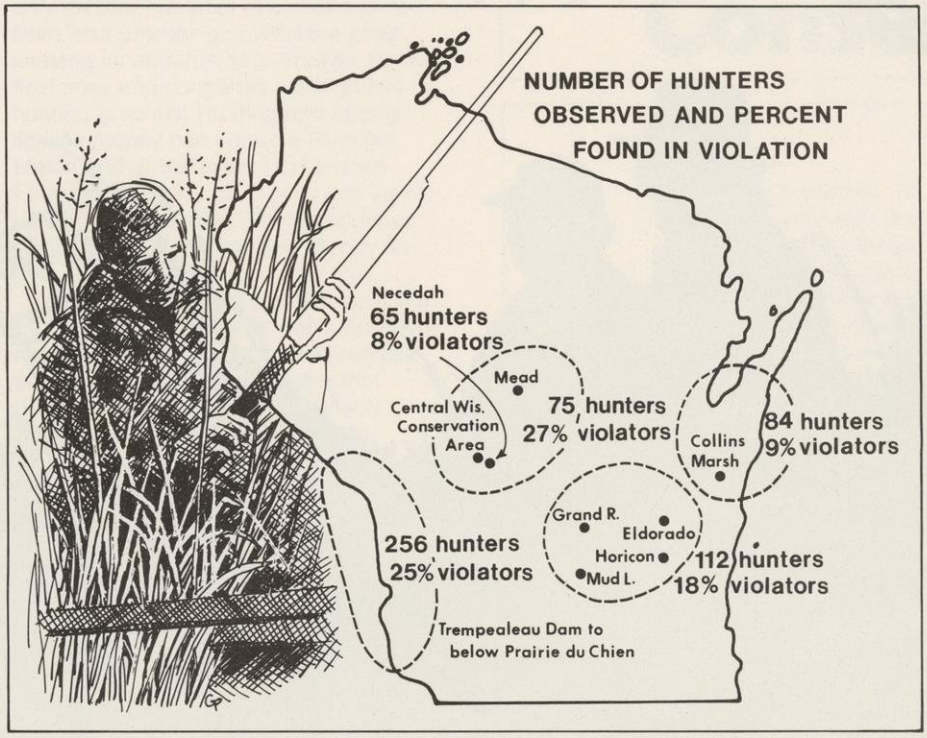
Retired Warden Bill Hiebing checks student observer Terry Anderson.

Surprisingly, the violator is often deeply involved with the sport. He is likely to shoot trap and skeet, to use a retriever, a duck call, and a special duck hunting skiff or boat.

HUNTING ATTITUDES - Almost 50% of the hunters interviewed described their day afield as poor, the bottom rating on a four-point scale. Hunters who violated or had ethical lapses, however, reported more satisfaction than non-violators. Their enjoyment came from bagging game, shooting opportunities, and competition with other hunters. By contrast, companionship, seeing game, and the opportunity to observe nature were most satisfying for non-violators.

Those who broke game laws were also significantly more likely to be violators. But ethical lapses without lawbreaking happened a lot in groups of five or more. These parties were also judged to be less intense about it all. One such party member exclaimed, "It was great! I shot two boxes of shells." Altogether his party of six bagged two ducks.

GOOD SPORTSMANSHIP - Good sportsmanship (helping another hunter retrieve a duck, passing up a shot to give another hunter a better opportunity, etc.) was observed much more frequently than violations. Good sportsmen exhibited special characteristics: they were *more skilled* than other hunters, yet had fewer opportunities, and took fewer shots; they



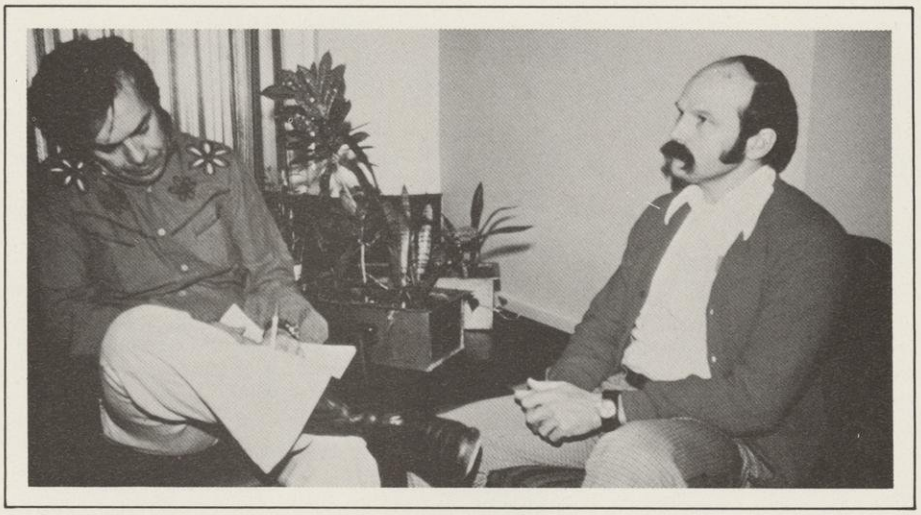
Trained observers watch from a distance.

were older, most frequently 50 or more. They were upset by unethical behavior; and in particular felt the point system encouraged violations through reordering. Good sportsmanship was clearly associated with age. Not many young hunters had it.

Nearly half of those interviewed thought hunting ethics could be improved through education and these comments were evenly divided between those advocating better juvenile, as opposed to better adult, education programs.

The study indicates there are five developmental stages in the evolution of a duck hunter. We call them shooter, limit bagger, trophy hunter, technical expert and waterfowler.

The shooter needs to pull the trigger and test the weapon. Targets may be bullseyes or clay pigeons but they can also be songbirds, insulators, signs or a hawk. For the limit bagger, success is measured by the number of birds or animals shot. The trophy hunter might take only greenheads or cans and pass up good shots on birds with less status. The technical expert has an almost religious fervor about the sport. Highly skilled, this hunter usually owns all the equipment: retriever, decoys, calls, camouflaged boat and other gear. Here hunting is the most important life activity. Many never grow beyond this stage to accept the self-imposed controls Aldo Leopold felt marked the ethical hunter. On the other hand, in the waterfowler stage, which is the highest ranking, the total experience brings satisfaction—contacts with nature, familiar and treasured surroundings and other important associations. Bagging game is more symbolic than essential.



Most hunters consented to a follow-up interview at home.

Hunting ethics might be improved all around if programs existed to help individuals progress through these stages toward the ideal. Chances for unethical behavior would be minimized and the time lag from shooter to waterfowler cut significantly.

Individuals behave differently depending on whether they're a few miles from home or out of state, or whether they're with a large, gregarious peer group or with their own children. These behavioral differences are important and there is no single answer to improving hunter ethics.

The quality of both regulations and law enforcement have an effect. In post-season interviews hunters confided that personality and attitude of the local wardens are important as to whether or not they violate. Given respect for the individual, they choose not to violate. Without respect, violating becomes a way to test and defy the authority figure. Others indicate high game population forecasts push them toward violation.

Many said fines don't bother them, but that they fear that their names might appear in the paper as violators. Social approval or disapproval carries weight. Moral and ethical standards are social as well as individual functions. A society is law abiding when citizens take

Continued. . .

Observers must score 19 out of 20 in duck identification to be accepted.

Hunters say these conditions affect the tendency to violate—ranked from most likely to least likely.

1. Hunting on their own land
2. Not much chance of getting caught
3. Game is abundant
4. It's late in the season*
5. Hunting alone and few others nearby
6. Don't believe the regulation is necessary
7. Personally know the landowner
8. Game scarce
9. Far from home
10. Drinking
11. Opening day
12. Heavy hunting pressure
13. Hunting out of state
14. Don't know the landowner
15. Using a public hunting ground
16. Your children present

*Violators ranked this #1. Violators and those who obey the law showed a slight variation in rankings, but it was minimal.

responsibility for each other and become directly involved in demanding legal and ethical behavior of others. This means hunters themselves must take the ultimate responsibility for setting standards and that they must demand that others adopt them.

Values, however, cannot be taught like parts of a gun. In fact, they are caught, not taught. But even the individual without a conscience will act ethically to achieve and maintain a place in the group. This fact needs exploiting. Hunters must demand ethical behavior and recognize and reinforce quality rather than quantity of bag.

Finally, those of us who hunt need to remind ourselves that our ultimate responsibility is to the wildlife resource itself. Hunters fall into two groups: the naturalistic, and those who see animals as meat or as a trophy to be hunted competitively as a symbol of skill or superiority over others. Naturalistic hunters have strong feelings of responsibility and compassion towards animals. They are more deeply involved with wildlife than non-hunters. For them hunting is a way to communicate with and be close to nature. Such involvement develops responsibility and by implication can be a major tool for improving hunter ethics. Hunters need to be more directly associated with wildlife programs and education. Just buying a sportsman's license, or joining Ducks Unlimited or a sportsman's club isn't enough.

In summary: individual hunters should challenge themselves to serve as responsible models for all other hunters and non-hunters, and work towards that fifth stage of development symbolized by the "waterfowler."

Sportsmen's clubs should reach beyond their roles as social organizations and reinforcers of those who are successful (legally or illegally) and instead make their major goal establishment, promotion, and enforcement of sportsmen's responsibilities. And finally, DNR should reevaluate its programs in game management, enforcement, and education to find new and appropriate ways for hunters to become more directly involved with wildlife.

None of these changes will be easy to make. In fact they may be impossible given the interim recreational character of today's hunt and the limited time people can devote to it. But the effort to move them from the casual to the committed has to be made. Otherwise hunting as we know it may wipe itself out. □

VIOLATIONS*

Categories	% of all hunters	% of violators
FIREARMS: Uncased, loaded gun in boat or vehicle, shooting from motorboat or vehicle.	3.2	15.6
LICENSING: Unsupervised juveniles.	.5	2.5
GAME: Late or early shooting, does not retrieve immediately, illegal duck, over limit, shoots coot and leaves it, hazes birds, illegal blind.	8.0	38.5
NON-GAME: Shoots protected species.	2.9	13.9
TRESPASSING: Hunting on posted land, reserve or closed area; entering closed area with gun.	1.0	4.9
ENVIRONMENT: Litters, breaks oak branches for blind, crushes muskrat house.	3.9	18.8
BOAT: Boat number illegible, no lifejackets, no running lights.	.7	3.3
USE OF EQUIPMENT: Decoys out too far, in too late (20 min.), out too early (1 hour), unattended.	.5	2.5

*70% were intentional, 30% accidental.

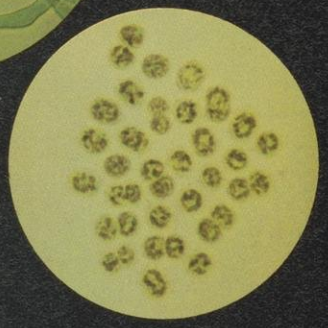
Illustrations by Georgine Price

ETHICAL VIOLATIONS

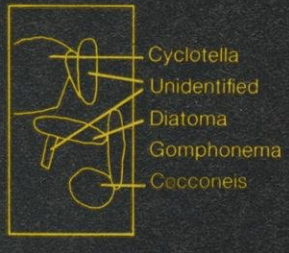
Categories	% of all hunters	% of violators
FIREARMS: Handles or points gun at another, crosses fence with loaded gun, unsafe with respect to another party.	2.4	6.6
RESPECT FOR OTHER HUNTERS: Shoots at unsafe angle, shot hits too close to others, boat not covered, sets up too close, shoots at another's probable game without reasonable expectation of success, crowding, creates a nuisance, scares game away, takes another's game.	9.1	25.6
RESPECT FOR GAME ANIMAL: Shoots too low or high, sky busts, indiscriminate shooting.	21.3	59.7
RESPECTS NON-GAME SPECIES.	1.4	3.8
LANDOWNER'S RIGHTS: Knocks down or cuts fences.	0	0
RESPECT FOR NATURAL ENVIRONMENT: Leaves smoldering campfires, cigarette butts.	1.4	3.8
BOAT HANDLING: No respect for others, cuts in front, doesn't slow down, doesn't wait turn at landing.	0	0
USE OF EQUIPMENT: Ethical violations other than boat or gun.	.2	.5

Annie, Fannie and Mike

Algae are like people. Some good, some bad, but mostly good. Many are beautiful. Often it's the worst kind we hear most about.



Swallowing Annie (*Anabaena*) and Mike (Microcystis) can cause nausea, vomiting and diarrhea. Photos by Bill Sloey



BILL SLOEY and
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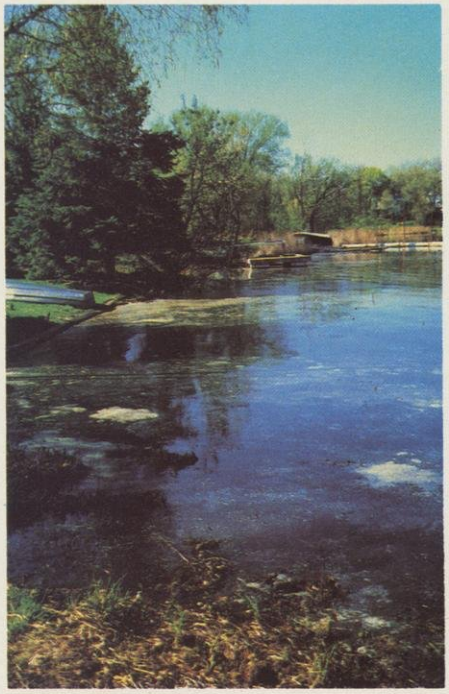
The word "algae" conjures up visions of skeins of green slime choking a roadside drainage ditch, or layers of thick scum washed into a favorite swimming beach on hot summer days. A lot of algae wear black hats — some real bad actors. Mostly, these belong to the blue-green group. We see them in summer, turning big, shallow or overfertile lakes into pea soup. They can sometimes dominate the water in Winnebago, Delavan, Pepin, Wisconsin, Mendota and many smaller lakes which receive too many nutrients from poorly functioning sewage treatment plants, urban runoff and, especially, from agricultural runoff. Organisms with strange names like *Anabaena* (Annie), *Aphanizomenon* (Fannie) and *Microcystis* (Mike) grow in profusion, often excluding other, more desirable, species.

Some deserve their bad reputation. They produce chemical compounds which make the water taste bad and smell bad. Worse, "Annie," "Fannie" and "Mike" all produce toxins which have, on occasion, been known to kill domestic and wild animals that drink too much of the water. No human beings have ever died from algal toxins in the United States, but each year thousands suffer from vomiting, nausea, diarrhea, and inflammation of mucous membranes after accidentally swallowing water laden with blue-green algae. There is more than a grain of truth to the old adage of not going swimming during hot, summer "dog-days" and it is these nuisance blue-greens that we are trying to control with our pollution abatement programs.



Mirror Lake in Waupaca County was treated for excessive algae blooms after local residents formed a Lake Rehabilitation District. Photo by Harry Lopas, Menasha

Not all algae, not even all blue-green algae, however, wear black hats. The majority are not only desirable but downright necessary. They form the base of the food chains — are the "grass" or the "cornfields" of our lakes and streams. Without them, water would be barren of trout and gamefish — fish would have nothing to eat. These are the algae with the white hats. They grow either attached to the bottoms of streams or are free floating in lakes and are eaten by insect larvae and small crustaceans. These small animals are then, in turn, eaten by small fishes and minnows which themselves provide forage for muskies, walleye, bass and northern pike. Many trout and panfish feed directly on the crustaceans and insect larvae. Were it not for the large populations of golden-brown diatoms such as *Melosira* and *Stephanodiscus,* Lake Winnebago would not boast of huge walleye and perch populations.

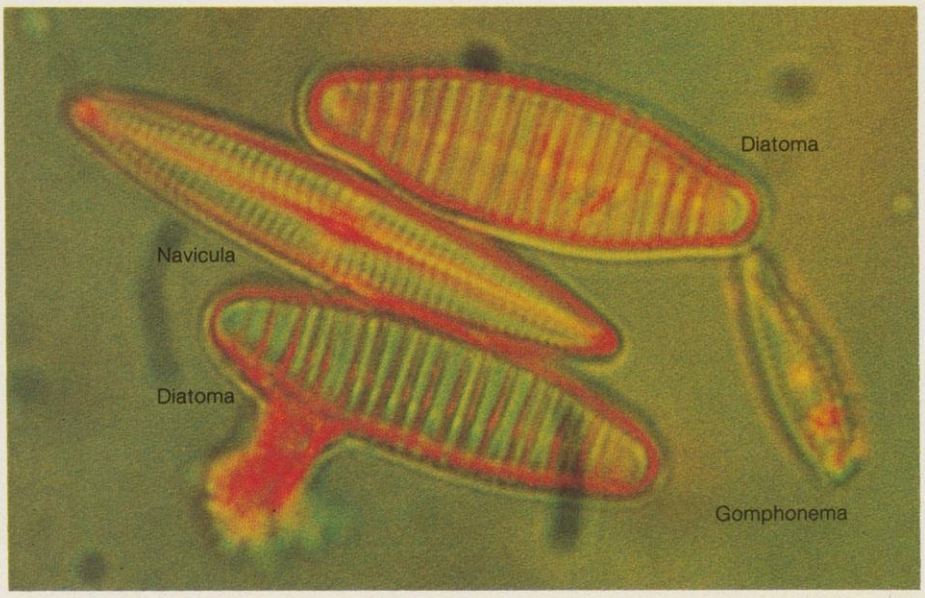
Sometimes diatoms also offer shelter to fish. Large blooms of diatoms in early summer and autumn shade the water so that light-shy walleyes come to feed on shallow reefs, even in midday. In some winters when there is little snow on the ice and sunlight can penetrate the water, diatoms bloom and conceal Lake Winnebago's giant sturgeon in their murkiness. Those years are sparse for spearers.

In smaller lakes, these same diatoms produce oxygen under the ice which keep insects, crustaceans and fish alive through the winter. That is, unless there is too much snow — then the diatoms die, oxygen disappears, fish die and we have a "freeze-out."

Fish managers have learned that trout streams can be made many times more productive if some of the tree canopy over the stream is removed to let sunlight in. Then, bottom-dwelling algae can grow on rocks and gravel to provide food for caddisfly, stonefly and mayfly larvae. Every trout angler knows that that means more trout. Next time you are on a stream, pick up a rock from a deeply shaded section and examine it closely. You will find it barren, save for a blackish-green zone near the bottom. Mostly, this is due to blue-green algae which provide food and shelter for midges and sowbugs — species not considered desirable by trout anglers. Then move to a sunny stretch and pick up another rock. You will find the top coated with a yellowish, slippery film of diatoms and the sides green and lush. There will be many insects and crustaceans. Algae are an important part of the system.

Besides being essential and sometimes a nuisance, algae can be important in helping detect and monitor water pollution. Excessive populations of blue-greens, like Annie, Fannie, and Mike, obviously indicate overfertility of the water. Other, more subtle, indicator species are also known. One particular green filamentous alga indicates the presence of organic materials in the water. Some species of diatoms are especially sensitive to heavy metals such as chromium, zinc and other toxic substances. Their absence may be a sign of heavy metal pollution. Others are known to be sensitive to certain herbicides or pesticides.

Unfortunately, we know too little about the ecological needs of most algae. We often don't know if absence, or excessive populations of a given species is a result of some man-made



disturbance such as pollution or a natural phenomenon. We have much to learn.

Even if algae were not sometimes a nuisance and were of no value in monitoring water pollution, they would still offer a strange, exciting and very beautiful world to the microscopist. The kind of algae found in soft, slightly acidic waters like coffee-colored bogs and northwestern lakes are especially striking. These belong to a group called desmids. It is a tiny, fascinating world that too few people have been exposed to. With a little light algae can kindle the imagination and help us acknowledge that all living forms, no matter how small, play an important part in maintaining the integrity and stability of natural ecosystems. Algae are but one form of life. All deserve understanding and respect. □

Photos by Walter Plaut, Chairman, Zoology Department, UW-Madison

Diatoms, unlike other algae, concentrate silica in their bodies to form two shells, one inside the other. The transparent silica produces beautiful patterns and shapes. Photographed with special microscopes and lighting equipment, these diatoms average less than 1/10th the size of the period at the end of this sentence. There are hundreds of different species of diatoms, all different as snowflakes. Those shown in the story include:

Amphora . . . an indicator of excellent quality water.

Cocconeis . . . the single most common bottom-living diatom in Wisconsin.

Cyclotella . . . found in the Great Lakes, likes good clean water.

Diatoma . . . the namesake for the species. Its silica ribs make it look tiger-striped.

Diploneis . . . a general indicator of good quality water.

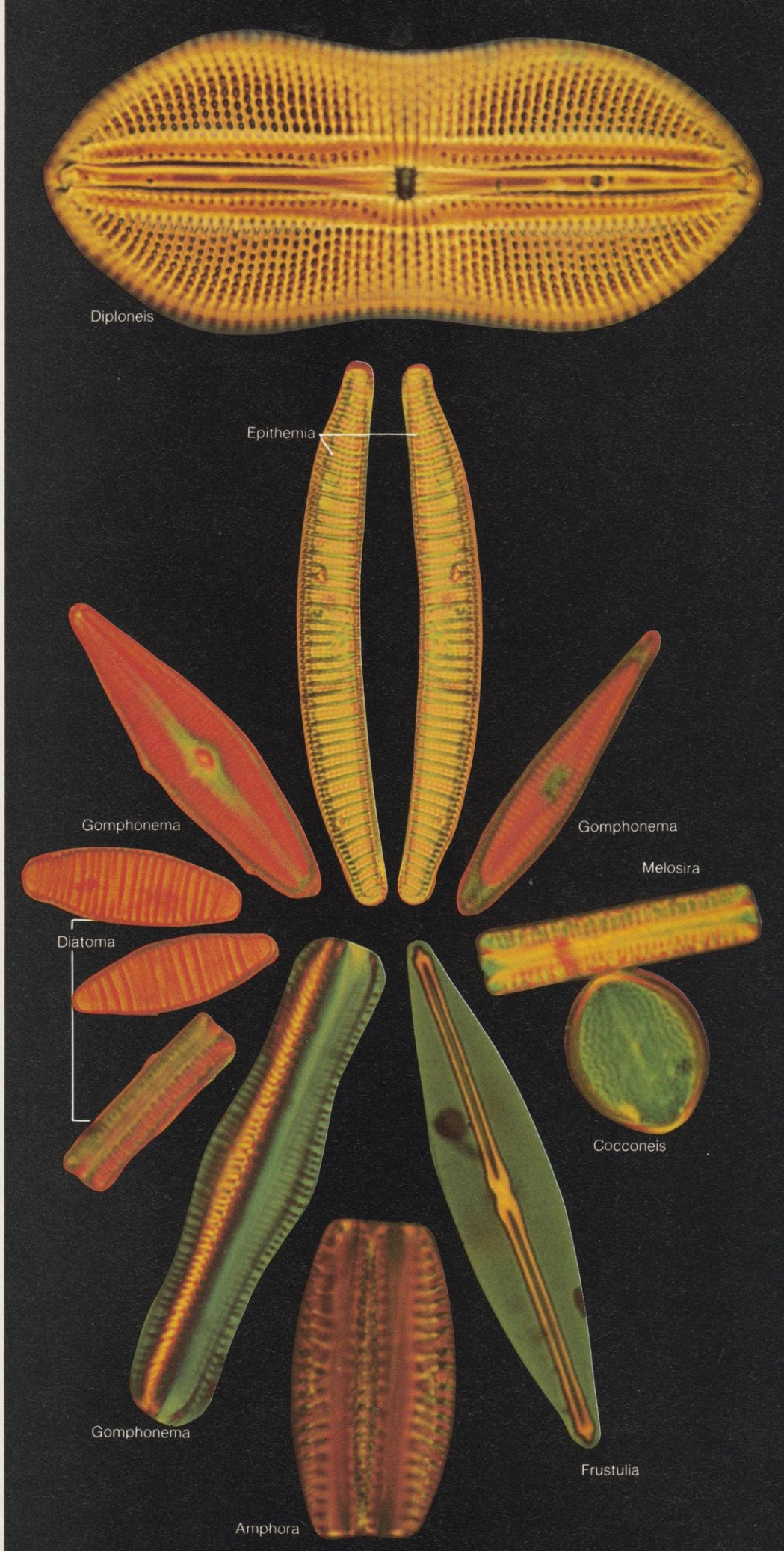
Epithemia . . . one of the most elaborate and widespread diatoms.

Frustulia . . . lives on stream bottoms. Important in the food chain leading up to trout.

Gomphonema . . . its jelly-like stalks make the bottom slippery in fast-moving streams.

Melosira . . . a free floating plankton. Melosira makes up 99% of all diatoms in Lake Winnebago. Their abundance indicates eutrophic water.

Navicula . . . means boat-shaped. It can make its own food through photosynthesis but is also able to eat other organic matter.



WISCONSIN SKIES

PROF. LYLE H. HORN
UW-Madison Meteorologist

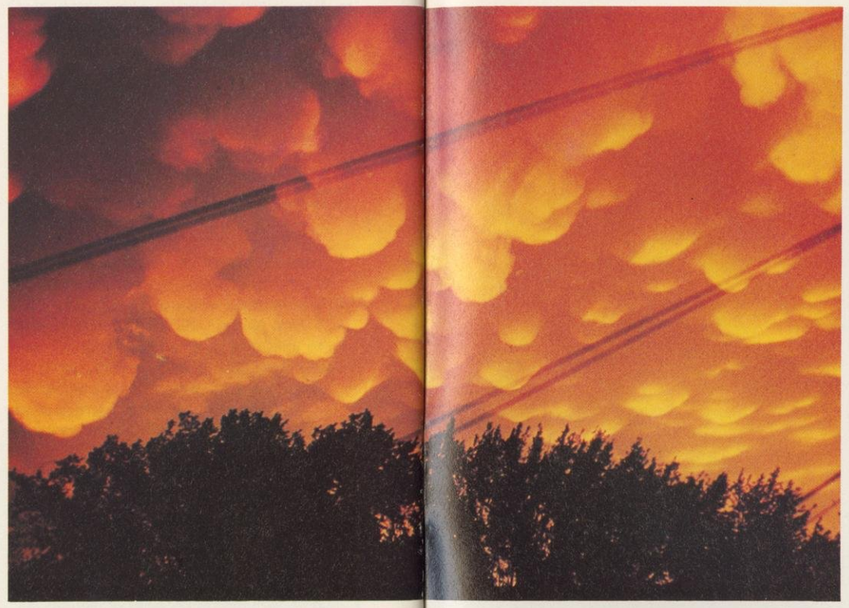
Clouds are a striking feature of the Wisconsin sky. One day may show scattered puffs of brilliant white cast against deep blue. Another may come in as somber and present a low, slate-grey overcast. Or a day may threaten and thunderheads tower on the horizon while their sound rumbles in the distance. Clouds help writers, composers and artists establish moods, and outdoor people like farmers predict weather. They give clues to large-scale pressure systems which bring day-to-day change.

The formation of any cloud requires three ingredients: air containing water vapor (an invisible gas); some process to cool the air; and infinitesimally small particles (called condensation nuclei) around which the water molecules can collect to form cloud droplets. There are always plenty of condensation nuclei, but water vapor and the degree of cooling vary greatly. Most of the water in Wisconsin clouds evaporated from the Gulf of Mexico, but it also comes from land and vegetation within the state and from areas to our south and west, especially in summer. Nearly all cooling needed is produced by upward movement of air. Air ascends, expands and cools to a temperature at which it can no longer hold all of its water vapor. Some of the vapor then condenses around condensation nuclei to form cloud droplets or ice crystals.

Ascending air is most common in regions of low pressure. If the ascent is gentle and uniform, layered or stratified clouds develop, but if the upward motion is vigorous and irregular, heaps or puffs of clouds are likely to form with clear areas between them. These different origins are reflected in the names of clouds. Layered clouds contain "stratus" or "strato" in their names, while heaps of clouds contain "cumulus" or "cumulo."

Clouds are also classified according to height above ground. The *cirroform* commonly have bases higher than about 16,000 feet and are composed entirely of ice crystals, even in summer. Middle-level clouds are called *altostratus* or *altocumulus* and are primarily made of water droplets. Their bases range between 6,000 and 20,000 feet. Below 6,500 feet are the low clouds, also composed of water droplets. A fourth class is the vertically developed cumulo-form clouds which have bases similar to low clouds. *Cumulus* are relatively small puffs but *cumulonimbus* may tower to 50,000 feet or more and produce severe thunderstorms. In especially severe ones, *mammatus* clouds, indicative of great turbulence, may form on the underside of cumulonimbus. The lower part of the cumulonimbus is water droplets, but the top is ice crystals.

When a large-scale storm system (low pressure area) approaches Wisconsin, usually from the west, high cirroform clouds appear first. As the system moves closer middle-level clouds form and thicken. Rain or snow often begins to the north and east. Then low clouds usually form as the falling precipitation saturates air at low elevations. Cumulonimbus most often are created in the warm southern portion of the storm system, particularly as cooler air from the west is drawn into the low pressure area. As the system moves eastward away from Wisconsin and fair weather returns, small cumulus clouds commonly form during the day in the flow of cooler air but evaporate toward evening.



Top:
The breast-like protruberances of *mammatus* occur in particularly strong cumulonimbus.
Photograph © Dennis W. Thompson.

Left:
Severe thunderstorms occur most often in *squall lines* — narrow lines of thunderstorms that may extend for many hundreds of miles. In this photo, taken in Madison, the late afternoon sun illuminates the rear of massive tops of thunderstorms. This squall line had passed through south central Wisconsin early in the afternoon and the thunderstorms were moving through Milwaukee and out into Lake Michigan. Cloud tops reached 50,000 feet.

Photos by author

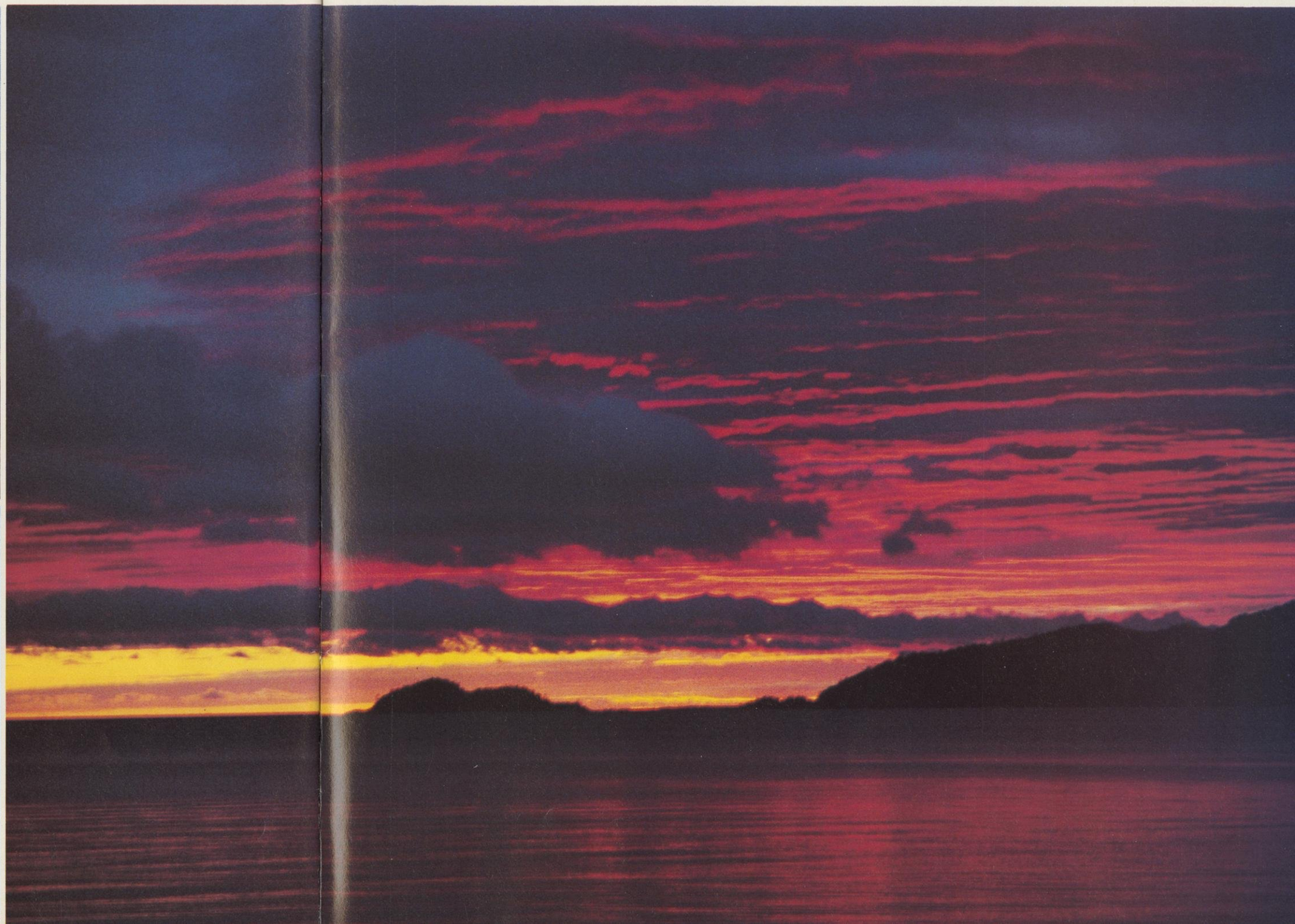
Right:
A cloud-to-ground lightning stroke on Madison's west side. Very strong rising currents of air rush past large rain drops and ice crystals in a cumulonimbus cloud and separate its electrical charge. Lightning is a large spark between areas of different charge, in this case between cloud and ground. Often lightning happens within a single cloud or between different clouds. Lightning is seen almost instantaneously but the thunder it produces (through sudden heating of the air) travels at the speed of sound (about 1100 feet per second). Distance between you and the lightning flash is estimated by multiplying the number of seconds which elapse between flash and thunder by 1100.

Bottom left:
Cirrus, a feathery or wispy high cloud, is in the foreground. Toward the horizon is a layer of *cirrostratus*. A few cumulus, slightly gray heaps, are also present. Cirrus clouds alone do not foretell a weather change. However, when followed by cirrostratus, as here, they indicate an approaching storm system. A halo often encircles the sun or moon when thin cirrostratus are present.

Top left:
Altocumulus and altostratus, middle level water droplet clouds. Their appearance in the western sky further indicates an approaching low pressure area. Altocumulus consist of small individual cloud elements often arranged in bands, while altostratus have a stratified appearance.

Bottom right:
After low pressure and rain or snow pass to the east, the clearing western sky can produce spectacular sunsets. As sunlight passes through the atmosphere, molecules of gases which make up the air mixture scatter the blue part of the spectrum and give the sky its blue color. When the sun is low on the horizon, at sunset, it appears red because most of the blue has been removed. Here, red light from the setting sun illuminates the lower side of remaining altostratus and altocumulus clouds.

Right:
During fair weather that follows a storm cumulus clouds often form in the morning. Bright sun heats the ground which in turn warms the air immediately above it. Rising currents of this warmed air create these fair weather cumulus. Toward evening as heating ceases, rising currents die out and the cumulus evaporate.



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