

2 P.M.
CUMULUS CLOUDS BECOMING NOTICEABLY LOWER, DARKER, LESS OVAL, INDICATE COLD-FRONT STORM POSSIBILITIES. APPROACHING FROM WEST, STORM WILL THEN MOVE EASTERLY

3 P.M.

4 P.M.

4:30 P.M.
VERY HIGH COBWEBBY CEILING OF ANVIL-TOP IS SPREADING AHEAD OF STORM

5 P.M.
SQUALL CLOUD BOILS ON AHEAD OF STORM. SUDDEN WIND SHIFTS OCCUR NOW

5:15 P.M.
SQUALL CLOUD PASSES. SKY MAY LIGHTEN, BUT STORM IS YET TO COME

5:30 P.M.
FIRST LARGE RAINDROPS, THEN FULL TORRENT AS CUMULONIMBUS PASSES OVERHEAD

6 P.M.
WIND SHIFTS TO THE WEST, RAIN DIMINISHES

6:20 P.M.
SCUD CLOUDS (STORM REMNANTS) INDICATE END OF THE STORM. AIR IS FRESHENED

7 P.M.
NOW WELL WITHIN COLD-AIR MASS. ONLY HIGH, SMALL, WHITE CUMULUS FORM IN THE COOL, DRY AIR. GOOD WEATHER FOR ONE TO THREE DAYS



CIRRUS SKY COVER INDICATES APPROACHING WARM-AIR MASS. RAIN MIGHT BE 12 HOURS AWAY

CIRROSTRATUS SKY COVER, SUN OR MOON HALO; RAIN MIGHT BE 10 HOURS AWAY

ALTOSTRATUS CLOUDS LOWER PROGRESSIVELY. SUN (OR MOON) APPEARS SHAPELESS BLUR. RAIN MIGHT BE 7 HOURS AWAY

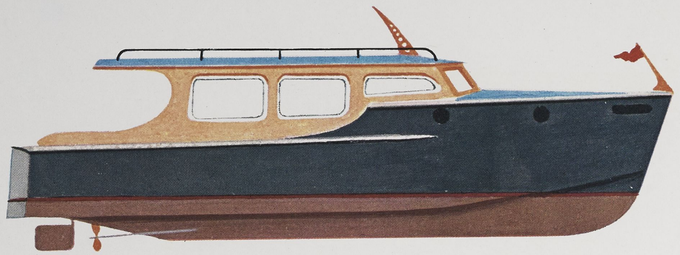
Reading the Clouds by Eric Sloane painted expressly for Field & Stream

STRATUS SHEETS MAKE THE DAY DULL, LESSEN VISIBILITY. RAIN MIGHT BE 2 HOURS AWAY

SLANTING WARM FRONT DRAGS ALONG GROUND WITH LONG, SLOW PRECIPITATION. WIND USUALLY SHIFTS FROM EASTERLY QUARTERS TO SOUTHERLY QUARTERS

NOW WELL WITHIN WARM-AIR MASS. AIR IS WARMER AND MOIST, VISIBILITY POOR. CLOUDS CONTINUE AS STRATUS TYPES OR FOGGY REMNANTS

Du Pont Offers You Top-Quality DULUX® Marine Finishes for Every Boating Need

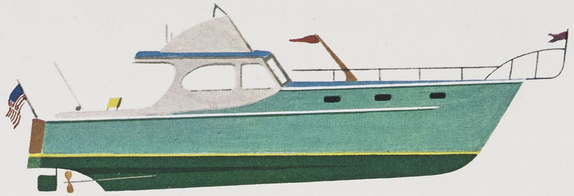


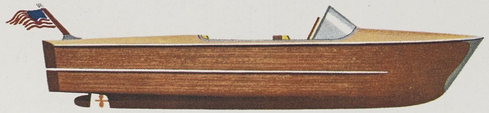


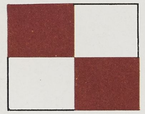




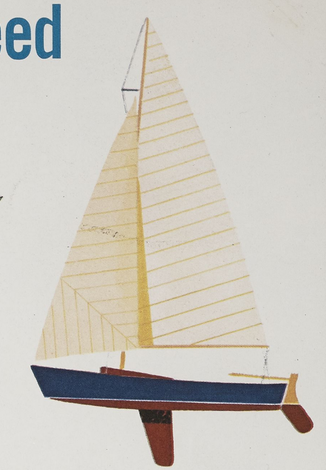












Nothing is more important to the boatowner than protecting the value of his craft, and keeping up its appearance. Naturally, this calls for the finest conditioning inside and out—using the very best finishes for *every* surface.

That's why Du Pont urges you to specify DULUX Marine Finishes for *all* your maintenance needs. Each of the top-quality paints and varnishes described on these pages has been designed for a specific purpose. Each is believed to be the very best that modern paint chemistry can formulate. By using them, you'll be assured of lasting beauty and protection all season long.

See your local Du Pont Marine Finishes Dealer for complete information. And while you're there, ask him for a free copy of Du Pont's handy reference guide, PAINTING HANDBOOK FOR BOATOWNERS—36 pages chockful of helpful data. Or write E. I. du Pont de Nemours & Co. (Inc.), Finishes Sales Division, Department FS-3, Wilmington 98, Delaware.



Sailboat, Outboard, Yacht or Dinghy...



TOPSIDE ENAMELS

DULUX Yacht Whites. Favored by yachtsmen in all waters. Use them on hull and cabin exteriors, including canvas and primed fiber glass. Available in Gloss, Semi-Gloss and Flat. Fast-drying to a tile-hard protective finish that resists weather, sun, salt spray, harbor gases and discoloration.

DULUX Yacht Black. An all-purpose finish for use on both wood and metal hulls and superstructures. Rich, gleaming, jet-black surface is quick-drying, tough and long-lasting.

DULUX Ship & Deck Enamel. 27 sparkling colors that stay bright and gleaming all season long. Tops in gloss retention, this rugged finish dries fast to a durable, mirror-like protective coating. Also ideal for cabin interiors.

DULUX Engine and Boottopping Enamel. A super-gloss, fast-drying finish for boottopping, engines and all properly primed wood, metal and fiber glass surfaces.

METAL PRIMERS

DULUX Metal Primer. A primer for all bare iron and steel surfaces. Has excellent rust-inhibitive qualities.

777 Zinc Chromate Primer. For use on properly prepared ferrous metal surfaces subject to underwater exposure when used in multiple coats, or as an intermediate coat between coats of DULUX Metal Primer and Du Pont Anti-Fouling Bottom Paint. Possesses excellent resistance to corrosion. Dries quickly.

DULUX Fiber Glass Primer for etched aluminum surfaces (see description at extreme right).



BOTTOM PAINTS

Du Pont Anti-Fouling Bottom Paints. Formulated on the *eroding* principle, these outstanding finishes contain powerful toxics to combat fouling all season long. Available in Copper Red, Sub-Marine Red, Sub-Marine Green, Sub-Marine Copper Bronze, and two new bright colors, Red and Blue.

New Vinyl Anti-Fouling Bottom Paint. Red. For the salt water racing craft where a harder finish is desired.

DULUX Hard Racing Bottom Enamel. Specially designed to provide maximum smoothness, hardness and "slip." For all racing boat bottoms in fresh water (and in salt water if craft is removed from water frequently).

MISCELLANEOUS

633 Marine Slip Retardant Additive. A spark-proof additive intended for use with DULUX Ship and Deck Finishes to provide a durable, slip-retardant finish. Ideal for any area where water or oil cause slip hazards.

37 Marine Paint & Varnish Remover. Paste type remover designed especially for effective removal of marine finishes. Non-staining.

643 DULUX Marine Glazing Putty. A fine-textured, high-solids glazing and troweling compound specifically designed for use in filling surface imperfections.

634 Polyurethane Caulking Composition. Fast-curing, high-tensile strength specialty sealant. Especially adapted to marine usage as a seam compound and adhesive.

There's a DULUX Finish to Fit Your Needs Exactly!



VARNISHES

604 DULUX Marine Clear Finish. An exceptionally clear, transparent alkyd-type varnish. Excellent for exterior and interior use.

605 DULUX Marine Spar Varnish. A clear, transparent phenolic-type topcoat with unusual wearing qualities. Excellent for brightwork where maximum build is desired.

606 DULUX Marine Plywood Sealer & Wood Primer. A clear priming coat that penetrates wood fibers, acts as a sealer against moisture attack. Dries fast.

670 DULUX Fast-Dry Spar Varnish. Designed for use where speed of drying is important. (Phenolic type.)

DULUX Paste Wood Filler. Unique alkyd-type, fast-drying wood filler. Comes in heavy paste form in Red Mahogany (645), Natural (644).



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DULUX Fiber Glass Primer White. Fast-drying, excellent filling and sanding properties. Adheres well to sanded fiber glass and other molded plastic surfaces. Also an ideal primer for aluminum. Topcoat with one of topside enamels (above).

REMARKABLE NEW ULTRA V SPAR VARNISH LASTS 2 TO 3 TIMES LONGER THAN REGULAR VARNISHES!

Formulated with a *special ultraviolet light absorber* that blocks out harmful sun's rays before they can penetrate beneath the surface! Outlasts and outperforms best grades of conventional varnish 2 and 3 times over—and *more!* Wards off weather, wind and salt spray from fit-out to haul-out. Comes in gallon, quart and pint sizes, plus a handy 16-oz. spray can that's ideal for fast touch-up jobs.





Dulux® Marine Finishes

DU PONT

Better Things for Better Living
. . . through Chemistry



pocketbook. Here the campers at left and center have regular camp gear, whereas those at right make do with household items

How do I manage all this? It's easy—and a lot of fun. I start out the night before, drive leisurely to the area I've chosen, sleep comfortably in my station wagon, and am ready at break of day for a full session of fishing or hunting. I'm what you might call a short-haul camper—and brother, I have found there's a lot of sense in this routine.

Like most of the guys I know, I do most of my fishing on Saturdays or Sundays, and my range is limited. Any weekend morning in fishing season, near a city of any size, you see sportsmen racing for the lakes and rivers and streams. The whole trip takes on the feeling of a serious business proposition, rather than the sport it used to be.

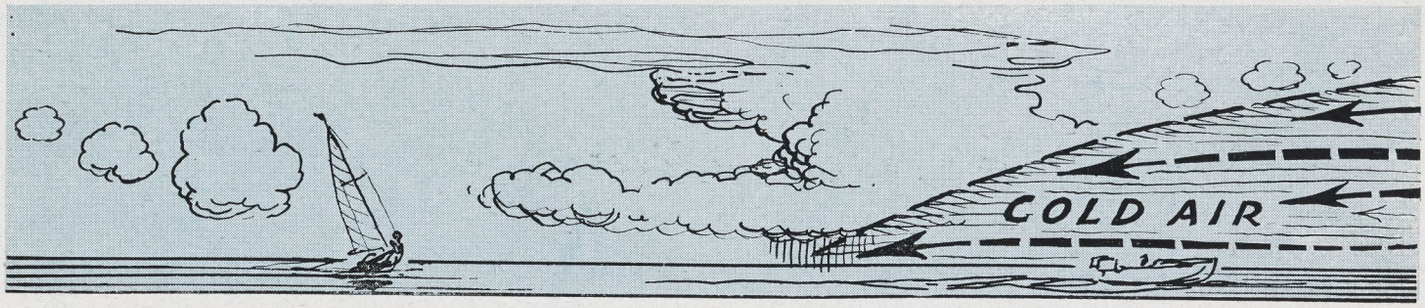
But with short-haul camping you have a chance for real escape and contemplation. You sleep soundly in clean country air, and the birds awaken you with that ungodly racket they make at first light, a chorus that is awe-inspiring and somehow wonderful. You awake in another world. The city, the job, the basement you were to clean today, are forgotten. The forest and the gray sweep of the lake beyond your campsite banish care.

And best of all, you are there at dawn, ready for action, much earlier than the alarm-clock and hotrod anglers. This can mean the difference, particularly in hot weather, between a stringer that hangs empty and one that strains the fingers of the man who carries it.

If you are a weekend fisherman of the hit-and-run variety, perhaps it's because you figure there's no sense in trading a soft, warm bed and a hearty breakfast for fitful sleep on knobby ground and chow painstakingly prepared over a wet wood fire. You're right—it makes no sense at all. You shouldn't trade comfort for misery, and you don't have to, because modern camping gear, food packaging, and transportation have revolutionized the picture.

The biggest boon of all to the short-haul camper is the station wagon. As a fisherman, chances are you drive one. If that is so, why not sleep in it? There, on four wheels, is your rolling motel. (*Continued on page* 123)

For details on overnight-camp gear, see page 82



Note the abrupt slant of the cold-air front shown in painting. It brings a short, hard rainfall

How To Be Weather-Wise

By ERIC SLOANE

THE weather changes when a new kind of air approaches and envelops us in its invisible ocean. The new kind may be one of many different varieties, but warmer air and colder air are the basic types that make weather changes. When we are within the gigantic bubble of a cold- or a warm-air mass, there is seldom a storm; it is along the fronts, or collision walls, of moving air masses that wind shifts and major rainfalls occur. The paintings opposite show an average cold front (top) and an average warm front (bottom).

Of course, no two fronts are alike. Here I have portrayed *average* storm fronts with their *average* time sequences. The cold-front storm is concentrated and rapid, taking about three hours to come and go, whereas the warm-front storm is slow and massive, often taking one or two days. A cold-air mass can actually be 75 degrees F., and a warm-air mass 40 degrees F.; they are so named because they are colder or warmer than air they invade and displace. The drawings on this page identify the two fronts on the opposite page; from them you may discern where, in the color paintings, the actual slant of each front is situated. In all drawings the air masses and fronts are moving from the right to the left as you face south.

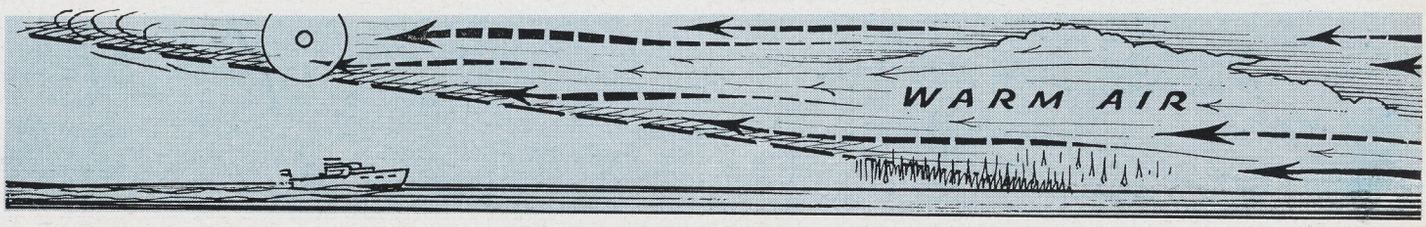
First notice that the backward slant of the front of the cold-air mass is short and abrupt; its rainfall is hard and short, and the storm band is usually less than ten miles deep. The forward slant of the front of the warm-air mass is long and gradual, and rainfall is slow and long; the storm band might be a hundred miles deep. Notice, too, that all the cold-air-mass clouds are cumulus types (accumulated lumps), whereas all the warm-air-mass clouds are stratus (straight ceilinglike layers). This is largely true both within the air masses and along their storm fronts.

The cold front moves quickly, often preceded by a "roll" or squall cloud with sudden gusts and wind shifts. The anvil top of a cold front's cumulonimbus (or thunderhead) flattens out and streams far ahead of the storm. You will see it as a high, veil-like overcast (far above the sailboat in the painting) occurring before every thunderstorm. As most such storms move from the west to the east, you can easily tell if you are in its direct path or if the storm center will skirt you or miss you entirely.

The cold-air mass is known as the broom of the skies, sweeping away all poor visibility, fog, and humid atmosphere. When a major cold-air mass (you can pick these out on your weather map) passes through, it leaves in its wake a day—sometimes as much as a week—of good, dry weather. Tiny, high, intensely white cumulus clouds will announce this condition.

The warm-air-mass front often slides overhead for a day or so before its lowered tail drags over your region to brush it with rain. Folklore has it that the warm-front rain "lasts as long as it took to come." So if twenty hours elapsed between cirrostratus clouds and rain clouds, the rainy spell should last just that long. The nose of approaching warm air pushes into the substratosphere, causing high-altitude cirrus ice-crystal clouds that form halos when the sun or moon shines through them. Folklore says, "Halo in the sky, rain is very nigh."

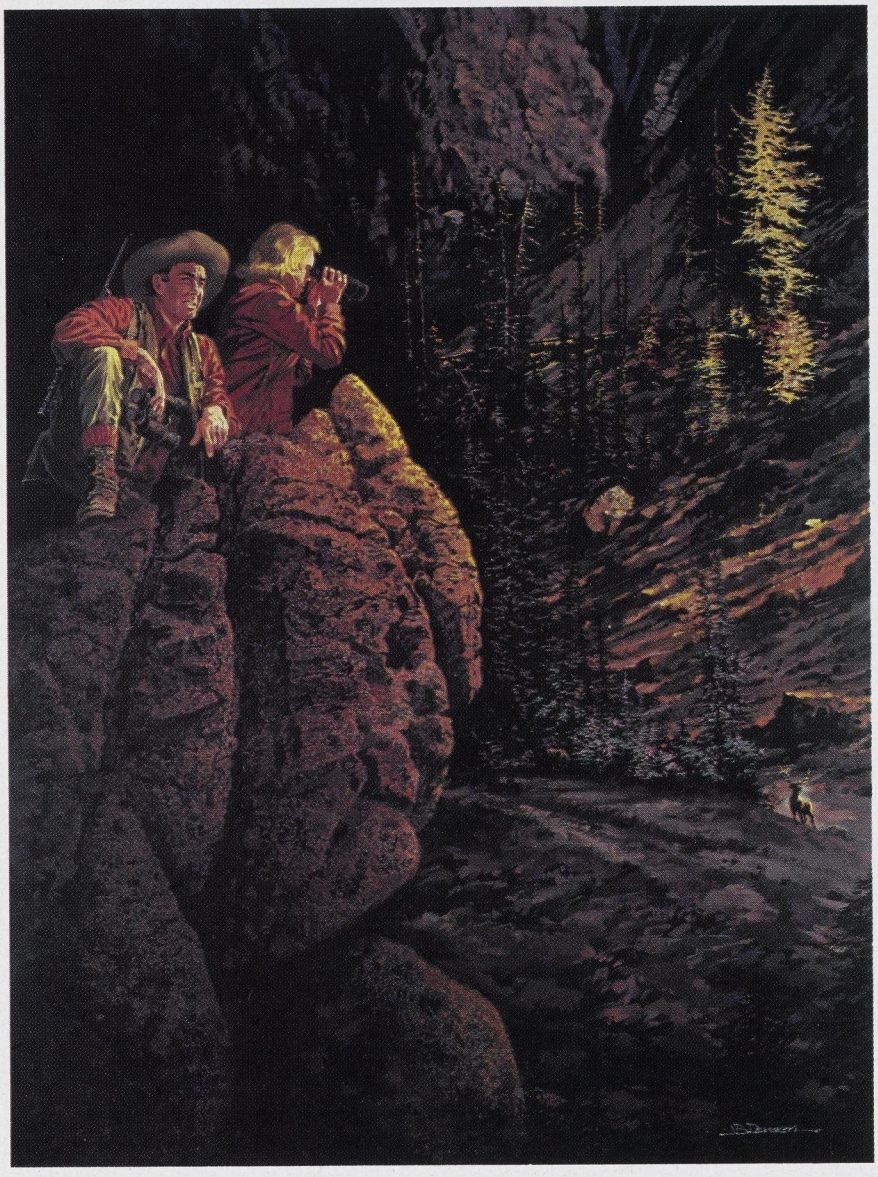
These two frontal storms are by no means the explanation of all storms, but they do lay a basic pattern for more than half our weather. They are the weather student's first lesson, and they are by far the most exciting weather phenomena to observe.



The slant of a warm-air front is long and gradual, and the rain it brings may last several days

NOW IS THE TIME

BY TED TRUEBLOOD



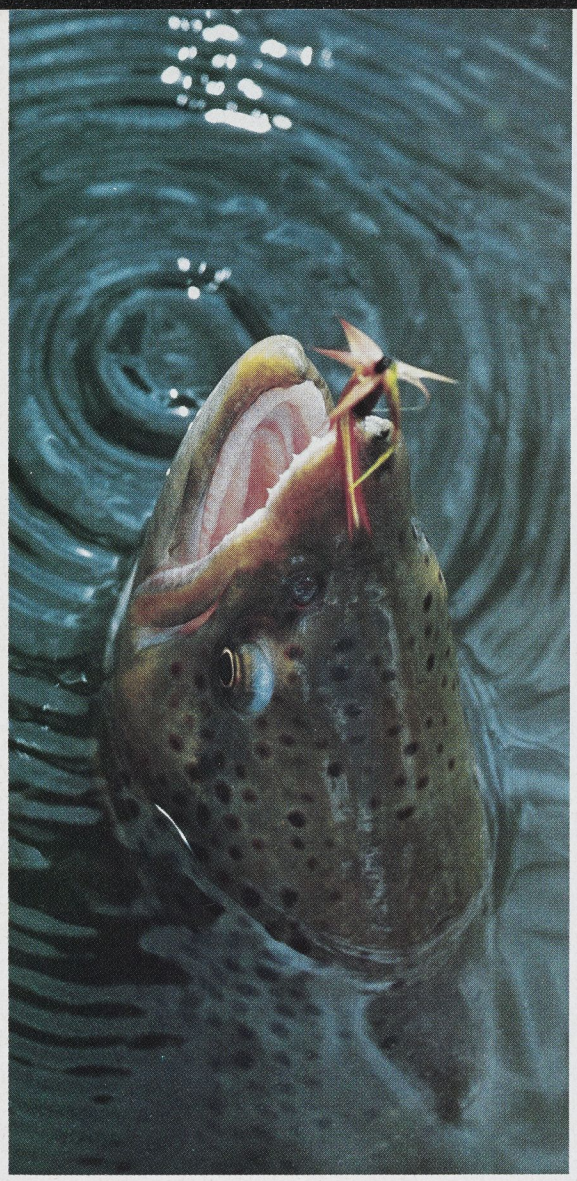
For any outdoor sport, there is a paramount rule: Nature keeps her own schedule, rewarding those who observe it and frustrating those who don't.

We're spoiled. Our modern civilization and urban living are to blame. We eat strawberries in January. When we want steak we have only to buy it. We come and go as we please, regardless of the season. We've learned to feel independent of nature. We ignore her. We're bigger than she is.

I don't think anybody believes this consciously. Rather, the feeling has simply grown on us from accepting the benefits of modern transportation, refrigeration, and all the other wonders of the 20th century as a matter of course. And we get by with it. So long as we remain in our accustomed environment we are usually able to do what we want to, when we want to, without getting into trouble.

But the fringe of brush that separates the highway from the forest also separates the present from the past. When we step through it we are no longer in the modern

ILLUSTRATED BY JIM DENEEN



What passes for intelligence is something else altogether.

But in reality, as soon as your fly sails off into space, the trout sinks to the bottom, fins erect and trembling in fright. Then, after a second, the fish darts for the nearest rock or log and spends the next couple of hours there. And you're left fishing over an empty hole.

While I was attending college in upstate New York, I found a small limestone stream about an hour away from campus. I don't think I caught a trout the entire first season; in fact, every time I entered one of the long, shallow runs full of feeding trout, the rises would wink out, one by one, like the lights of a city at daybreak. *Tough, smart fish,* I thought. Then one day a voice boomed out from the brush along the bank: "One step every 20 seconds! Whad'ya think this is, a bowling alley?" The owner of that voice eventually became a close friend, but in the meantime I took the stranger's advice. You should, too.

Count 20 seconds out on your watch. When the trout are rising and you need to cover another 10 feet before you're in range, imagine moving only two steps in 40 seconds. It took an annoying amount of self-control to learn how to do this, but I no longer betrayed my presence with telltale ripples. Those trout became easy—at least as easy as wild brown trout ever get.

Biologists who study trout have observed that there are degrees of fright behavior. There is the outright bolt-and-run-for-the-nearest-log, which occurs when you stroll up the middle of a pool. But you can also mildly frighten a trout with a sloppy cast; in this case, the fish is alerted but isn't spooked enough to run for cover. These trout can fool you into thinking they're more selective than they really are.

I got fooled by this very phenomenon last spring during the Hendrickson hatch—a large mayfly that may be the first insect to bring trout to the surface to feed. The trout are willing takers because they're hungry, but there's more to it. Early-spring waters often run fast and off-color, conditions that limit a trout's ability to see your offering in detail. At the same time, these trout probably haven't seen a dry fly since the end of the previous season, which makes them slightly more susceptible to being fooled.

Last spring, however, the Batten Kill was running unusually low and clear, and I encountered some surprisingly frustrating fishing. I was sure the clear water, which allowed the fish to get a good look at my fly, was making them particularly finicky. Since the water was so low and clear—midsummer conditions, actually—I switched to patterns designed for summer's picky trout: thorax flies, no-hackles, and parachute patterns; but still I took no fish. Out of curiosity I timed the risers, something all the books tell you to do, but I seldom bother with because I prefer to get my fly over a rising trout as many times as possible. One was feeding with a monotonous rhythm, taking a mayfly every 10 seconds. I pitched my fly over it at the 9-second mark. Nothing. I kept timing that fish, and it was a full minute after my fly floated over it that it began to rise again.

Later that day, I got into a position where I could see a trout hovering just under the surface. Every time I cast, the fish would shiver, sink a little lower in the water, and then slide back up to feed after a couple of minutes. Even though I had changed to midsummer patterns, in my early-season arrogance I had used the same approach and short, heavy leader that I normally use in a regular, high-water spring. My line was landing right on top of every riser, alerting them to a threat from above. The disturbance wasn't enough to send them running, but it was enough to take their minds off feeding. My mistake had been to assume that the fish were studying my patterns when, in fact, they were simply put down by my heavy leader. It wasn't intelligence but extreme wariness that was at work.

You should also know that trout are warier when feeding on the surface than when taking food from subsurface drift. One August day I saw a 14-inch brown trout sipping tiny mayfly spinners over a smooth sand bottom. It was feeding so furiously and there were so many flies on the water that one rise seemed to blend into another. The brown took my dry fly, but when I tightened, the fly scraped over its jaw and came loose. The trout didn't bolt as I figured it would; rather, it hung 6 inches under the surface, looking at all those mayflies, but afraid to poke its nose out of the water. I got the fish to twitch a little for both an ant and a beetle pattern, but though it moved for them, it wouldn't rise.

Then, I tied on a small Pheasant Tail nymph. On the first cast, a bad one that landed too far to one side, the trout raced over and inhaled the nymph. At first, this didn't make sense to me. Why would a fish be afraid of surface food, but have no fear of something drifting a few inches lower? Then I thought about what feeding on an insect drifting on top of the water means to a trout. It has to poke its nose into an alien environment: the temperature, density, and clarity of water are in sharp contrast to the air a fraction of an inch away.

That alien environment makes the trout even more nervous than it already is, which is why you can so easily spook a surface feeder. Subsurface feeders haven't left the safety of their environment, so they don't spook as readily. So you see, intelligence really plays no part, though for our sake we pretend it does.

world where nature is bent to suit our whim. We become a part of nature. She is our master.

Primitive people are well aware of this. The Eskimos of Anaktuvuk Pass don't hunt caribou when they feel like it; they hunt when the caribou come. Farmers everywhere—despite mechanization, irrigation, and chemical control of weeds and insects—plant and harvest, not when they are in the mood to plant or harvest, but in harmony with nature's rules. If they ignored them, the world would starve.

Modern sportsmen, however, particularly those with an urban background, often fail to make the necessary adjustment when they step from the world of man into the world of nature. It isn't always easy, and I have often been as guilty as anybody.

Several years ago my wife and I had an elk-hunting camp near a spring on a high lodgepole ridge. After a few days' exploring we discovered that a big herd of elk was feeding at night on the south slope, in an open area of grass and scattered yellow pine, about 3 miles from our camp and 1,000 feet below it.

To get there, we crossed the ridge, which ran east and west, and walked down a long, south-sloping hogback. The yellow pines the elk were using grew on its west slope. On the other side, the moist east slope, was a typical "elk jungle," a spruce thicket possibly half a mile across. There were several springs in it, each of them surrounded by bog, and the willows and alders were thick wherever the towering spruce let in enough light for them to grow.

This was where the elk spent their days. You would be lucky to see one 30 feet away, much less shoot him. It takes a real hunter to go into such a spot and kill an elk, and the problem of getting him out afterward is sometimes almost insurmountable. Naturally, we hoped to catch them out on the open slope among the yellow pines, where abundant tracks revealed they had been feeding.

Years of elk hunting had developed in us the habit of leaving camp when the east first began to pale and Orion was still brilliant in the autumn sky. The practice usually got us far enough away from camp to find game as soon as we could see to shoot, and it was what we did here. For three mornings we started at the usual time and pussyfooted along the western border of the jungle after the elk had already gone into it for the day. For three evenings we watched it until dark, but they didn't come out until it was too late to see our sights.

Obviously, we were asking nature to modify her rules—in this case manifested by the habits of the elk—to suit our convenience. And, obviously, she wasn't about to do it.

Then we got wise. On the fourth morning we left camp a full hour earlier. We walked about 2½ miles with a candle lantern, blew it out, and hung it in a tree before climbing over the last hump in the hogback. When we crossed it the light would have been visible to the elk—assuming, of course, that they were still feeding where they had been.

The last half mile was slow. We had to walk it in the dark, without making a sound, if all our efforts were not to be in vain. Finally we sat down to wait about 75 yards uphill from the spot where, according to the tracks, the elk usually went into the jungle. It was still too dark to see one, much less shoot, but the wind was in our favor and we were full of hope.

For a long time there was only silence. Then a bull bugled down among the yellow pines. Another answered from the hogback, along the edge of the jungle—we couldn't tell how far away. The eastern sky was getting pale. A pine squirrel chattered excitedly. We heard the funny, little sounds that juncos make, as though they were snapping their teeth. Then we heard an elk, walking and cropping grass. It was too close, much too close. If it came around above us and got our scent it would bolt into the jungle and the entire herd would probably go with it.

There are few things more exciting than waiting in the presence of game, knowing it is close, but not knowing how many or where, or whether they would detect us and vanish before we could see. Every minute was an hour.

At last we realized the stars were growing faint—most of them, in fact, had already disappeared. The early-morning sounds were becoming more persistent. Canada jays started their indignant shrieking. More squirrels were awake. Coyotes in several directions greeted the new day. Bulls were bugling all over the mountain.

Finally we could see elk, first one, then dozens of them. There must have been forty in the herd. Some were still grazing down the slope to our right. Some were standing near the edge of the jungle. Some walked leisurely into it and came back out; others went in and stayed.

The wait from the time we saw the first elk until we could see the crosshairs in our scopes was the longest of all. Even it ended eventually. We picked out two fat cows, standing broadside at 50 yards, and killed them.

Nature can be, and often is, generous. But she makes the rules, and unless we abide by them we are bucking hopeless odds in any outdoor activity from picking mushrooms to hunting elk to fishing. The time to take her bounty is when she offers it. Tomorrow may be too late.

Knowing when to go in search of nature's gifts requires no occult power. Experience helps, but careful and constant observation is even more important. And obviously, a little thought must be applied to what we see if we hope to take advantage of it.

Each winter during the Christmas holidays we see an outpouring of duck hunters. They usually show up about the time my partner and I are ready to pick up our decoys and start home—after the sun has dissipated the morning chill—and they seldom get any game except coots or an occasional unlucky goldeneye.

Most of them are high school or college boys. They lack experience, of course, but even without it a couple of days should teach them that nothing helps the duck hunting like ducks. Their real trouble is laziness. They like to sleep late and they hope—though surely without any real conviction—that nature will change the rules for their special benefit. Unfortunately for them, mallards that have learned to reach the safety of the big lake by 9 o'clock are pretty sure to be there on time, even during vacation.

The same thing applies in all our dealings with nature. We must adapt our schedule to suit hers, because she certainly isn't going to change hers for us. I took a friend to one of my "secret" spots on the Henrys Fork of the Snake River last summer and a terrific rise of good fish started about 9 o'clock. I was wild to get at them, but he fiddled around for an hour, despite my urging, and I was reluctant to start fishing without him. By the time we got into the river the rise was over. It didn't come on again all day, so we missed the only period of good fishing we might have had.

The time to pick berries is when berries are ripe. The time to see hawks is when the hawks are migrating. The time to catch fish is when the fish are feeding—even though the hour may force us to break our usual comfortable routine. I can think of no exception to the rule that the time to accept nature's gifts is when she offers them.

In our area the meadow mushrooms appear only with the combination of 60-degree temperature and rain. This frequently occurs at a most inconvenient time. But we have learned from experience that mushrooms won't wait. If we hope to lay in a supply, the only way to do it is to drop everything and go get them.

The salmon run and the geese fly and the mule deer migrate from the high country to their winter range when nature tells them to, just as they have been doing for thousands of years. When we leave civilization behind, whether for an hour, a day, or a month, we, too, are subject to nature's rules. The success of our venture, in nearly every case, depends on how well we observe them.

The late Ted Trueblood left a legacy of columns written for FIELD & STREAM *over nearly 30 years. This one, reprinted from January 1964, is part of a series to run intermittently.*

—The Editors

WHEN ALL ELSE FAILS

By Bill Ignizio

There's an old adage (or at least there should be) which states that "half the game is knowing when to break the rules." It's advice more bass fishermen should heed. Though the rules that tell fishermen how, where, and when to fish work most of the time, there are days—and we've all had more than our fair share—when the fish simply don't respond. On those days when all else fails, the angler willing to break the rules will catch fish while his by-the-book compatriot will only simmer in frustration. These unorthodox approaches include, but are not limited to, altering the way a standard lure is retrieved, investigating "non-productive" locations, and using offbeat tackle.





When bass reject the tried-and-true tactics, it's time to employ some unorthodox fishing techniques.

For example, standard operating procedures state that a topwater lure should be allowed to sit motionless until the ripples caused by its landing have dissipated. Only then should you begin a twitching retrieve.

That's sound advice, and the tactic has produced well enough over the years to become set in stone. But a "dead lure" method also works. I learned this tactic from guide Bud Andrews, who should know—he's taken well over 300 10-pound-plus largemouths from Florida's public waters.

"When fishing gets tough," he says, "you can sometimes get bass to hit a topwater lure by just letting the lure sit still. I do the same thing with an artificial worm. Bass see it drop down. You don't have to hop, skip, or drag the bait to get a hit. You have to watch the line very carefully, though, or you're going to miss the pick-up."



Fishing a deep-diving plug in the shallows can be effective—if you do it properly. Cast the plug near shore, keep the rod tip high and slowly reel in line. If you feel the lure beginning to hang up, reel in even slower or stop cranking altogether. A buoyant plug usually pops to the surface as soon as you halt the retrieve; at that point begin reeling in again at a slightly faster pace.

Deep-diving crankbaits also can be fished in unorthodox ways. Despite the double set of treble hooks found on most of these lures, it is possible to work them successfully along thick weed edges and on and near weed-topped underwater humps. Occasionally the lure snags, as you might expect, but it usually travels only a short distance before a bass takes it. A guide I know *(Continued on page 86)*

The author usually fishes by the book, but always adapts to the conditions of the day.

ANGLER IN HEAVY BRUSH PHOTO BY ED J. MENDUS; OTHER PHOTOS BY STEVE PRICE

Tick Attack

Some folks will try just about anything when a tick has them ticked off. What they need is some hands-on advice.

By Linda Wasmer Smith

Just about everybody has a favorite method of removing ticks from the skin. Some folks swear by a hot kitchen match, while others are partial to applications of petroleum jelly, fingernail polish or rubbing alcohol. But which way is best? An Ohio State University scientist has finally addressed that burning question.

Entomologist Glen Needham, Ph.D., allowed ticks to attach themselves to the backs of sheep. Then he compared the effectiveness of each of the four removal methods mentioned above, plus a fifth method: manual removal with fingers or forceps.

Needham found that the hot match, petroleum jelly, fingernail polish and rubbing alcohol were all equally useless. None induced a tick to detach itself. Manual removal, on the other hand, worked every time. And with the right technique, the tick could be pulled off without leaving any mouthparts behind.

Some of the results came as no surprise to Needham. For example, covering the tick with fingernail polish is supposed to work by cutting off the tick's air supply. Unfed adult ticks, however, breathe only a few times per hour when at rest. The polish hardens long before the tick needs to come up for air.

"I had thought that the hot match might work," Needham said. "But all the ticks did when I put the match on them was curl up their legs and look well-done. They didn't even look like they were trying to detach." In addition to the obvious risk of burns, a hot match also has its unforeseen hazards. The heat may cause the tick to salivate or even explode, thus releasing any germs it may be carrying into your body.

According to Needham, the best tick attack method is the one frequently condemned as the wrong one—manual removal. He recommends grasping the tick as close as possible to the skin, then pulling upward with steady, even pressure. Don't twist or jerk the tick because this can cause the mouthparts to break off. Also, don't squeeze or crush the tick because this can lead to the release of germs.

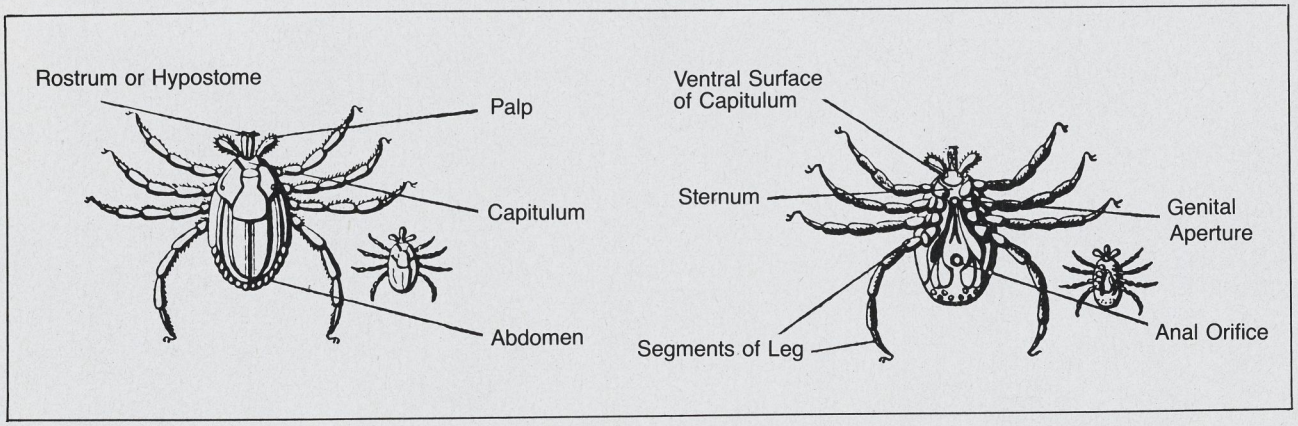
Many methods have been devised to remove the tick—shown here from above (left) and below—from the skin, but manual removal is best.

As an added precaution against infection, Needham suggests that you avoid handling a tick with bare hands. Shield your hands with a tissue, a paper towel or rubber gloves, or use tweezers instead. After you've removed the tick, wash your hands and disinfect the bite area. Needham also advises that you pull off any tick as soon as you discover it.

If the various other methods of tick removal are really worthless, how did they become so popular?

"Most folks feel total disgust about touching or handling a tick," explained Needham, who has himself been studying the little buggers for 15 years. "That disgust, combined with the fear that the tick's head will break off, leads people to try something other than pulling off the tick. When people try these other methods, they end up finally having to pull the tick off manually after all."

So, the next time a tick has you ticked off, take the easy way out. When just pulling them off is the best thing to do, why use something fancy?



of winter. He casts the light jigs with spinning gear and four to six-pound line; he relies on stiff baitcasting rods when fishing the heavier jigs and spinnerbaits that he uses most of the time. The baitcasting reel on his jig rod is spooled with 10 or 12-pound line, and the spinnerbait rod is matched with 14 or 17-pound line.

On the first night I spent with Nichols on Norris Lake, the smallmouths preferred jigs. I fish jigs often during my daytime outings, so I held my own. The following night, the bass wanted spinnerbaits. I own a passel of spinnerbaits but had never really worked at fishing them on the bottom in deep water. That proved to be a severe handicap. The first half of the night yielded little action. We probed a number of points and caught only a few bass.

"We've got to try something different," Nichols said.

He leaned back in his pedestal fishing chair and sifted through 30 years of night-fishing experience on Norris Lake. You could almost hear him think. When his cogitation ended, he started the big outboard and we moved slowly toward the middle of the lake. He studied his depth finder intently. We moved around for maybe 10 minutes, zigzagging several times. It was apparent that a depth finder is even more important at night than it is in the daytime, because at night you are unable to use landmarks to find offshore structure. When Nichols stopped, we were more than 200 yards from the nearest land.

"There's a submerged ridge out here," he told me. "It runs parallel to the creek channel."

The top of the ridge had dips and humps in it and was between 10 and 14 feet below the surface. Thanks to the black lights, I had no trouble keeping my spinnerbait on the bottom. I could occasionally feel the lure bumping over boulders, but sensing strikes was another matter. Nichols put four smallmouths in the boat in short order while I was still waiting for my first fish.

At that point, I stopped fishing to study his technique. The moment his lure touched the bottom, his illuminated line began a rhythmic motion as he lifted the rod tip while making several cranks on his reel. This would make the blade throb and attract any bass in the vicinity. After lifting the lure, he held his rod rigid at the 11 o'clock position until the lure touched down again. It looked so simple, yet he had caught three more bass by the time we reached the end of the ridge. I caught only one fish. It's hard to beat experience.

The ridge we were fishing was typical of the structure where Nichols takes most of his smallmouths in Southern impoundments.

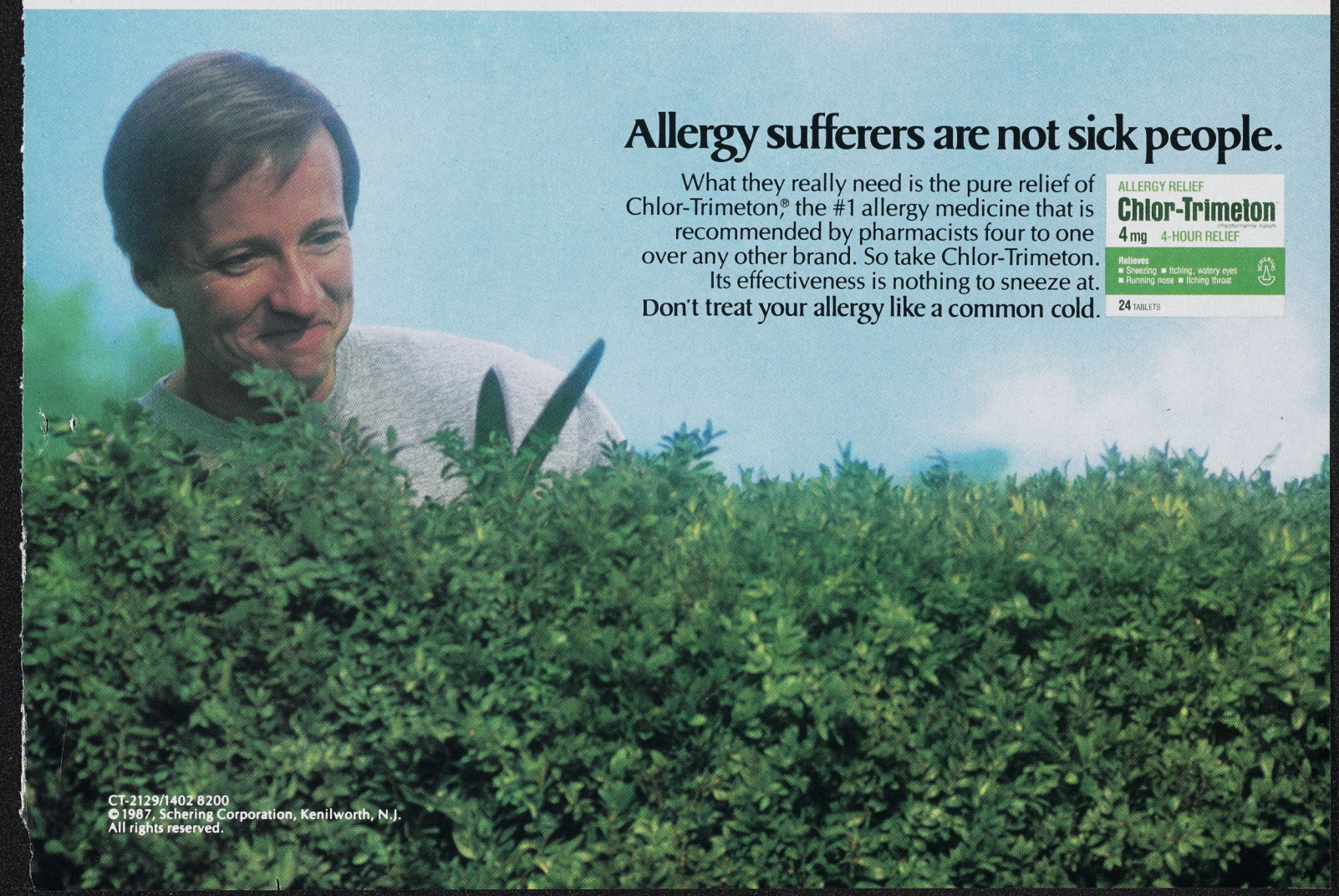
"I find," Nichols told me, "that smallmouths like rock and gravel in the lakes I fish, but they'll stay with anything that will hold baitfish—such as grass, stumps and drop-offs. Anything that will hold baitfish will hold smallmouths, too."

In May and June, Nichols begins fishing for smallmouths in shallow water near spawning areas. As the weather and the water temperature warm, he follows the fish as they move out to drop-offs and creek channels in deeper water. In the fall, the bass move shallow again and go on a feeding spree to fatten up for the winter, and Nichols goes shallow with them. As fall turns to winter and the water temperature drops, the bass again move back to their deep-water haunts, and so does Nichols.

His rule of thumb is to fish shallow when the surface water temperature registers 50° to 70°, and to fish deep when the water is colder than 50° or warmer than 70°. He believes that June, July, October and November are the best months for quantity and quality because the smallmouths are actively feeding in 15 to 18 feet of water, which is fairly shallow and easy to fish. At other times, the fish are often 25 to 30 feet deep and harder to catch.

Before you plunge into the darkness, be warned that fishing for midnight smallmouths can be addictive. After more than 30 years of it, Nichols still has trouble sleeping before he goes on a fishing trip.

"After all these years," he told me, "I still get excited about going fishing. The day I don't, I'll quit."



Night sky in late hunting season

occurs, although the shortest day of the winter was on December 21.

January 4: The third-best meteor shower of the year, the Quadrantids, is at maximum, but the morning moon will spoil after-midnight viewing. Expect to see fewer than the forty or so meteors that a dark sky would bring.

January 7: Apogee moon (farthest from the earth) occurs today. Leo's bright star Regulus is near it after moonrise. In conjunction with the star before rising at about 8:00 P.M., the moon pulls away toward the left as they climb the sky.

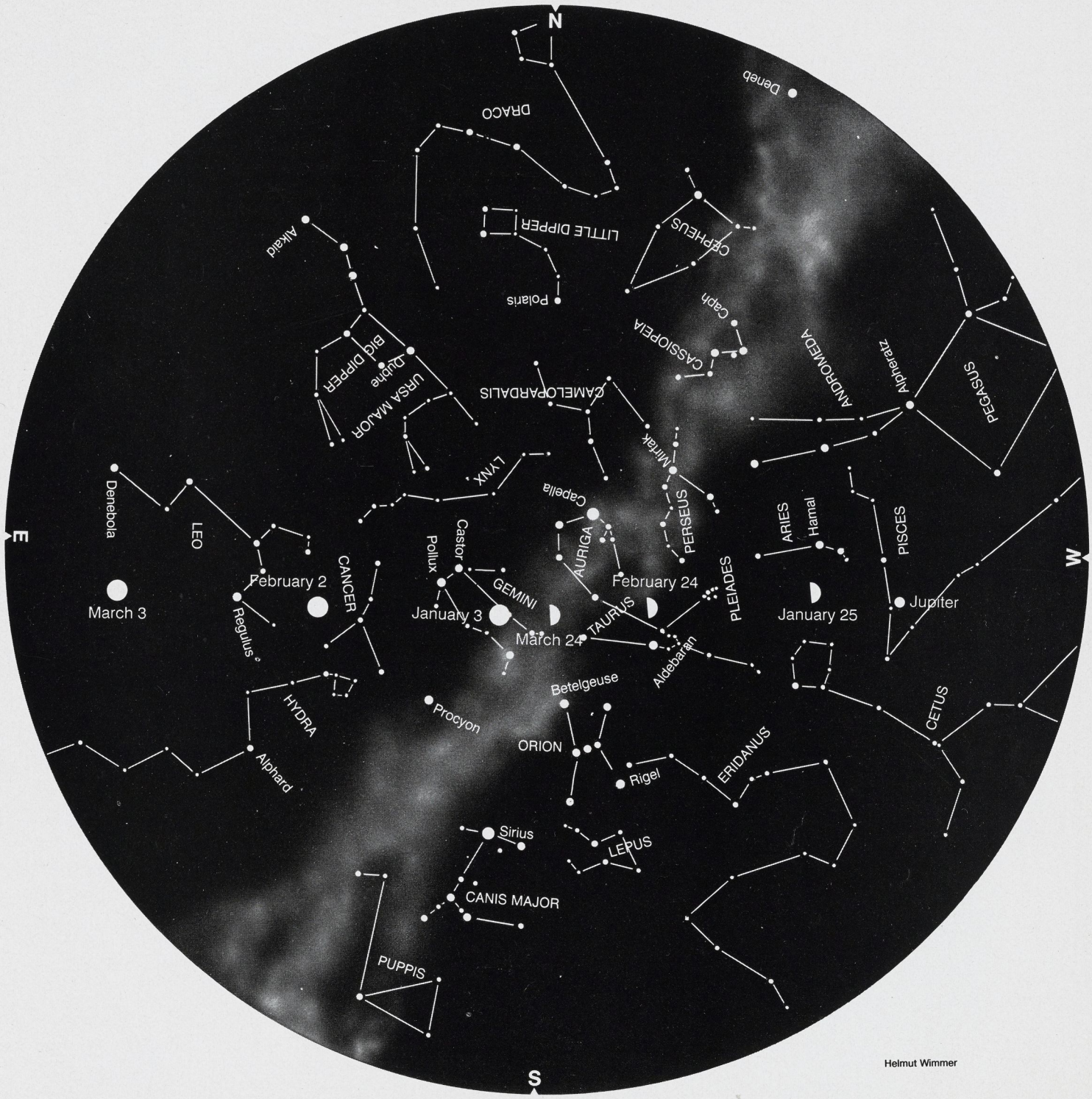
January 9: Regulus (higher and to the right) and Spica (lower) are the two bright stars bracketing the waning moon after midnight.

January 10–12: Rising later each night and closer to Spica, the moon finally occults (covers) the star over the Southern Hemisphere at their conjunction, at about 5:00 A.M., EST, on the 12th.

January 15: Mars, Antares, and the crescent moon are worth getting up to see before dawn. Look for them low in the southern sky, two reddish objects to the left and below the rising moon. Mars is the higher of the two. Later in the day the moon passes Mars (at about 11:00 A.M., EST) and Antares (at about 6:00 P.M., EST), occulting the latter over the southwest Pacific. Moonrise is at about 3:30 A.M. and the other two objects are up by 4:30 A.M. Saturn appears above the horizon during morning twilight. By the morning of the 16th, the moon is past Antares. Both reddish objects are above the crescent, with Saturn below it.

January 19: New moon is at 12:26 A.M., EST, and perigee moon (nearest the earth) occurs only sixteen hours later, building strong tides tonight and tomorrow. Should east-to-northeast storm winds blow along the eastern seaboard, flood conditions may arise.

January 20–21: A new crescent moon passes Mercury on the 20th and Venus on



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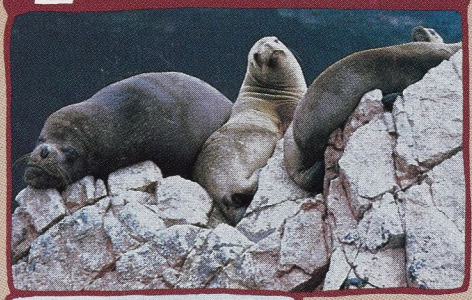

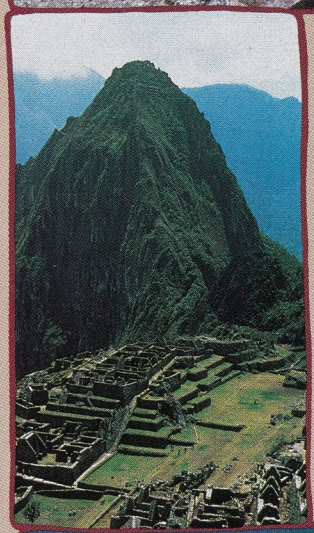





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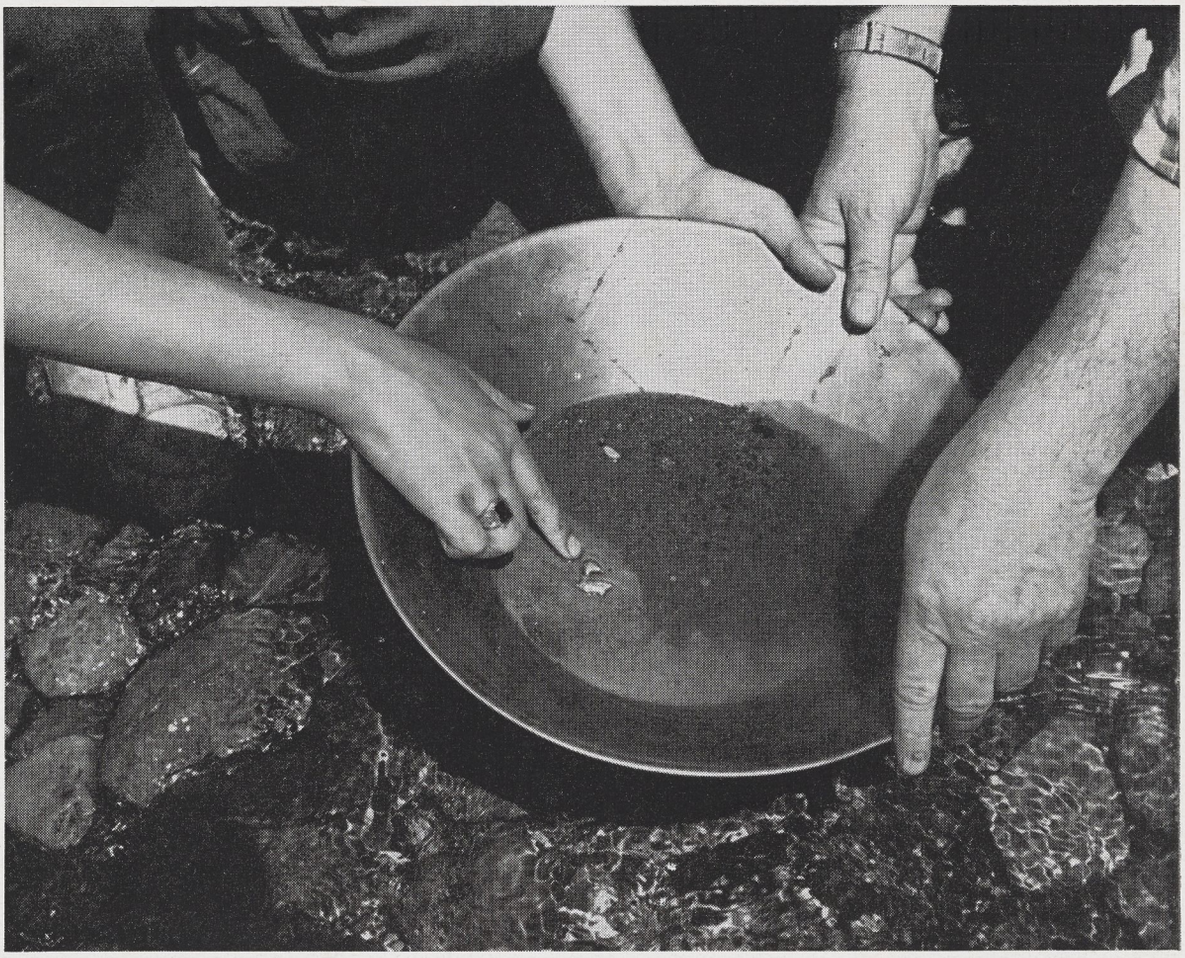

Now, don't go expecting a nugget like this! Young Brent Clark didn't—until we kind of ganged up on him

Ever Try Panning for Gold?

BY TED TRUEBLOOD

Here is one situation where a flash in the pan can mean money in the bank. Well, not much, but the fun you have will make you rich

MARCH, the desolate month that drags out endlessly between the end of hunting and the beginning of fishing, is not a bit too early to start making vacation plans for next summer. In fact, planning is one of the best ways to speed the hours of this disconsolate time, and I have observed that if I can only live through the month of March I usually make it for the rest of the year.

To those kindred souls who languish in confinement and yearn for the bright days ahead I have a suggestion: This summer, if you intend to vacation in the West or in Alaska, include a little gold panning in your schedule. It won't make you any money—what does that's fun?—but it is one of the most fascinating of hobbies. To prospect in the manner of the forty-niners, an activity in which all members of a family can share, to fill a pan with gravel and then wash it down until only the black sand and perhaps a few specks of gold remain, is utterly engrossing.

Although placer mining has been carried on in the West since 1828, there still are many spots where you can park your car beside a good road and wash out a pan or two of gravel with an excellent chance of finding a few colors. (A color is a particle of placer gold worth only pennies; larger pieces are called nuggets.) There are many known deposits that, for one reason or another, couldn't be mined profitably on a large scale. Then, too, each hard rain, spring runoff, and high water moves some soil and concentrates the gold in it on bedrock or in river bars. This is the way in which most placers were formed originally, and the process still goes on.

Many low-grade placer claims—and some not so low—are being held by their owners because present economic conditions don't justify working them. It is an extremely poor idea simply to walk onto a man's claim and start panning, but if you ask permission first it will nearly always be granted. In fact, many an oldtimer would be delighted to show you where and how to find a few colors.

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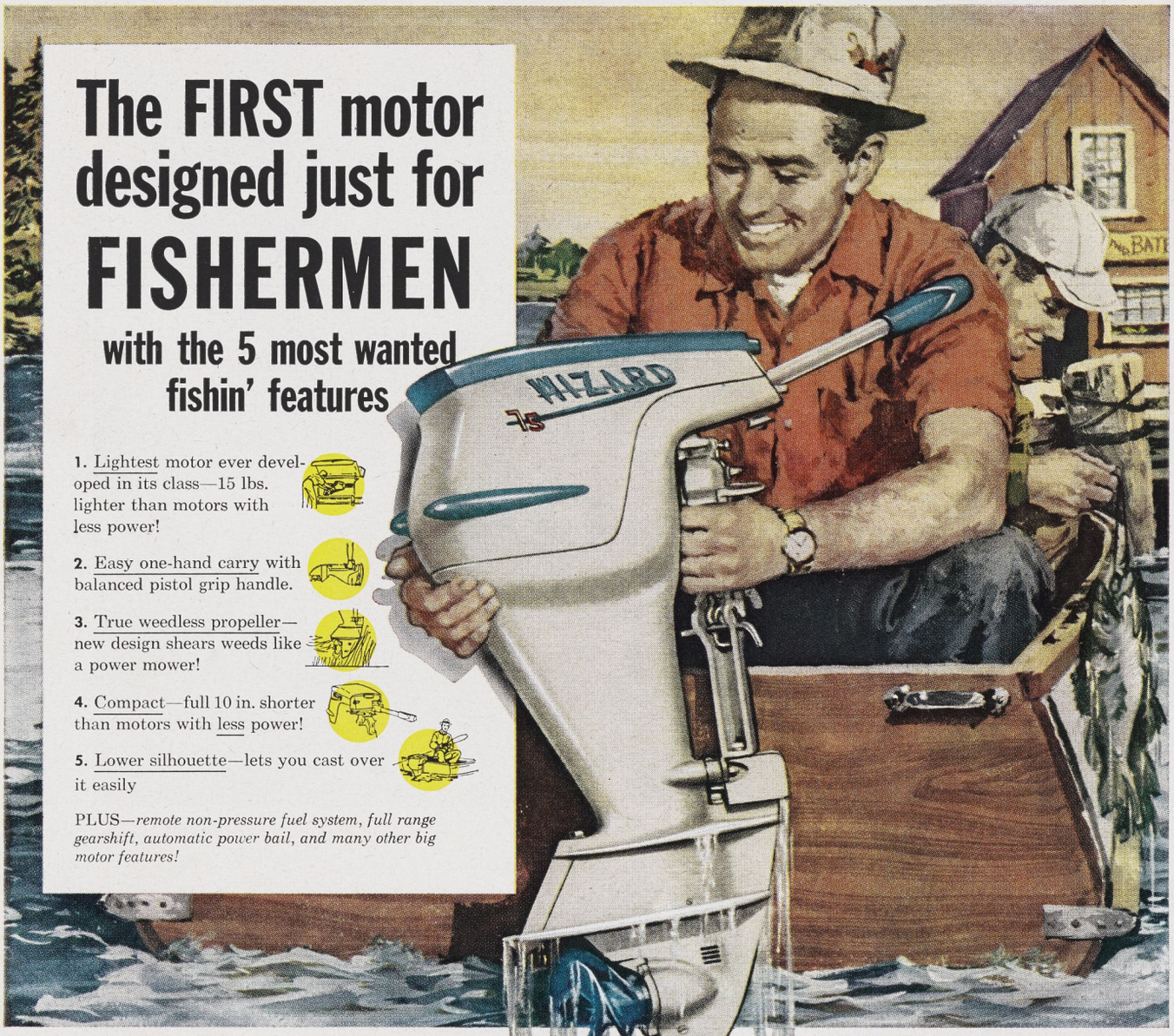

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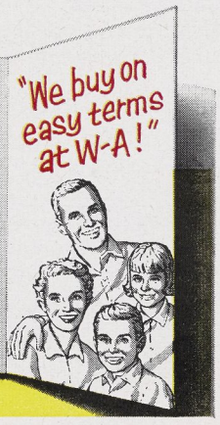



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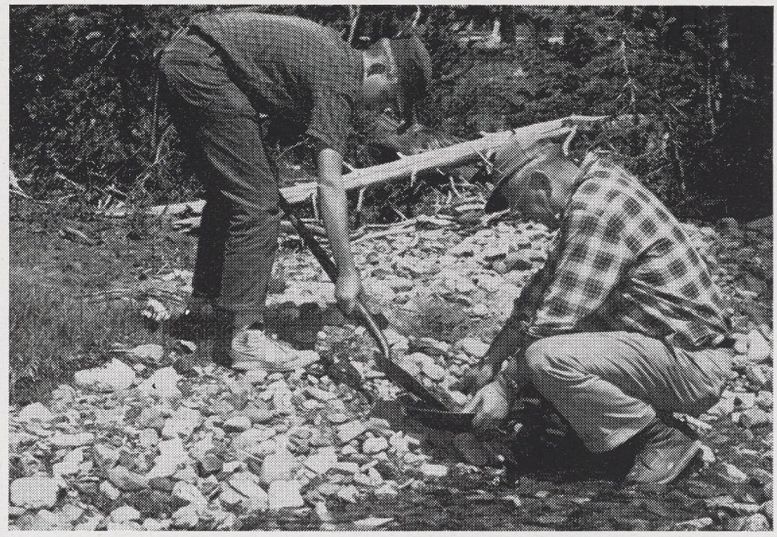

Jim Clark (*right*) and Brent fill a gold pan with gravel from a placer

Spots that were worked out and abandoned many years ago may also reward the amateur prospector. My brother and I once got about half an ounce of gold in a couple of days by carefully digging out the cracks in the bedrock below an old placer claim and panning the sand, fine gravel, and clay that we found in them. Judging from the size of the trees growing there, this ground had been mined fifty or seventy-five years before.

The place to find gold is in a known gold-producing area. There are placer-mining districts in all eleven of the Western States, plus South Dakota and Alaska. In addition, Alabama, Georgia, Indiana, Maryland, North Carolina, South Carolina, Tennessee, and Virginia have produced some placer gold. Information Circular 6786, "Placer Mining in the Western United States," which you can obtain by writing to the Central Experiment Station, Bureau of Mines, 4800 Forbes Avenue, Pittsburgh 13, Pennsylvania, contains a map showing western placer-mining districts. It also tells how to pan gold, where to look for it, lists the minerals usually found with it, and gives other useful information.

Placer-gold deposits result from the weathering and erosion of gold-bearing rocks. Running water carries them toward the sea, meanwhile grinding them smaller and smaller and setting free the gold they contain. Consequently you should expect to find gold in river gravel, either along a stream or in an old streambed that may be far above the present level of river or creek. River gravel can be identified at a glance by the rounded smoothness of the rocks. (*Continued on page* 24)



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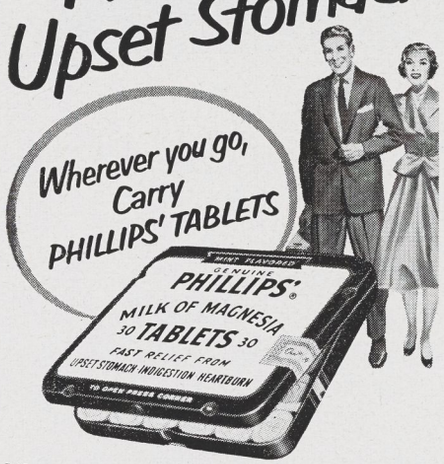

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There are occasional exceptions to this river-placer rule. A residual placer is one formed by the weathering away of a rich gold lode, with the resultant material gradually working its way down the mountainside. Glaciers played a part in the formation of some placers. In the Southwest, gold is found in angular gravel (as distinguished from well-worn river gravel) that was swept along for short distances by flash floods. The beach deposits on the coasts of California, Oregon, Washington, and Alaska were formed when gold-bearing material was discharged into the ocean, and of these the famous beach placers at Nome were by far the richest.

In most cases, though, placer gold is found in river gravel; that is the logical place to look. The inside of a bend is a good spot to try panning, as is the upper end of a long gravel bar lying downstream from a curve. Bars running across the stream at an angle and exposed during low water may contain gold. In general, you should try to select places where the river was dropping its load while still running at flood stage.

Gold is six or seven times heavier than quartz and feldspar, which make up the bulk of placer sands; so the colors are always found among particles much larger than they are. Coarse gold occurs in layers that contain cobblestones and boulders, and even very fine gold is found among sand and pebbles ranging up to the size of baseballs.

In old channels above the present level of a stream, nearly all the gold may be concentrated in one comparatively thin stratum or in one streak within that stratum. The richest gravel is usually on bedrock, but that is not always the case. In one spot I prospected along the Snake River the paydirt was covered with about three feet of adobe soil. Immediately beneath it, the top eighteen inches of gravel ran 600 colors to the pan, but the farther I dug the less there was. I found no gold at all in the gravel eight feet beneath the surface.

Possibly I should explain that this was not a rich strike. The gold of the Snake and Green Rivers, and most beach gold as well, is notoriously fine. It runs from 200 to 1,000 colors to a cent. Athough this doesn't warrant mining on a large scale, it does produce a thrilling sight when you finish a pan and see a streak of yellow, made up of maybe 100 to 500 individual colors, trailing along behind the black sand in the bottom.

The equipment for panning gold is simple and inexpensive. You need a pan and a shovel and, occasionally, a pick. A gold pan can probably be bought in any town in the West, certainly in any of the larger towns near gold country. The standard pan is 16 inches in diameter at the top, 8 to 9 inches across the bottom, and about 2½ inches deep, with sloping sides. There are also 12- and 14-inch pans. All are made of sheet iron, and if you can't find a regular gold pan a sheet-iron skillet will serve about as well.

Your new pan will be covered with a film of grease that kept it from rusting in the store. Heat it over a fire or your camp stove until every trace is burned off. Gold won't stick to a greasy pan.

Now you're ready. Fill the pan with gravel and submerge it in water, preferably still, shallow water. Work the contents with your hands until any lumps of clay that may be present are thoroughly dissolved, and throw out all the larger rocks and pebbles.

The next step is to hold the pan flat under water and agitate it thoroughly, using an irregular around-and-around movement. Your object is to get the contents into a loose, semisuspended state so that the gold will settle to the bottom. After a few seconds of this, bring the pan to the surface, tilt it, and swish off the top layer of sand with water. Fill it with water and brush off the pebbles that have worked to the top. Agitate it again and once more wash off the top layer.

The circular, irregular motion —it must make the contents shift and roll to be effective— alternated with washing off the top layer is repeated until nothing is left but the gold (we hope) and other heavy minerals. These will be concentrated along the edge of the bottom.

With about a pint of water in the pan, slowly rotate and tilt it so that the water flows around and around. Light-colored sand will run ahead, followed by black sand and possibly a few small garnets or other semiprecious stones or bits of heavy mineral; the gold will trail along behind. Only the platinum-group metals are as heavy as gold.

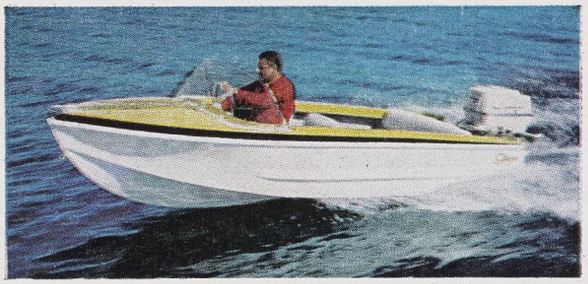
(*Continued on page* 123)



Father, son, and fun with a rod and reel



boat rides as gracefully as the decoys



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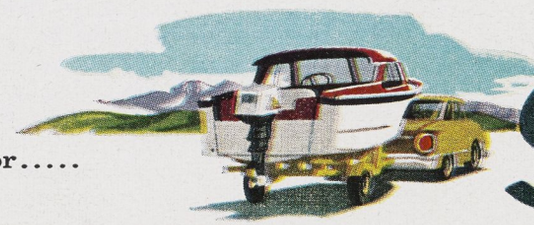


Glasspar®

Ever Try Panning for Gold?

(*Continued from page* 24)

You can wash out all the light-colored sand and garnets and most of the black sand if you are careful. If the gold is coarse, it is now easy to pick out the colors. If it is fine, it is easier to wash them, along with the last of the black sand into a glass jar.

The most common black sand is magnetite, an iron ore. You can remove it with a magnet when your concentrate, as it is called, gets dry, or you can pick up the gold with a little mercury while it is still in the pan. The final separation can be made at home.

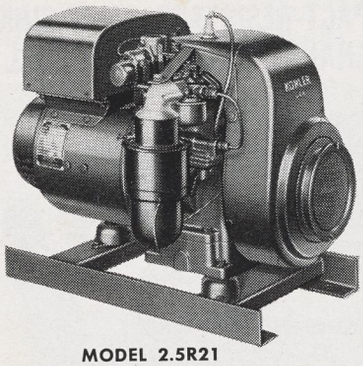
Clean gravel (not cemented, free from clay) and coarse gold make for fast panning; fine gold requires slow, careful work, especially toward the end. Some colors are so small that they float off if they get dry.

Since the days of the forty-niners, fool's gold has been the bane of tenderfeet. Pyrite (iron disulphide) is brassy yellow, hard, and brittle, forms cubic crystals, and has a specific gravity of 5—about the same as magnetite. Gold is much softer, malleable, not crystalline in placers, and much heavier. If in doubt whether the yellow speck in the bottom of your pan is pyrite or gold, bear down on it with the point of a knife. Pyrite will shatter; gold will either cut or bend.

Conceivably, one of the micas might be mistaken for gold. Mica is found in thin, irregular flakes and slivers that sometimes have a yellowish luster. It is very light, however, and is often seen lying on white sand, never with the heavy minerals in the bottom of the gold pan.

One day last summer Jim Clark and his son Brent and I set out to pan some gravel. I wanted to take the pictures that illustrate this article, Brent wanted to find a little gold, Jim was agreeable, and my son Dan tagged along.

Now, I must confess to a wicked thought. In my pocket was a brass nugget—a piece of brass welding rod that had spattered to the ground in molten form and had there solidified in realistic shape. It was a good nugget, even if it was brass, and I'd been waiting for a chance to use it. I asked Jim what he thought about slipping it into a pan of gravel and letting Brent find it. He said, "Okay."



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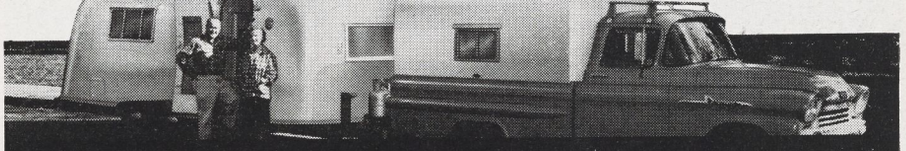

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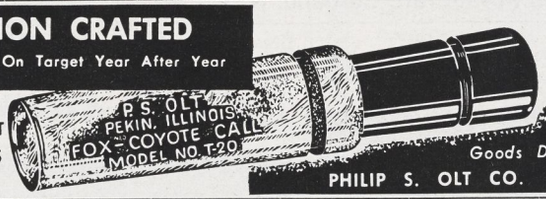

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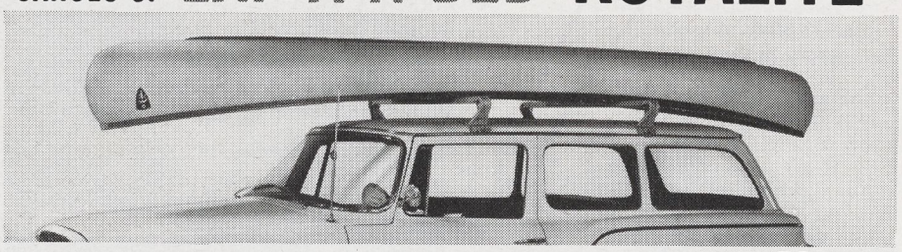

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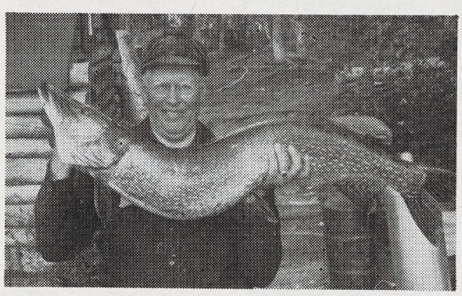

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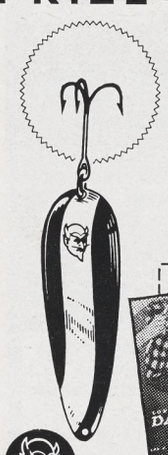
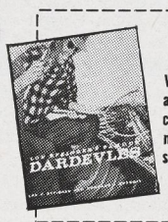


JOSEPH OAKLEAF and his Dardevle-caught 36 lb., 4 oz. Northern Pike at Cree Lake, Saskatchewan.



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So Jim and Brent did the panning and I took the pictures, and while Jim was tossing out the larger rocks he let the phony nugget drop into the pan. In due course they got the gravel worked down to the point where you could expect to see some gold if there was any. Brent saw the nugget. He snatched it out and looked up with eyes as big as silver dollars and said, "A nugget! A real gold nugget! The first one I ever found!"

I was instantly ashamed. After all, he was only 14. It was a low trick to play on a boy and I knew I'd have to confess. Before I could bring myself to do it, however, I discovered that I had underestimated my victim.

Brent has been a rock hound almost since he could walk. He has a good collection of rocks and minerals, and I'm continually surprised at how much he knows about them. Now he showed the nugget to Jim and me, and when Dan came running up he showed it to him. Meanwhile Jim continued washing out the contents of the pan and I took pictures.

Maybe we didn't act excited enough. Brent began to get suspicious. He rubbed the nugget against his pants, then bit it. (Brass is harder than gold.) Then he grinned, put it in his pocket, and said, "Well, it gave me a thrill, anyway."

On the way back to camp—after not finding any gold—I said to Jim, "What would you have done if there had been *two* nuggets in the pan?"

He thought it over a minute and said, "I'd have had a heart attack and died!"

Fifty Years of Fishing

(*Continued from page* 64)

in Loch Awe, Scotland—39 pounds 8 ounces. But not until 1958 did the all-time Contest brown show on the boards. This was a 26-pound 2-ounce lunker out of the unlikely Obey River in Tennessee.

The open-class brown-trout winners heavier than 20 pounds are scattered all over the country. An Oregon brown (22-6) won in 1954, and another in 1955, both out of Wickiup Reservoir. In 1952 Strawberry Lake, Utah, turned in a 20-pounder. In 1950 Owens River, California, yielded a 22-pounder. In 1949 it was a 21½-pounder from Monument Lake, Colorado; in 1948, a 20-pounder out of the Truckee River, Nevada. In 1946, a 20-pound

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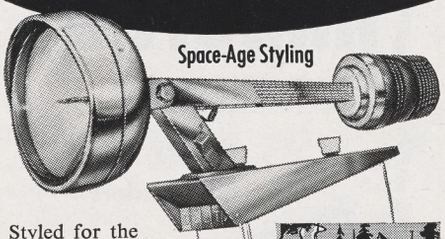





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4-ounce brown from New Mexico won; in 1945, a 24-pounder from Regulator Lake, California. Before 1945 there was no open class for browns, and no browns over 20 pounds were killed on the fly.

There have been many interesting changes in Contest regulations and entry classes. In 1945 an open class was established for brook, brown, and rainbow trout. In 1945 a class was opened for the southern, or spotted, weakfish, and in 1954, owing to an ebb in the northern weakfish's cycle, the class was narrowed down to a single special prize.

One of the most exciting classes was opened in 1938, when chinook salmon (Pacific or king salmon) was added to the lists. The top fish, a 92-pounder, was killed in 1959 on a Luhr Jensen Krocodile.

When the Contest formed a spinning division in 1948, west coasters began chasing the chinooks on lighter and lighter tackle. The first winner beamed out at 14-3. The following year a fisherman reported a 53-pound 3-ounce king, taken in the Nehalem River, Oregon. According to newspaper stories, he said he had landed this fish on 6-pound-test line by swimming after it nearly a mile downstream following the strike. In the closing rounds, he said, he maneuvered the giant salmon into shallow water, jumped on its back, and hauled it ashore.

This was hailed as one of the most heroic light-tackle fresh-water catches of all time—at the time. It might have remained so if the same gent hadn't leaped into the limelight again in 1952 with an alleged spin-caught steelhead of 30 pounds 3 ounces, which he had privately weighed and witnessed. Not until his Contest affidavit was completed did he show the fish around in Portland, Oregon.

All might have gone well for the fisherman if he hadn't put his trout on display, minus its guts and gills, in a sporting-goods store's cold locker. The proprietor took the trouble to weigh the gutless fish, and came up with 21 pounds 2 ounces. Now, Portland is full of steelhead addicts, and most of them came to see the fish. All agreed that cleaning the fish would not cut its weight more than 3½ or 4 pounds. Then the manager measured the fish; it was only 39½ inches long as against the 42½ inches declared on the Field & Stream affidavit.

The magazine was notified, and its Associate Editor, Frank Dufresne, undertook an exhaustive investigation. Dufresne talked with everybody but the fish. He turned up

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many interesting facts. A top Oregon fisheries official told him that a steelie that dressed out at 21-2 would have lost 15 percent of that figure in the process of cleaning, and not a fraction more. This would put the original weight at 24 pounds 4 ounces. The angler retorted that his fish had suffered four days' shrinking in the locker room, but this, if true, would hardly account for a shrinkage of three full inches.

Still, Dufresne needed more evidence. He got it from a clerk in a marine-supply house, who had sold the fisherman 7 pounds of sinkers on November 14, the day after the fish had been caught according to the affidavit. The fish had been shown to no one until November 17. Seven pounds of sinkers could have been inserted in the fish for the official weighing, and removed later with the guts and gills. Confronted with all this, the fisherman withdrew his claims—all of them.

The first muskie of over 50 pounds recorded in the Contest was a 51-pounder out of Chief Lake, Wisconsin, in 1916. This began a long dominance of Wisconsin fish. In 1919 the record was edged up 3 ounces by a Lac Vieux Desert, Wisconsin, catch. The next muskie over 50 pounds weighed 50-4, and came from Columbus Lake, Wisconsin, in 1925. In 1931 a new world record of 56½ pounds was taken from Lake of the Woods, Minnesota. In 1932 the Contest winner, 58 pounds 4 ounces, came out of Lake of the Woods, Ontario. That's the same water, a little farther north.

In 1935 Wisconsin took the Contest with a Lac du Flambeau 52-pounder. In 1936 a Quebec 50-pounder was tops, and 1937's winner was an Ontario fish of over 50 pounds. In 1938 a 56-pounder was hauled from Lake St. Clair. Talk grew hot about the inevitable 60-pounder. In 1939 it happened—a muskie of 60 pounds 8 ounces from Eagle Lake, Ontario.

In 1940 Michigan broke the record with a 62½-pounder from Lake St. Clair. In 1941, 1942, and 1943, Ontario copped with 56½, 55, and 54 pounds. The 54-pounder came from the northern side of the St. Lawrence River. The 1944 winner, killed by Arthur Lawton of Albany, New York, weighed out at 58 pounds 5 ounces. It was a St. Lawrence fish too, but not a world record.

In the 1945 Contest, Ontario chalked up a 58-pound 8-ounce muskie. In 1946 it repeated with a 55-pound 2-ounce giant. What counted, though, was the world record. This was a clincher in tourist advertising, and Michigan had it.

Finally Wisconsin clobbered the

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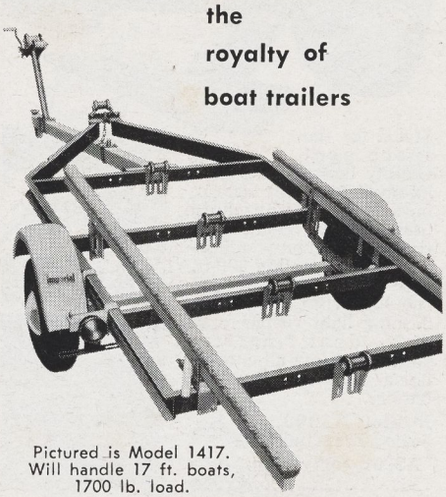

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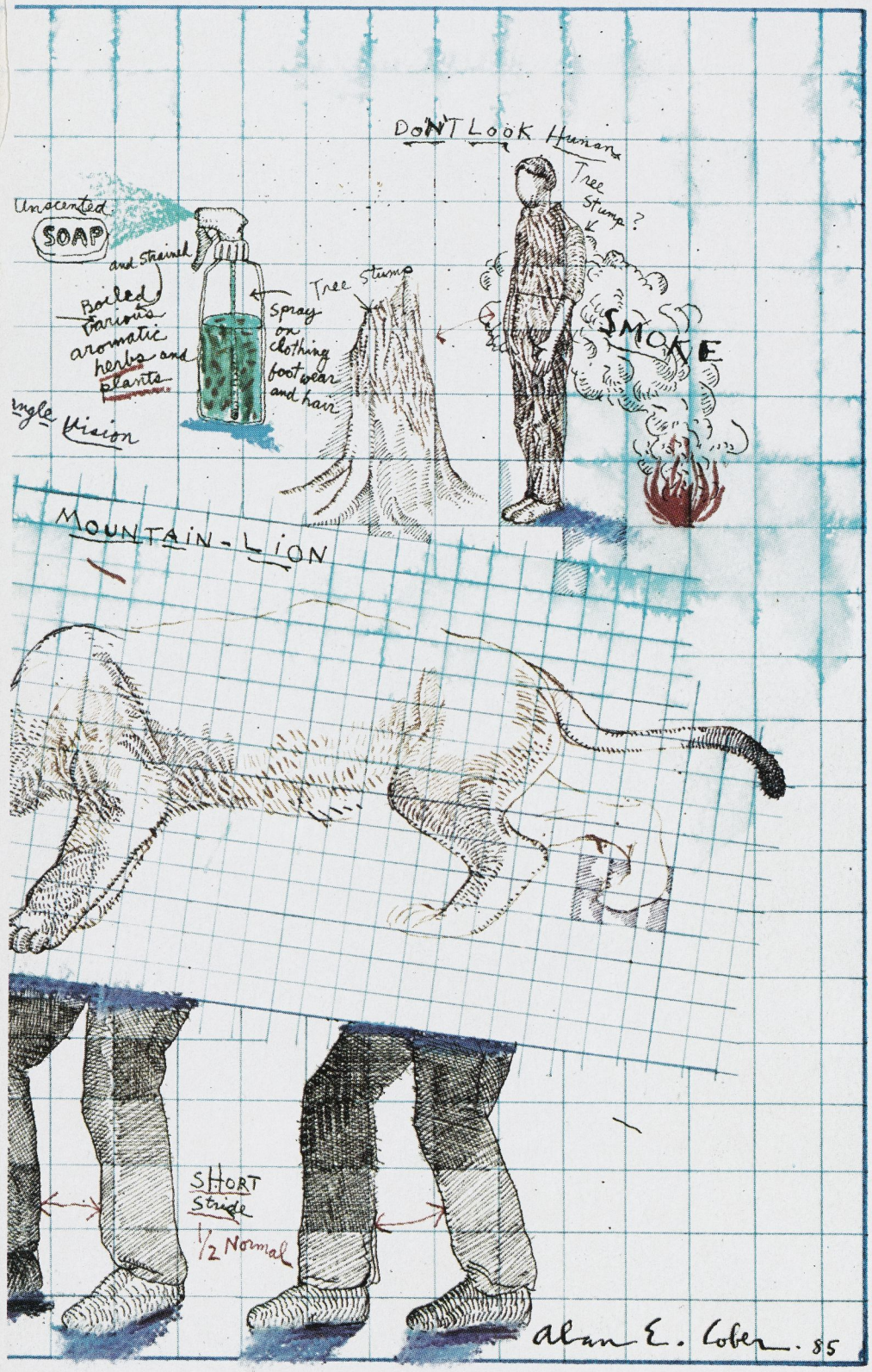
STALKING: The Natural Act

LEARNING HOW TO BLEND IN

by Tom Brown



Hundreds of years ago, man had a very different sense of himself in relation to nature. Nature wasn't alien to him—he didn't oppose it. He felt, and was, a part of it. The earth was his parent; animals, plants, rocks, water, wind and sky were his brothers and sisters. Our ancestors knew nature intimately. They were one with the land, and that oneness extended to everything they believed, made and did. Time was defined by day and night, the seasons and the flow of game.

Their weapons may have been crude by today's standards, but their hunting abilities were finely honed. A Native American in the woods could move silently, as if composed of shadow, moving with—not against—the wind. Because his weapons were useless at far range, his hunting prowess was measured by how close he could get to the animal before attacking.

(Continued on page 140)

LAND OF THE BEAVER

In rugged pursuit of their quarry, the fur traders incidentally opened up a vast northern wilderness. by Zack Taylor



"Howl of the Weather" by Frederic Remington, courtesy Frederic Remington Art Museum, Ogdensburg, New York.

Stalking

(Continued from page 89)

Hunting required a man to pick up an animal from its tracks, follow it for hours and sometimes days, then stalk to within a few feet of it before the kill. Stalking was a demanding art form, involving movement as disciplined and precise as that of ballet. The goal of stalking was simple: You had to become invisible. Getting close enough to an animal to touch it was proof that you'd achieved mastery as a stalker. Few hunters today know what's required to achieve that goal.

In a sense, it's no wonder. Hunting arms are now highly sophisticated, the result of a technology our forebears couldn't have dreamed of. Our guns are now capable of killing animals from hundreds of yards away. Even bows now have pulley systems that allow the arrow to reach its target at 30, 40, even 50 yards. Because we've learned to depend on gear that can kill at long ranges, many of us don't care that we stomp through the forest in heavy, cumbersome boots, weighted down by thick clothing; we also don't care that we may not be in especially good physical shape. Our guns can do the work for us. To some of us, hunting is now more a sport of luck, not skill. Blinds and stands are placed on well-used runs, and a hunter simply has to wait for game to pass. And yet, oddly, with all of our sophisticated weaponry, most hunters go away empty-handed.

If we want to increase our success as hunters, and also increase the excitement and pleasure of the hunt, we need to relearn the ancient arts of stalking and tracking. By stalking, and getting as close as we can to an animal, we benefit the animal, too. Too many game animals are merely wounded by far-off shots, and then left to travel, panicked, deep into the woods to die unrecovered—all because of the clumsiness—and distance—of a hunter trying his luck.

Hunting becomes an exciting undertaking when we give the hunted a decided advantage. By honing our stalking skills, getting into good physical condition, and becoming as sensitive as possible to the landscape we travel through, we not only become more effective hunters but we also gain a sense of harmony with the natural world that surrounds us. We no longer are clumsy intruders—we become, as the Indian was so many centuries ago, a part of nature.

As you might imagine, gaining stalking skills isn't easy. It took me two years before I was good enough at stalking to touch my first deer. Even then, all the conditions had to be perfect—and I'm still not convinced that the deer wasn't deaf, dumb and blind. But I'd spent the preceding years in very disciplined practice, much of which simply meant getting into shape. You can liken stalking to *t'ai chi;* it takes the same discipline and art. I found myself practicing stalking—being silent, moving as deftly as possible—to the point where it became a natural part of my movement. Deer weren't the only animals I stalked, either. I learned to move close to—and then to touch—all manner of creatures: a frog, a fly, a bird.

When I opened my survival-training school, I realized that my students simply didn't have the time to put in the kind of practice I'd gone through. I had to modify the process so that at least its basics could be learned in a much shorter time. Finally I did manage to whittle down the components of stalking to a practice program I hoped would work. To my amazement, it did—and does—work. To my delight, many of my students quickly learned to get close enough to touch deer, foxes, weasels, opossums and pheasants, to name a few—and just a couple of days after learning the techniques. These are the techniques I'll set out here. I think you'll be amazed at how they'll help you to be a more effective hunter, and how they'll increase the joy and suspense of being in the woods. These techniques don't only work for the hunter, of course: They can work for the photographer, camper, nature enthusiast and hiker.



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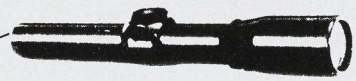

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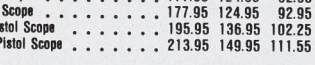

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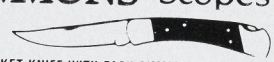

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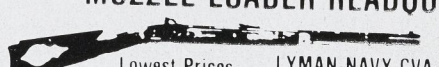

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THE RIGHT ATTITUDE

Your success as a stalker depends on your attitude. You have to *want* to get close to an animal. You have to see the natural world not as a territory to be invaded, but as one in which you want to make your home. Remember that the woods are home to thousands of creatures: How successful would a burglar be if he crashed through your window in the middle of the day while you were having lunch with six friends? To put it mildly, you'd notice him. You are noticed when you crash into the woods, too. Animals flee your too-obvious presence, and you don't even know it. The first step to making your presence less obvious—to learning how to blend in with the landscape—is to increase your awareness.

Nothing moves in nature without affecting everything else. If you are stalking a deer and fail to notice another deer a few yards away, or a jay perched in a tree, you will probably set off a series of alarms that reach the deer you're after—sending it deep into the woods, far away from you. You must notice *everything* around you while you're stalking, being careful to disturb—or alarm—the inhabitants of your environment as little as possible. This may seem like a tall order, and in fact it does take practice. But you'll have the greatest chance of success not by trying hard to see everything, but by allowing yourself to see what's around you. You have to enter the natural world with your senses wide-open, allowing them to register stimuli that we usually block out. Too often in stalking you're tempted to only visually focus on the animal you're after: You may miss a scent, or the movement of the wind, or the sounds of other animals that crucially affect your ability to reach your prey.

Wide-angle vision is a critical part of total awareness. It is one of the most important concepts on which stalking is based: We could quadruple our animal sightings if we could learn to constantly use wide-angle vision, to integrate it into our everyday awareness. Unlike other creatures, human beings tend to pinpoint their focus. Most of us look out across the landscape and focus on a small area; we may move our eyes, but we take in what we see *linearly*, missing whatever is on the peripheries. If an animal were just 10 feet outside of your area of focus, you would not see it. Our normal way of focusing is poor for picking up movement over a wide range.

Animals usually spot us by our movement, and not necessarily because they can tell we're human beings. Rather than focusing on one particular spot, they take in the full peripheral picture and become susceptible to the slightest movement within this range. The goal of seeing in the wilderness isn't, first, to look for a specific animal: It's to detect movement. Once you've caught that movement, you can then quickly focus on what's causing it, but catching it is the first step. The ear flick of a deer, a muscle tremor in a fox, the twitch of a squirrel's nose—even the blink of a rabbit's eye—are easily seen. Learn not to look for anything in nature; instead, learn how to see. You can't begin to stalk successfully without this ability.

Wide-angle vision and total awareness come about most easily if you're relaxed. This may seem a simple component of learning how to stalk, but it can be a difficult one to achieve. We spend so much of our lives in a state of tension and restlessness that it's often tremendously difficult to shed these characteristics—even in the wilderness, and even when we think we're shedding them. You can't relax by trying to. (Have you ever *tried* to go to sleep? It's a sure way to stay awake.) Your eyes may busily dart around trying to take in everything, but the very jerkiness of your movements, the lack of peace you feel within yourself, not only makes you conspicuous to animals around you but also inhibits your ability to take in much of anything at all. I've found that anything you can do to allow your body to relax will in turn relax your mind. Breathe deeply, learn to flow when you move, gently blank out your thoughts so that your senses have full play. You will soon find yourself—it may seem paradoxical—more acutely aware of and alert to everything around you than you've ever been. Not, again, because you've tried to become so, but because you've allowed yourself to be.

CAMOUFLAGE

The way you move in the woods and the way you allow yourself to see in the woods are more important than your scent. Scent can be a deterrent to success as a stalker, however, so it's worth following this simple procedure to make yourself as unobtrusive as possible. Wash with an unscented soap and rinse well. If you can, wear only clothing that you've stored in a cedar chest or outdoors. Stand in the smoke of a fire just long enough to give yourself a once-over: Smoke scent is a natural scent in the woods, and most animals pay it no mind (it's visible smoke they worry about). Finally, boil and then strain various aromatic herbs and plants—but only those found in the area in which you'll be stalking—and pour the liquid into an atomizing bottle. Spray yourself liberally with this mixture—on clothing, footwear and into the hair. This will be your final cover-up.

Clothing is important. Don't wear anything that will scrape or "whistle" when you're passing through brush—such as a polyester wind jacket or parka. Generally, my rule is: The less the better. However, there are obviously times of the year when you must wear something more than soft moccasins and a bathing suit. I either wear wool, which makes little noise when it comes into contact with brush, or—what I consider to be the ultimate—brain-tanned buckskin (other tanning methods just do not produce a soft enough leather). Unfortunately, this kind of buckskin is difficult to obtain, so you'll probably find yourself sticking to wool. As for colors, I prefer them to be earth-toned and mottled. (You should, of course, wear blaze orange if your state requires it during hunting season.)

When it's very cold, I'll wear heavy mukluks, although during the most crucial part of the stalk—when I approach the animal—I'll have changed to well-worn tennis shoes or moccasins. (I don't find cold much of a factor when I stalk—the suspense of nearing an animal seems to keep me warm!)

MOVEMENT

With a relaxed body and mind, you'll learn to move across the landscape like a shadow. Move with other forest sounds, such as wind, rain and the ebb and flow of leaves, bushes and branches. Allow the forest's sounds to camouflage you: The sharp crack of a twig breaking during a lull of silence is enough to send an animal running. Make what noise you must when the rest of the woods does too. Your sounds will then blend in with the other noises and be overlooked.

Pay attention to the wind and how it gusts, and conform your movement to that of trees and grass. Conform to the shape of the landscape: If surrounded by tree stumps, do not, if possible, make yourself higher than they; in grasslands, bend over to make your height even with the grass tops, or "become" a small bush. The point is to conform to the natural shapes around you—to be as visually inconspicuous as possible.

Stay within the shadows, out of direct light, whenever possible. Remember to use your wide-angle vision when you cannot avoid direct light: You'll be able to sense when the best time is to move through it. Pick your route of travel long before traveling it. It is better to go a longer and less-obstructed route than to try pushing your way through difficult terrain. It takes longer to get through 10 feet of brush than to circle around it for 100 feet.

STALKING

There are four things you should remember about stalking, in addition to the general guidelines I've outlined.

1. *Move slowly.* As I've said, animals can pick up the slightest movement. Consequently, there are times when you must move at a pace that may seem painfully slow. This gradual movement not only minimizes the chances of an animal seeing you but also makes it less probable that you'll break twigs or make other noises in the brush.

Moving slowly does pose a problem, however: Most animals move faster than it's possible to stalk. To stalk successfully, try to meet the animal while it is browsing or grazing. Don't try to follow its fast pace. In other words, learn to move when the animal doesn't. This becomes a kind of chess game, in which you try to guess the animal's line of travel and plan your course of intersection. The more you learn—



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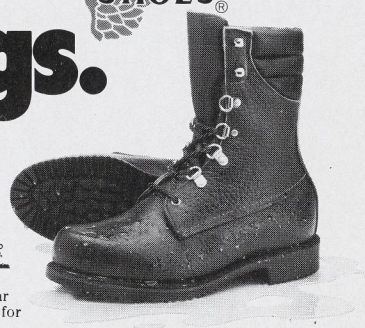

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through total awareness—about an animal, its movements and habits, the better you'll be able to second-guess where it's going.

2. *Move gracefully.* Your movement should not only be slow but it should also flow. Make your movement continuous, not jerky.

3. *Freeze whenever an animal looks your way.* If an animal detects no motion, it will go back to eating, and you can move again. But be prepared to stop at any time when you stalk and to hold that position for as long as you have to.

4. *Move with a rolling compression.* Every time your feet—or your elbows and knees if you are crawling—or any part of your body touches the ground, try to make that contact with what I call a rolling compression. By "rolling" down the foot, hand or knee and then slowly adding weight, you will minimize the crunching of the ground and decrease your chances of being heard.

These four rules of stalking movement are crucial to your success. They should, and will with practice, become second nature. But here are some more specific guidelines you'll want to follow in a variety of situations.

First, and though it may seem like a contradiction, don't be afraid to stalk from an upright position. Earlier, when I said you should conform to the landscape as much as possible, I wasn't only saying that you should look like a bush or a tree stump: The deeper point is that you shouldn't look human. It may sound strange at first, but an animal will not bolt simply because it sees you standing. I have frequently stalked deer to within a few feet, moving upright in a field with grass that was only a few inches tall. How?

By following the four rules of movement—freezing when the deer looks up, then moving slowly, gracefully and quietly when it doesn't look up—the deer doesn't realize I'm moving toward it. Deer don't reason things out. So long as I'm as motionless and vertical as a tree stump, it doesn't matter to the deer that the stump is closer than it was a few minutes earlier. If I continue to conform myself to the landscape—in this case, appear to be something natural and familiar that the deer sees everyday (a tree stump or trunk)—the deer will ignore me. To his mind, I won't have moved at all.

Again, the point is to not appear human! Body position is of the utmost importance. Never allow the deer to see you move, and always keep the deer within the center of your range of vision. Continue to see at the widest angle, too, as other animals you aren't stalking may pick up on your movement and send out an alarm. Keep your body relaxed, with your arms held close to your sides. If an animal sees a silhouette of you with outstretched arms, you will have ceased to be a tree trunk: You'll have become human, and the animal will bolt.

Finally, never look at the ground. Train



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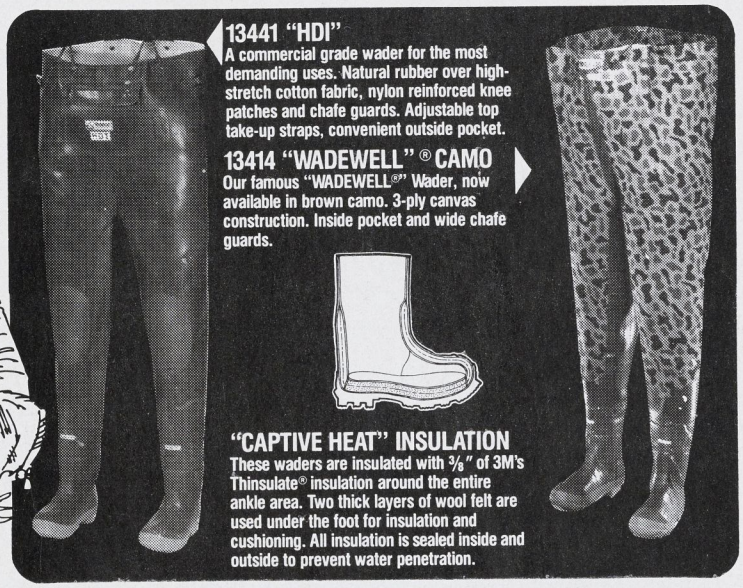

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your eyes to see everything above it. So long as you use a "stalking step," you won't be in any real danger of tripping over anything.

This step is easy to master. The main thing to remember is that you must be ready to freeze during any part of it. Since you'll be walking in a relatively short stride (about half your normal stride), you'll be able to freeze without losing balance. Pick up your foot with the toes pointed downward, as this will enable you to remove it from low brush that could grab at you. Move as slowly as if you were pulling your foot out of mud. Then lift your leg as high off the ground as possible and move forward. This will be somewhat similar to being in thigh-deep mud and trying to take a step forward without your foot hitting the mud. This high lift also prevents you from getting caught in brush. (Native Americans learned this step by watching the great blue heron stalk fish.)

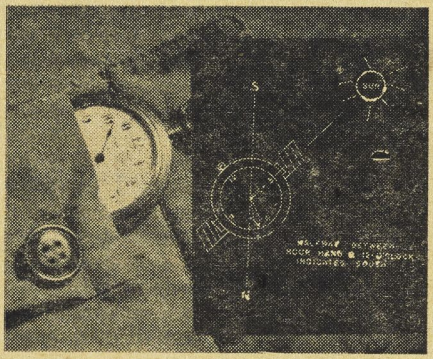
As you get ready to move your foot toward the ground, point your toes toward the place you want it to land. This enables you to spear through low brush and find an easy opening without making noise. As the foot nears the ground, point your toes upward so that the ball of the foot is aimed straight at the ground.

The next movement was borrowed by Native Americans from the mountain lion. To begin, gently touch the ground with the outside ball of the foot, thus establishing where the ground is. Gently roll the ball inward until it is firmly placed, but do not apply body weight. Next, roll the heel back and drop the toes in a slow compressing motion—but still with no body weight. Let your foot feel the ground, gradually add weight, and then finally ease your entire body onto the leg, allowing the rear foot to pull itself up. With all of your body weight now on your front foot, you can prevent your rear foot from pushing up—which would grind the soil.

Stalking is subtle, silent and flowing. You don't use your eyes to do anything but look at the game: Your body feels its way forward, your feet "see" the ground on their own. In essence, your body becomes a large receptor, with every nerve and sense attuned to moving toward a goal with the most ease and the least disturbance possible.

This method of stalking is universal. Everyone from the ancient Ninjas to Native Americans to Australian aborigines use it. Where did they learn it? By watching animals that stalk—perfectly—on instinct. When human beings learn to stalk effectively, they learn more than how best to get close to an animal. They relearn what their human and nonhuman ancestors always knew: how to move through the landscape and be a part of it. SA

For information on Tom Brown's wilderness schools write to: Tom Brown, Tracker Inc Dept. SA, P.O. Box 173, Asbury, NJ 08820.



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If you have an uneasy feeling about your location in the woods, don't become unduly alarmed simply because your compass was left back at camp. Remember your pocket or wrist watch can accurately tell direction too—every day that the sun is shining.

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If your watch is one of the newer electronic models you're out of luck. It simply can't do this job for you.

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THE MARCH TO EXTINCTION

Approximately one species of mammals or birds becomes extinct every year, according to reports given at a San Francisco endangered species symposium. In the year 1600, there were an estimated 4226 species of mammals on the earth and 8684 species of birds. Since then, 36 mammals and 94 bird species have disappeared. In addition, 120 mammals and 180 bird species are keeping a precarious hold on existence.

Scientists say the extinction rate is rising. Known data shows the rate in the 17th and 18th centuries to be approximately .05 per year. Since 1900, one species a year has become extinct. Of the 594 species known to be endangered, 219 are island species, 108 are North American species and 52 inhabit Southeast Asia.

Causes for extinction are most often alteration of habitat (60 percent), 52 percent are driven to extinction by new predators or competition mostly in the form of rats, cats and dogs and even goats. By contrast, sport hunting has threatened relatively few species. Possible exceptions are some races of native American bighorn sheep and the Arabian oryx.

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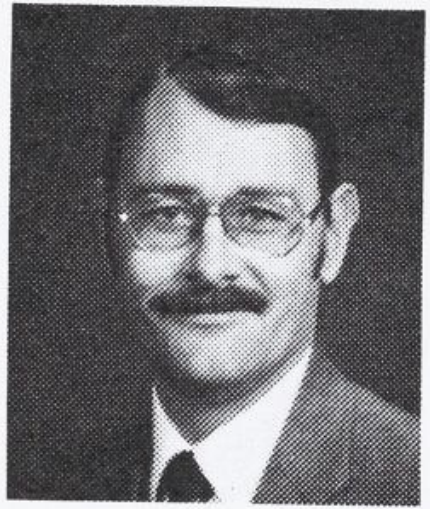

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C1

Clues to Suicide: A Brain Chemical Is Implicated

By DANIEL GOLEMAN

THE anguish that leads to suicide seems to follow no set path. But researchers believe they are making important progress toward understanding that painful process.

They have identified a deficiency of a specific chemical — serotonin — in the brains of some people who are prone to take their own lives in the face of life's difficulties.

Some researchers believe as a result that biological factors may play a far greater role in the events that end in suicide than has been realized. And the hope now is that a drug could eventually be developed to correct the chemical deficiency and prevent at least some future suicides.

"A low level of serotonin seems to be a biochemical marker for those depressed people who are most prone to suicide," according to Herman van Praag, a psychiatrist at the Albert Einstein College of Medicine who was among several researchers who presented new findings on suicide at a meeting last month of the New York Academy of Sciences.

Other researchers, though, continue to place their greatest emphasis on psychological factors and, in particular, on what they see as a lethal combination of rigid thinking and feelings of loss and hopelessness.

A recent study found, for example, that an intense level of hopelessness felt by those who had made one attempt at suicide was by far the strongest indication that they would try again.

Many observers believe there can be no single explanation of why people take their lives. "Suicide is a complex malaise," said Edwin Shneidman, a pioneer in suicide research who is professor of thanatology at the U.C.L.A. School of Medicine. "Sociologists have shown that suicide rates vary with factors like war and unemployment; psychoanalysts argue that it is rage toward a loved one that is directed inward; psychiatrists see it as a biochemical imbalance. No one approach holds the answer: it's all that and more, including an existential dilemma."

Biological factors may play a large role.

"Suicide is mainly a problem among white older men," said Susan Blumenthal, director of the suicide research unit at the National Institute for Mental Health. The average for all groups is about 12 in 100,000. But it has been generally declining since 1950, especially for those over 44 years old.

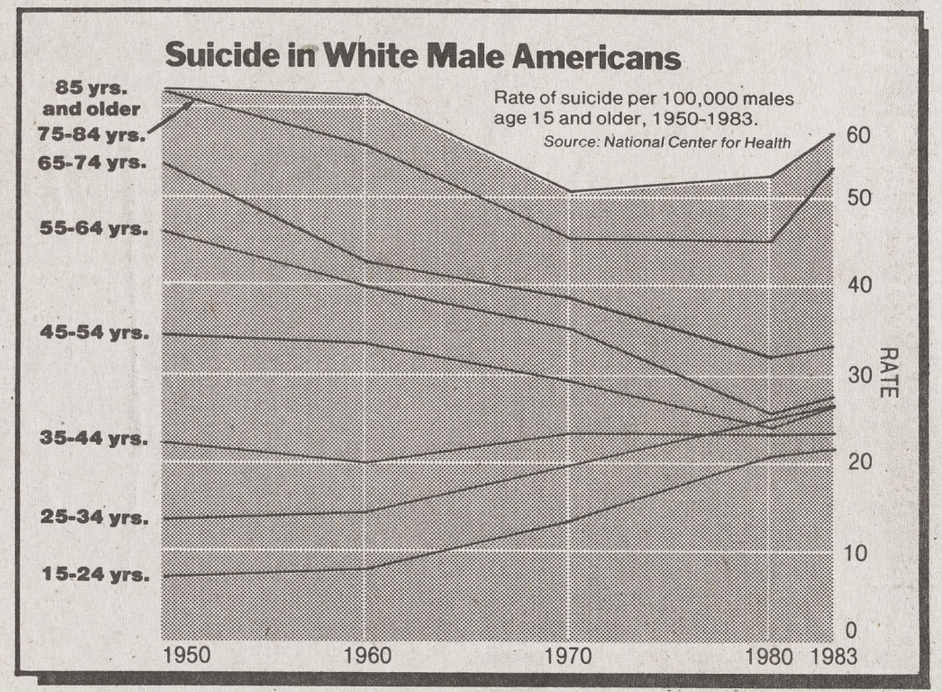
Young people represent the chief exception to the trend, and their increased rate has of late received widespread attention. In the 1970's, the suicide rate doubled for white males from 15 to 24 years old. The rate has also risen for young black men, to over 20 in 100,000 among those 25 to 34 years old. This is the highest for any age group among blacks, who over all have lower suicide rates than whites.

Still, overall rates remain highest among the elderly, said Lee Robins, a psychologist at Washington University Medical School in St. Louis. The rate for those 75 or older is still more than three times the rate of that among the young.

For women, it is about three in 100,000, about a quarter of the overall average, said Dr. Blumenthal.

"Even though they are much less likely to take their own lives," she said, "women are four times more likely than men to make an unsuccessful attempt. For women attempts often are a way to express their distress,

Continued on Page C8



The New York Times/Oct. 8, 1985

Scientists Seek 4,600-Year-Old Air at Egyptian Boat Site

Organic Farming Moves Toward Mainstream America

By JANE E. BRODY

KUTZTOWN, Pa. — To many people, organic farming means overpriced, anemic-looking fruits and vegetables sold in health food stores. But to the staff of the Rodale Research Center here, it is an economic and environmental necessity — a means of assuring the continued production of an adequate food supply at the lowest possible cost to farmers and their land.

Farms are now falling like weeds under a cultivator to the financial squeeze placed on them by modern agriculture, which depends heavily on costly synthetic fertilizers and pesticides. The concomitant exploitation of the natural resources that helped make this country's agriculture the world's most productive suggests a day when the United States will no longer be able to feed itself, let alone the millions elsewhere its foods now sustain.

As Robert Rodale, who established the research center with profits from the prolific Rodale Press, put it: "American farming is more than the most productive system ever created. The vast production hides the fact the farming on that pattern is also the most destructive of all systems."

Each year six billion tons of American topsoil is lost to erosion. And no one believes it is healthy to consume foods and water that may be contaminated with herbicides, insecticides and cancer-causing organic chemicals formed from fertilizer runoff.

According to Mr. Rodale, relief from dependence on such substances is even more important in developing countries, where few can afford the costly chemicals and concurrent depletion of the soil.



Part of Rodale Research Center in Kutztown, Pa., where organic farming techniques are developed and tested.

In recent years, organic farming has made dramatic gains, moving from the long-haired, back-to-nature folks of the 1960's into the mainstream of American farming and agricultural research. The Rodale center estimates that about 30,000 commercial farmers are now running organic operations in a number of states, including Iowa, Wisconsin, Illinois, Nebraska, California and New York.

On a recent visit to the center's experimental plots, scientists from the United States Department of Agriculture and from the New York State College of Agriculture and Life Sciences at Cornell University were taking measurements in the Rodale fields. "A few years ago you would never have seen that on our hallowed organic ground," Dr. Liebhardt said with a satisfied smile. "Now we have a steady stream of researchers from universities and governmental laboratories doing studies here."

Actually, the studies today rarely if ever invoke the word "organic," which the Rodale team says is a limited concept that carries a lot of unnecessary baggage. "We're not just replacing nitrogen fertilizer with manure or compost or substituting natural pesticides for synthetic ones," Dr. Liebhardt explained.

Rather, the Rodale concept for the 80's and beyond is "regenerative" agriculture, techniques that will not only halt current losses but also will actually rebuild the land and assure its continued productive capacity.

"Farming today now 'mines' the soil," said John Haberern, director of the 8-year-old research center. "Our goal is to leave the soil better in the end than when we started out."

The studies here have also gone beyond merely demonstrating that foods can be grown without artificial additions. Today the emphasis is on how a farmer can put organic techniques into practice "without losing his shirt," Dr. Haberern said. "We are trying to show farmers how to go from total to less to no reliance on chemicals in a profitable way."

The researchers realize that few farmers are willing to sacrifice income for environmental principles or the promise of future benefits. Rather, they want to do at least as well and hopefully better financially by converting to an organic operation.

Ways to Go Organic

Hence, the main intent of Rodale's current research is on economically viable ways to switch from conventional to organic farming. On 15 acres of cropland leased from a local grain farmer who for years had used standard chemically dependent techniques, the researchers are exploring the total economic effects of three different approaches tested over a period of five years.

One approach simulates a combination cattle-grain farm in which manure is used to fertilize the land. The second relies on plant material alone as fertilizer, primarily by growing nitrogen-fixing plants along with the cash crop. The third uses standard chemical methods to produce the grain. The crops are tended and harvested with conventional machinery.

A major aspect of the studies is to determine which approach produces the best yields for the least input during a chemical-to-organic transition.

So far, four years into the study, the results indicate that although in some instances crop yields may be lower when converting to an organic system, total income is likely to be higher because costs are much lower. In other words, what the farmer loses in cash for his grain is more than made up for by the money he does not have to spend to produce it.

In the Rodale studies, if a farmer goes "cold turkey" into growing corn organically, he can expect yields to be 40 percent lower the first two years. By the third year, the deficit is 10 percent and by the fourth only 7 percent. "But the net return to the farmer is 10 to 25 percent higher because he has not had to buy pesticides or fertilizer," Dr. Liebhardt said.

A less dramatic loss in yield occurs when oats, barley or wheat are grown with red clover, a legume that supplies nitrogen to the soil. "And if the farmer starts with soybeans, he can expect yields comparable to those attained with chemicals, but at far less cost, so his net return is actually much higher," Dr. Liebhardt said.

When manure is available from cattle raised on the farm, yields can be even better than with commercial fertilizer. This year, the manure-nourished corn stood a full foot higher than the conventional crop by early July, although both crops were planted at the same time. Dr. Liebhardt explained that pesticides used on the conventional crop tend to burn the plant and that soil without manure is harder, so less water gets in. By the third year of the study, the organically grown corn was producing higher yields than the chemically treated test crop.

Legumes for Erosion Control

Weed control is another focus of the Rodale research. Thus far the studies indicate that although weeds are four to five times more prolific when no herbicides are used, the crop yields are the same or higher.

To control erosion, researchers are testing the effectiveness of planting legumes among still-growing corn. The legumes provide cover all winter, grow again in the spring and then are plowed under to enrich the soil before the next cash crop is sown. Dr. Haberern deplored the attention being given to so-called conservation tillage, in which land is not plowed to reduce erosion but lots of herbicides are used to keep weeds down.

"It's a technique being pushed by the herbicide producers," he said. The Rodale studies, he added, indicate that a more effective approach is to plant on ridges, tilling just the top of the ridge, since the less the soil is worked up, the fewer weeds grow.

"The conventional approach to agriculture is to dominate nature," Dr. Liebhardt said. "Our approach is to work with nature." And while Dr. Haberern acknowledged that regenerative farming is not the answer to every farmer's problem, a survey of more than 800 farmers who had made the conversion revealed that, for 83 percent, their income was the same or better when farming organically.

Organic farming: The other conservation farming system

By Terry Cacek



THE attention given various forms of conservation tillage in the last decade has overshadowed interest in organic farming. But organic farming systems also produce conservation benefits extending to soils, water, nutrients, energy, and wildlife. Moreover, organic farming today is economically and agronomically competitive with conventional and conservation tillage systems.

What is organic farming? It is not a well-defined system but a concept, an approach to farming. It is a group of techniques and much more. It is an ethic, a set of attitudes about the land and about farmers' relationship with the land.

The U.S. Department of Agriculture provides the following definition:

"Organic farming is a production system which avoids or largely excludes the use of synthetically compounded fertilizers, pesticides, growth regulators, and livestock feed additives. To the maximum extent feasible, organic farming systems rely upon crop rotations, crop residues, animal manures, legumes, green manures, off farm organic wastes, mechanical cultivation, mineral bearing rocks, and aspects of biological pest control to maintain soil productivity and tilth, to supply plant nutrients, and to control insects, weeds, and other pests" (*19*).

Organic farming is commonly thought of as a primitive farming method. But today's organic farmers use the best seed varieties and soil conservation practices. Large, modern machinery enables timely, effective cultivation. Knowledge of weed and insect life cycles and of nutrient cycles enables organic farmers to design optimum crop rotations. Biological pest controls and ecosystem management techniques are among the most sophisticated practices that can be applied to any farm.

Let's compare organic farming with conservation tillage, then look at both of these alternative systems in relation to conventional farming.

Soil conservation

In 1917 scientists at the University of Missouri began a series of classic experiments on relationships between crop production and erosion. Much of the data was summarized in 1932 by M. F. Miller and H. H. Krusekopf (*11*). The two scientists compared erosion rates among plots that were in continuous fallow, continuous grass sod, continuous wheat, continuous corn, and a crop rotation including corn,

Terry Cacek is an agricultural specialist with the Division of Wildlife Management, U.S. Fish and Wildlife Service, Washington, D.C. 20240.

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wheat, and clover. This rotation is typical of those used by organic farmers.

The tons of soil lost per acre each year, averaged over 14 years, were as follows: fallow, 41.6; grass sod, 0.3; wheat, 10.1; corn, 19.7; and the rotation, 2.7. Clearly, erosion rates were within tolerable limits only for grass sod and the rotation. The rotation resulted in 86 percent less erosion than continuous corn and 73 percent less erosion than continuous wheat.

Differences between erosion rates on mono-cropped plots and the rotation plot became even more interesting when the corn years on the rotation plot were compared with the same years on the continuous corn plot. The comparison was made for April through September only and only during the four years in which the rotation plot was in corn. Erosion on the continuous corn plot was 4.7 times greater than that on the rotational corn, suggesting that groundcover alone did not explain the lower erosion rate on the rotation plot. Presumably, changes in soil structure influenced soil erodibility.

Another long-term Missouri experiment reported a soil loss of 7.1 tons per acre for corn following corn but only 4.2 tons per acre for corn following clover and 2.4 tons per acre for corn following two years of grass-clover hay (*8*). Soil loss for soybeans following corn was 6.9 tons per acre versus only 2.0 tons per acre for soybeans following one year of grass-clover hay. These data show that legume-based crop rotations significantly reduce soil erosion.

Field studies in the Palouse region of Washington in 1981 verified these findings. A.G.W. Patten used the Alutin method of measuring cross-sections of rills to collect erosion data on an organically farmed field and on an adjacent, conventionally farmed field (*13*). The long-term rotation on the organic field was winter wheat, spring peas, Austrian winter peas, winter wheat, spring dry peas, and summer fallow. The conventional field was managed in a rotation of winter wheat and spring dry peas. Both fields were in winter wheat during the year of data collection, but erosion on the conventional field was 14.4 tons per acre compared to 3.7 tons per acre on the organic field, a 75 percent difference. Some of this difference may have been due to the fact that the organic farmer planted 12 days earlier than the conventional farmer. But this may reflect more than a casual difference. Production and maintenance of soil-saving groundcover is a major element in organic farming philosophy.

The soil savings from organic farming compare favorably with those reported for various conservation tillage systems. Summaries of several conservation tillage studies reported soil savings of 67 to 100 percent on individual fields (*12, 18*).

Water conservation

One reason soil erosion is less on organic fields is that runoff is much less. In the early Missouri experiments, runoff from the rotation plot was 40 percent less than from the continuous wheat plot and 53 percent less than from the continuous corn plot (*11*). Considering corn only, runoff from the rotational corn was 61 percent less than runoff from continuous corn. The later Missouri study found the difference much less striking—a 10 percent difference in runoff between corn following corn and corn following clover (*8*).

Runoff is important because it affects erosion. Infiltration is important because it affects the water available for storage in the soil and for subsequent use by plants. The early Missouri studies showed 13 percent more infiltration for the rotation than for continuous wheat and 23 percent more infiltration for the rotation than for continuous corn (*11*).

A recent summary of several studies on the water conservation qualities of conservation tillage systems concluded that maintenance of crop residue on the soil surface can reduce runoff 20 to 25 percent (*1*). In addition, conservation tillage and increased groundcover combine to reduce evaporation, so water that enters the soil is more effectively retained.

Nutrient conservation

Organic farming is often criticized for depleting nutrients, especially phosphorus and potassium (*19*). Supposedly, this depletion is caused by the reluctance of organic farmers to use processed fertilizers, and natural fertilizers are not always economically available.

How does one counter this criticism? First, one must note that reductions in erosion and runoff reduce the loss of nutrients. In the early Missouri study, total losses of phosphorus and potassium in the eroded material from the rotation plot were 66 and 65 percent less, respectively, than from the continuous corn plot (*11*). But nutrient loss data were collected for only two years. During those years, the rotation plot was in corn and wheat, so nutrient savings across the entire rotation probably were greater. Various conservation tillage systems in the Corn Belt reportedly reduce phosphorus losses 34 to 91 percent on different soils (*1*).

Second, one must weigh short-term, local depletion against long-term management of the world's stocks of these elements. Neither the Missouri plots nor the Palouse fields are typical of the ideal organic farm. The ideal organic farm includes livestock, so much of a farm's grain and hay are processed through animals. Most nutrients are returned to the soil in manure. Smaller amounts of nutrients are exported from the farm in the animals. Given the finite nature of the world's stocks of phosphorus and potassium, the organic farmers' scheme of recycling nutrients seems preferable to the through-put of nutrients required by conventional grain farming.

Finally, one must consider the startling findings of Patten's research in the Palouse (*13*). No commercial fertilizers had been applied to the organic field since 1909, whereas the conventional farm received commercial fertilizers, including phosphorus. Potassium fertilizers are not required in the Palouse. In spite of the nutrient subsidy on the conventional field, Patten found more extractable phosphorous and potassium in the organically farmed soil than in the conventionally farmed soil. On 26 matched pairs of fields in the Midwest, William Lockeretz and associates found no difference in the levels of available phosphorus or potassium between conventional and organic fields (*10*).

Organically managed soils effectively provide nutrients to plants despite the lack of commercial fertilizers. Just how this occurs is not understood very well. More organic matter and greater microbial activity may influence nutrient availability (*19*).

Energy conservation

A midwestern study found that organic farmers in the region used 57 percent less energy per unit of value of production than conventional farmers (*9*). One of the most energy-intensive aspects of dryland farming is the manufacture of nitrogen fertilizers. Organic farmers avoid this energy cost by using legumes to produce nitrogen and by recycling nitrogen in manure.

The energy savings with organic farming appear to exceed those with conservation tillage systems. Many claims made about energy savings with conservation tillage are based on savings of tractor fuel only. If all energy costs are considered, including costs of manufacturing chemicals, the energy savings shrink. The most energy-efficient conservation tillage corn system uses about 8 percent less total energy than conventional tillage (*20*). Even a slight increase in chemical use, as is some-



Soil Conservation Service/Steve Musser



Vernon Hamilton



Soil Conservation Service

Conservation tillage, particularly no-till (top left), and organic farming based on crop rotation and other conservation practices (right) seemingly result in better habitat for wildlife, including ringnecked pheasants (bottom left).

times required with conservation tillage, could reduce the energy savings to zero. In the Wheat Belt, by contrast, conservation tillage systems can result in major savings of total energy (*17*).

Wildlife conservation

Despite the great interest in conservation tillage and organic farming, almost no research has been done on their impacts on wildlife. Farmers and biologists claim that both alternative farming systems increase wildlife production, but few claims are backed by good data.

As with energy conservation, the Corn Belt and Wheat Belt must be considered separately from the standpoint of wildlife impacts. A comparison of wildlife populations on an organic farm in eastern Nebraska with populations on adjacent, conventional farms found a notable difference only in the case of breeding birds, but that difference exceeded all expectations (*4*). The organic farm had eight times more bird territories than the conventional farms. A similar comparison of individual organic fields with conventional fields in Iowa found differences in breeding bird populations of about the same magnitude (*5*). Presumably the benefit to birds is the result of greater habitat diversity provided by crop rotations. Other possible explanations include reductions in toxic chemicals and differences in food and cover quality.

Ongoing research in Iowa is comparing bird nesting in conventional and conservation tillage fields (*15*). Increases in nest densities in conservation tillage fields appear to be similar to those found in organic fields. But more information is needed before concluding that conservation tillage benefits wildlife in the Corn Belt. First, the ecological and physiological impacts of chemicals must be better understood. The herbicide paraquat, for example, causes egg mortality in the laboratory (*6*), but its impact in the field has not been studied.

Second, a better understanding is needed of the ecosystem impacts of conservation tillage. Even with increased wildlife production in conservation tillage fields, production in those fields is far less than production in "odd areas," including fence rows, ditch banks, and areas too steep to farm. Moreover, conservation tillage so effectively reduces erosion that it may result in the conversion of these steeply sloping habitats to cropland. U.S. Department of Agriculture researchers are now working on technology for growing soybeans on slopes up to 18 percent. Even a slight loss of these odd areas could more than offset the wildlife production gains within conservation tillage fields. On the other hand, reductions in fall plowing leave more food and cover through winter, a definite ecosystem enhancement.

In Nebraska, expanded use of ecofallow, a system combining conservation tillage with a milo-wheat-chemical fallow rotation, was followed by higher pheasant populations (*2*). But pheasant populations also increased in areas outside the ecofallow region, so the case for ecofallow remains unproven.

In western Kansas, scientists are perfecting the use of modified undercutters to control weeds in wheat stubble (*15*). The sweeps of the undercutters run several inches below the soil surface, where they cut the roots of the weeds but leave the wheat stubble standing. The sweeps pass under pheasant nests without destroying the nests. The only nests destroyed are those that fall directly in the paths of coul-

ters or tractor tires. About 50 percent of all nests survive the undercutting. Undercutting qualifies as conservation tillage because it retains stubble on the surface (*16*).

The greatest benefits of conservation tillage to wildlife may occur in the Northern Plains, where spring wheat is now planted. Spring wheat provides no nesting habitat for early nesting birds, such as mallards. Unfortunately, the spring wheat region largely overlaps the prime duck-producing region of the Dakotas, western Minnesota, and northeastern Montana.

Conversion of this region to no-tilled winter wheat would create millions of acres of new nesting habitat, free of spring tillage. The important change is not the switch to no-till but the switch to winter wheat. No-till is simply the technological breakthrough that allows conversion to winter wheat. Winter wheat is no-till planted into standing stubble, and the stubble creates a microclimate next to the soil surface that enables the seedlings to survive the winter. Conversion to winter wheat also is being aided by development of cold-resistant varieties.

Although no-tilled winter wheat could provide millions of acres of new habitat, that habitat will be of marginal quality. And, as in the Corn Belt, biologists fear the consequences of chemicals.

How do these benefits to wildlife in the Wheat Belt compare with those of organic farming? No research has been done on organic farming and wildlife in the Wheat Belt. In all likelihood, organic rotations will produce more years of nesting habitat than conventional farming but fewer years of nesting habitat than continuous, no-tilled winter wheat. However, clover in organic rotations provides excellent habitat compared with no-tilled winter wheat, which is marginal habitat.

The profitability question

Of course, no conservation farming system will be adopted by farmers unless it is profitable. Research to date has produced conflicting results. Some researchers have found organic farming competitive economically with conventional farming (*9, 14*). Others conclude that organic farming is profitable but not competitive with conventional farming (*7, 19*).

Organic farmers purchase less fertilizers and pesticides, and they produce most of their own feed. Organic farming thus is less capital-intensive than conventional farming. Organic farming also is less sensitive to the price and availability of credit, and less capital is lost in years when disasters destroy all production.

The greater diversity on organic farms creates other economic advantages. Organic farms are less susceptible to market changes in one commodity or to disasters that destroy one crop. Diversity also provides a better seasonal distribution of labor and cash flow. Organic farming is most profitable on smaller farms that involve livestock.

Any increase in the price of nitrogen fertilizers will shift the competitive balance in favor of organic farming. The federal government is phasing out price controls on natural gas from which ammonia is manufactured, but the future impacts on nitrogen fertilizer prices remain uncertain.

Conservation tillage systems are more sensitive to soil type. In the Corn Belt, if methods are properly matched to soil types, profits from conservation tillage can equal or exceed those from conventional tillage (*3*). On the millions of acres of soils unsuited to conservation tillage, organic farming may be the only feasible conservation farming system.

Conservation tillage reduces the labor requirement per acre or, conversely, allows one farmer to farm more acres. It also requires less machinery than conventional tillage or organic farming. Conservation tillage advocates often cite this as an economic advantage. But problems with pests and soils may require the occasional use of conventional tillage in conservation tillage systems. If that is the case, farmers must maintain both conventional equipment and conservation tillage equipment.

A choice

Organic farming and conservation tillage both seemingly produce substantial conservation benefits for soils, water, and nutrients. Organic farming also seems preferable for wildlife in the Corn Belt, while no-tilled winter wheat is preferable in the northern Wheat Belt. Organic farming provides greater energy savings than conservation tillage in the Corn Belt, and both systems save energy in the Wheat Belt. Both organic farming and conservation tillage are economically viable.

The important conclusion from all of this is that not one but two viable conservation farming systems exist. With sufficient information on both systems, farmers can choose intelligently between the two.

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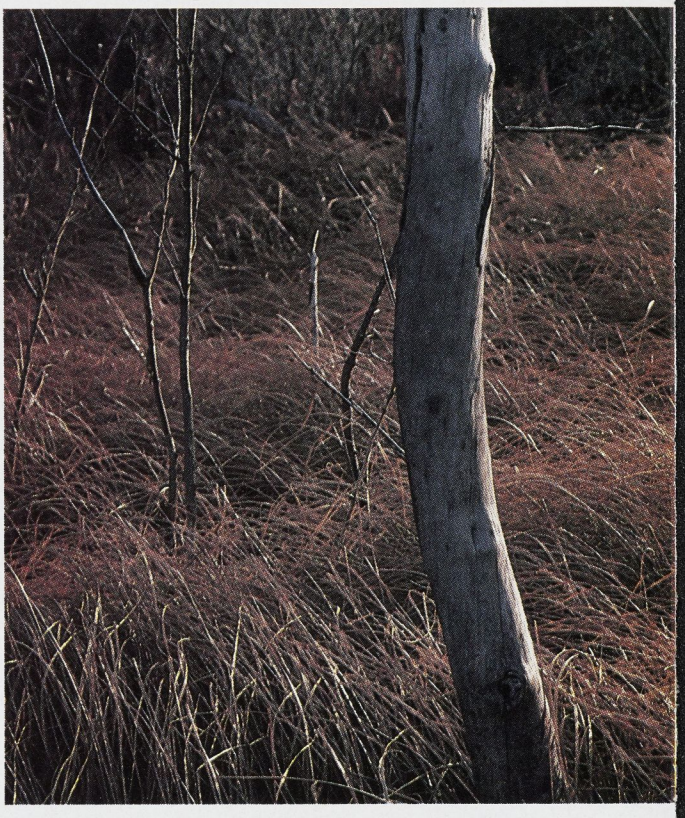
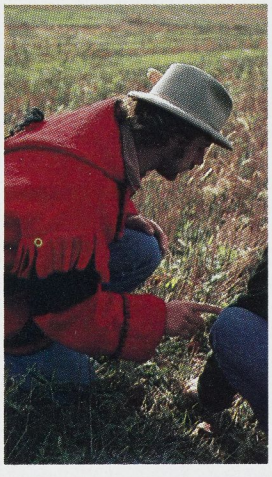
Waking Up To Nature

Awareness is a vital outdoor skill. Without it, you can't be a top hunter, tracker or survivalist. by Tom Brown



T. Brown, Tracker, Inc.

Awareness is the most important of outdoor skills, and yet it is the most neglected. You can't be a top survivalist, tracker, bird-watcher, or hunter without it. As Thomas Carlyle once wrote, "The tragedy in life is not what men suffer but what they miss." Carlyle wasn't talking about the fact that most of us never get to see Timbuktu, but about the small and simple everyday things we pass by without noticing—things that could add richness to our lives and knowledge.



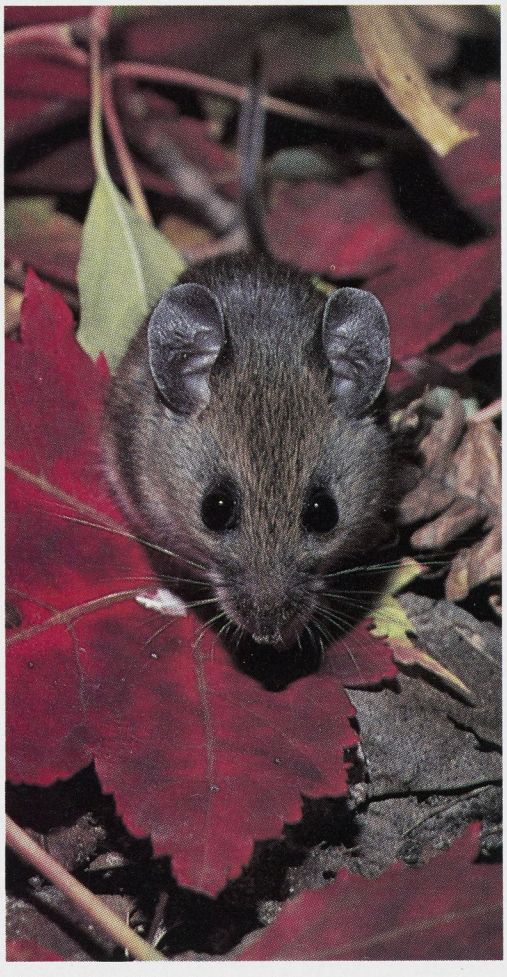
Colleen Coles

The author observing.

Thousands of students have been through my tracking and wilderness survival school in the past several years, many of whom are outdoor experts—hunting guides, search and rescue teams, police in rural areas, survival and wilderness instructors. Whatever the reason they attend my school, and whatever the degree of their particular expertise, I've found that the first and most important thing most of them need to learn is how to see, how to *sense* what's around them. Learning to observe, to be aware, must be the baseline of everyone's training.

Test yourself. Pause for a moment and answer these simple questions. What kind of clouds were in the sky the last time you were out? Which way was the wind blowing? How many different wildflowers can be seen from your front door, and which ones are in bloom? How many bird voices can you hear—how many have you heard today? If there are frogs within hearing distance, what do their voices tell you? Where is the nearest rabbit, owl, deer, coyote or fox? Last time you were out, how many animal tracks did you see in your yard? What time were the tracks made, what were the animals doing and where were they going when they made them? If your awareness is as heightened as it could be, you'll have no trouble answering these questions.

I remember taking one of my classes out for a walk on an edible plant trip. We passed a dozen deer, two fox, one cottontail, six groundhogs, myriads of birds and insects, plus thousands of other creatures, and nobody in the class noticed one of them. All these animals were within very close range—in some cases we might have reached out and touched them. When I asked the



Rod Planck

Stalking Wolf's allegory "Go Ask the Mice" forced me to look to nature, not textbooks, for answers.



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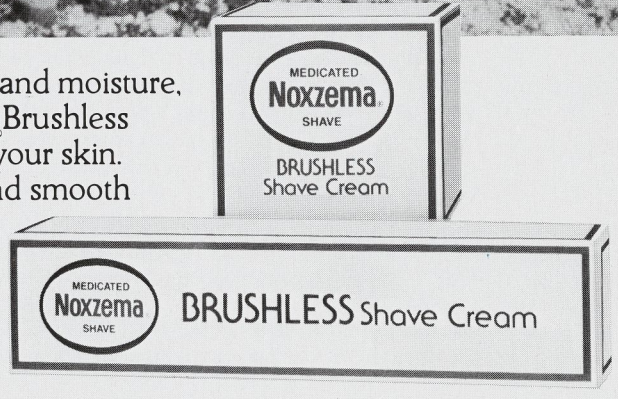

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Plant yourself near landscape that attracts you, perhaps under a tree. Listen and observe closely; if your senses aren't sharp, you could miss the bedded whitetail (below) or the woodcock crouched in its nest (bottom). Nature seems to unfold for those who sit, watch and wait.



Larry Dech

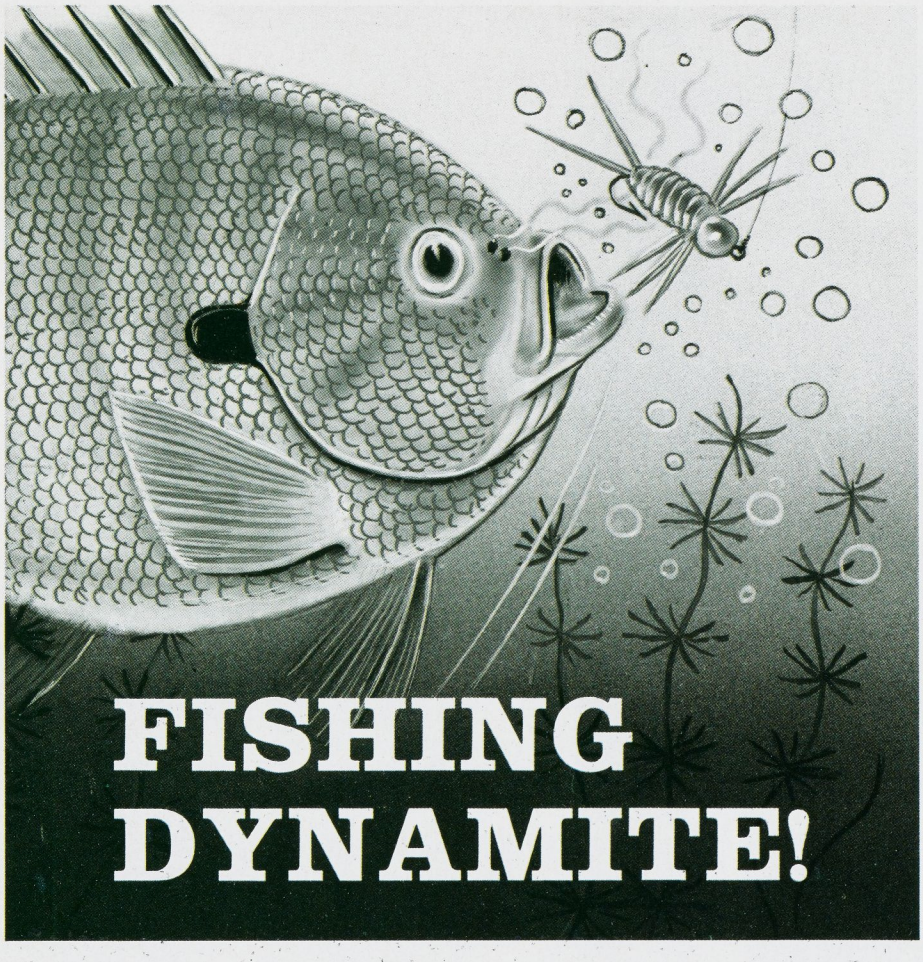
Avoid the "clock mentality" while in the woods. Learn to slow down; drink in your surroundings.



Larry Dech



Larry Dech



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group what they had seen, they looked at me blankly. When I went through the list of what they'd missed, the general reaction was embarrassment and anger at themselves: How could they have missed so much?

Building your powers of observation and awareness is actually quite simple, although it takes practice and breaking some bad habits. You *can* learn to see a world which has always been there but which eludes most of us. But we need to identify the obstacles that have broken down our observational abilities before we can relearn those talents. Relearn is the correct word. Most of us knew much more as children than we know as adults. No matter what outdoor activity you enjoy, learn the following simple techniques, learn how to regain the awareness you once had, and you will tremendously increase your enjoyment.

Loss of Awareness

In most of our childhoods, each day was filled with fascination, newness and wonder. The desire to explore, to have an adventure, always seemed to be the force that drove us. Allowing ourselves to explore because we *wanted* to gave us a natural awareness. Children don't miss a thing. But society lured us away from using our senses: Television and magazines suddenly took up our time, and we were told not to look for answers through our own experiences but in books and from teachers. The older we grew, the less we looked beyond the standard paths. Life became a series of ruts.

When Thoreau wrote that "most men live lives of quiet desperation," he was talking about a great majority of people in "civilized society." We're encouraged to live in a society of sameness. Distinctions that were sharp to us as children have become blurred; we become numb to new stimulations, new ideas. We even carry our dulled senses, our fear of the unknown, into the most beautiful and exciting of environments—the wilderness. We tread the same paths, sleep in the same campgrounds. Cut off from the landscape even when we go to it, we sit on chairs that keep us from the earth, listen to radios or record players that block out the forest's symphony, wear clothing that insulates us from the breeze.

Even the food we eat doesn't make us aware of our connection to the earth. We don't see a loaf of bread as coming from a wheat field blown by the wind. The apples we buy seem to come from the shelf of a supermarket rather than a tree. Our children don't realize—and we often forget—that the meat they eat was once an animal. Losing this sense of connection tends to remove us from the rich flow of life.

The Apache scout had a finely honed sense of time based on where the sun was at any given point and how the behavior of animals changed throughout the day. Our eyes are glued to the clock. We gear our whole lives to the position of those man-

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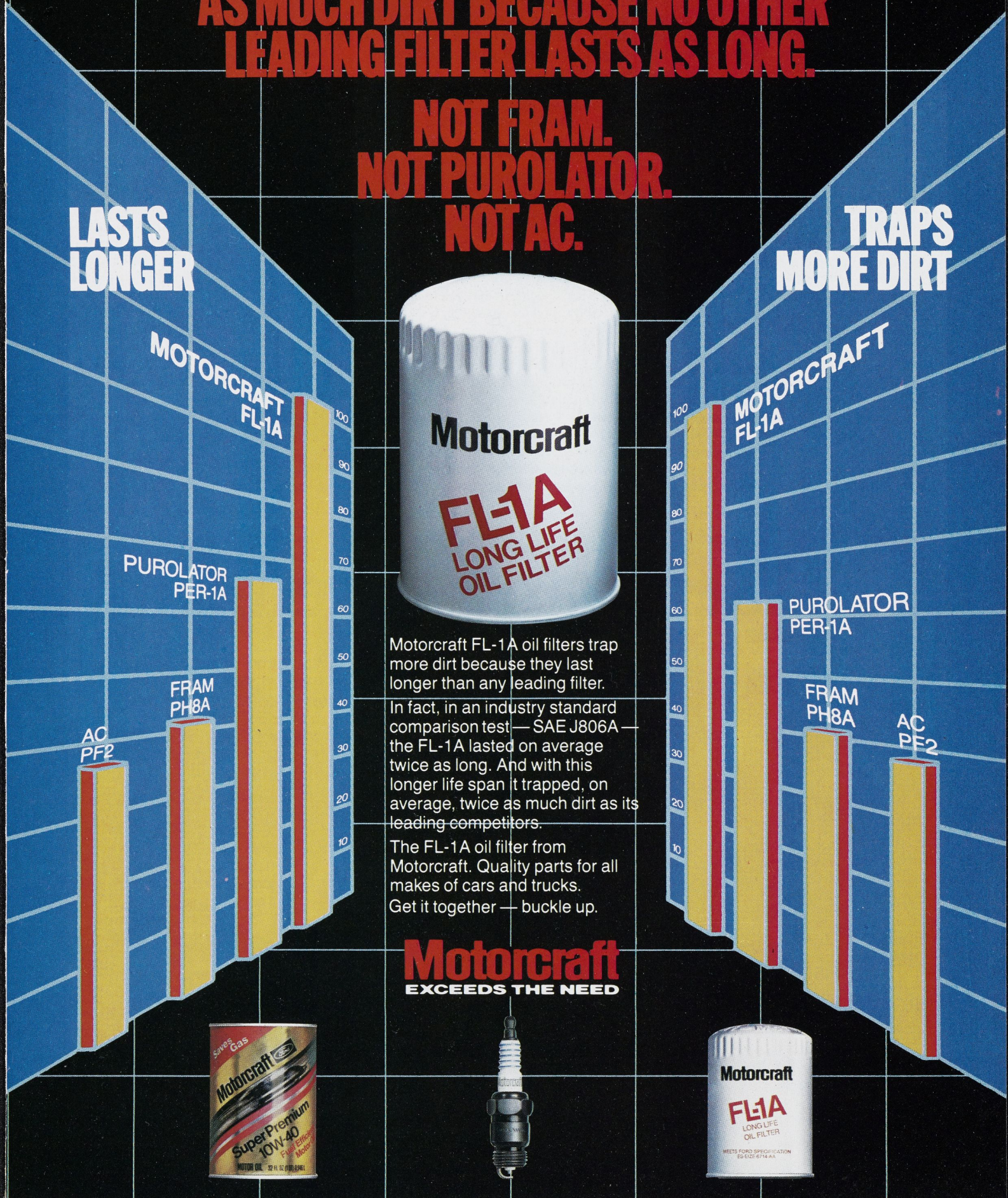

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made hands (time to eat, time to go to work, time to go to sleep). We've forgotten how to listen to ourselves, how to take cues from the subtleties and beauty of the world around us.

The "Same Old Thing"

I have seen thousands of robins in my lifetime. You probably have, too. But was the last robin you saw as fascinating, as wonderful, as *alive* as the first one that caught your attention as a child? The child buried deeply in all of us would say yes. But the adults most of us have become would think I was crazy for asking. The first step in awakening senses is to discover that wondering child in each of us.

When a child and a mud puddle come together, it may be the same puddle he's run through a hundred times, but every time he plays in it, the puddle is something unique, something different. He changes everyday—so does the mud puddle. This is the way I feel about nature. I have never become so familiar with something that it loses its individual uniqueness and freshness.

Stalking Wolf, my childhood Apache friend and mentor, told me, "Touch is the ultimate in observation." Through the intricate art form of stalking, I encourage my students to track and touch various animals. To get that close to an animal you must live with it, learn its habits day after day—where it sleeps, what it eats and drinks. Stalking Wolf called touch the mingling of spirits, the farthest you can get in observation and awareness.

Thinking Feelings

People often imagine what they're going to feel in a situation before the situation occurs. This also blocks awareness. A general rule at my school is: Don't anticipate or imagine what you're going to feel in a situation beforehand.

A vivid example of "thinking feelings" happened one cold night when I was hiking in the Rocky Mountains with a group of students. We were on our way back to camp, the wind was blowing heavy and cold, and the temperature was dropping. I mentioned that we were going to have to cross a mountain stream, and within ten minutes all of the students were grumbling about how cold it was going to be, what a terrible night it was and couldn't we go a different way. When we reached the stream I just walked right in; they held back, then reluctantly plodded ahead. It wasn't until they were almost knee-deep that they realized I had taken them into a hot spring. Later everyone confessed they'd felt *cold* water at first, refusing to believe it was a hot spring until they were knee-deep in the water. As Confucius said, "To have no expectations is to have everything." Without any expectations we're incapable of prejudice—in other words, every experience you have becomes new.

Labeling

Yet another block to awareness is the obsession many people have with naming or labeling things. Because we live in a name-oriented society we've come to feel that the only way to know an entity is to put a label on it. Naming does in fact remove mystery—but it also removes truth.

Once I was walking through the woods with a group of children who continually asked, "Tom, what is this here? What's that? What's that?" As one child held out a leaf, I answered her as "accurately" as I could: "This is a maple leaf viburnam." Another pointed to a bird, and I replied, "That's a ruby-crowned kinglet." I continued to reply with the proper scientific and naturalist terminology until I realized they never focused on any one plant or animal—and they certainly weren't remembering the names I had given them. Then a little boy came up to me with a spotted wood snail in his hand and asked me what it was. I paused to think before replying. Then I asked him questions. "What do you think it eats? How does it move? Where are its eyes? With each question I got the little boy, and then all the children in the group, to wonder about the life of this tiny creature, all without ever naming it. For an hour the children were utterly fascinated with this one snail, something I had failed to achieve when I was naming everything in a scientific manner for them.

continued

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Names really don't teach us anything. I've seen a birdwatcher look over the landscape and see a bird. He immediately looked it up in his field guide, saw that it was a "ruby-crowned kinglet" and checked it off his "life list." He no longer paid attention to the bird—seeing it once was enough—and never learned what the bird was doing, where it might have come from and where it was going. Get rid of the "life list" mentality and learn to experience things without the prejudice of words. Know the mystery of things instead of their names.

Time and Destination

Nearly everyone you meet on a city street has—or thinks he has—a place he must be and a time he must be there. The pressure of "time" and the single-mindedness of reaching a "destination" are two of the biggest blocks to awareness I know. The problem is people tend to take this kind of thinking into the woods with them. I can't count the number of hikers I've encountered who were headed to a campground with literally just enough time to get there before dark. It never seems to occur to these hikers to allow themselves time to take a break, to wander a bit, to take a moment to really see what's around them. Driving themselves to their destination makes hiking a physical workout, not the voyage of discovery it could be. Sometimes time isn't the problem as much as destination is. A person who says, "I'm going into the woods to find deer" has already limited his experience before it's begun.

Automatic Vision

Automatic vision is what happens when we limit ourselves to seeing what we want to see. Essentially it's allowing ourselves to recognize only what's familiar to us. We all begin as tourists, and it's true that you can always spot one—he's the guy taking in everything because everything is new and unfamiliar. But, similar to the average tourist, most of us have visually stuffed our surroundings into niches after a day or two and we see what we're comfortable seeing. The development of automatic vision slowly but effectively strangles awareness.

When you first see a scene—a landscape, a new town, a new mountain or forest—your subconscious scans it and picks out whatever objects are familiar. Our minds like the familiar, we're drawn to it magnetically. Every time you see the same scene again, your subconscious leads you to the same objects, blocking out whatever surrounds them. Our vision is not directed by our conscious minds, but unless we do consciously direct it, we'll see only a fraction of what there *is* to be seen.

A good experiment to test our automatic vision might be to place an unfamiliar object—a deer skull, maybe, or a long feather—in one part of the living room where your family normally doesn't look. (You'll find there are usually three or four places in every room where people never look—between a couch and a bookcase, perhaps, or on the outside wall of a closet.) The object should be in full view, but if you've put it in that unfamiliar place, you can bet nobody will notice it. Rebel against what your subconscious tells you is "normal" or the "right" way to see things. Look where you've never looked before.

Look to Nature for Answers

Stalking Wolf did not believe in books or even teachers. He believed that while a teacher might be able to point the way to greater understanding, the rest was up to you. Stalking Wolf was a true "coyote teacher"—one who does not give answers but rather asks the questions that will point in the direction of the answer. I attribute any awareness I have to Stalking Wolf's method of teaching. It taught me to think for myself and formulate my own conclusions.

A good example of this type of teaching is illustrated by a little story I call "Go Ask the Mice." My boyhood friend Rick and I were walking along a pine barrens trail about 20 feet behind Stalking Wolf. As we passed under a huge old pine tree, Stalking Wolf turned around ahead of us and said, "Don't disturb it." Rick and I looked at each other, baffled, and asked, "Don't disturb *what*?" Was there a deer, a fox, or something else that had eluded us—something we'd feel foolish we'd missed? Rick and I looked everywhere, and finally craned our necks to peer into the heights of the pine tree. We finally saw it—a beautiful great horned owl not ten feet from us.

Forget the "life list" concept; know the mystery of things instead of just their names.

We were amazed not so much that the owl was there, but that Stalking Wolf had known it was there without even looking up. "How did you know it was there?" we asked him incredulously. In true coyote fashion, he replied, "Go ask the mice." By looking down he'd seen mouse tracks, mice that had scurried away from their dreaded predator, the owl. We learned more truths about mice and owl behavior than we possibly could have if some teacher had asked us to look up an answer in Chapter Three of a biology textbook.

The Sit

Probably my favorite way of seeing nature is to walk anywhere in the landscape that attracts me and sit down. Maybe under a big old spreading tree, leaning against it, feeling as one with the earth. I find that once you sit down, birds become unaware of your existence and go about their daily lives heedlessly. Nature seems to unfold to people who sit and watch and wait.

I remember one night when I couldn't sleep and told my wife Judy that I felt like going to an area closeby where the Appalachian Trail reaches Sunfish Pond. She knew I needed to be alone, but she thought I was crazy. This area was heavily traveled by backpackers on weekends ("You need a traffic cop on trail intersections just to keep the backpackers from bumping into each other," she said). I assured her I knew what I was doing.

I settled close to an old oak snag, and waited until the darkness was broken by the first light of dawn. The animals began to stir. Birds echoed back and forth, taking no notice of me—one bounced off my shoulder, another even lit on my knee. Then came the night shift home from work; a raccoon climbed the old dead oak snag where I sat and into his hole to sleep away the day. Chipmunks began to race around me and over my legs. The whole symphony of daytime was coming into full swing. The first spear of light to come over the horizon fell on the back of a beautiful red fox, its fur turned into a ball of red-orange fire, a sight I will never forget.

Then I walked to the trail and encountered a few hikers. We greeted each other. I asked them what they'd seen. "Oh, a few birds," they said. They seemed bent on their destination, imagining that all happiness, all awareness, all the animals would be wherever it was they were going. Like the old poem that says, "Happiness is not found at the end of the trail but along the way," I realized that in two hours of sitting I had seen so much more than these people who'd covered many miles in the same amount of time.

Concentric Rings

Nature is a lot like a quiet pond. If a rock is dropped into the center of a pond, the disturbance causes an immediate concentric ring effect—each ring creates another ring picking up the disturbance and reaction of the previous one. Understanding the principle of concentric rings is what enabled the Apache scout to survive.

If you listen closely to blue jays you can learn what they are responding to. A slight tonal change in their call will identify man, bear, fox, weasel or deer. The deer know that the blue jay's scolding means danger, and they will form another "ring" by snapping their heads up and looking around, a movement that alerts yet another "ring" of animals to respond.

You can begin to see this effect by sitting quietly in the woods and listening to the surge of bird voices, watching the movements of animals as they enter and leave the area. With practice you can tell at greater and greater distances what is happening by "reading" the various concentric rings.

Waveology

I remember once, several years ago, arguing with a friend of mine about what

"nature awareness" meant. He seemed to want to reduce the whole concept to a series of practical tips. This was so far from what I meant by nature awareness—and yet I couldn't find the words to tell him what it meant to me. I was then living in a little resort town in the Northeast, close to the beach and the Atlantic—the only wilderness nearby. Frustrated by his view of things, and with myself for not being able to zero in on my own feelings, I left my house and took a long walk.

It was dark and a magnificent Northeastern storm was brewing. As I approached the boardwalk, the storm increased in intensity. The rain began to fall hard. Just at this time a concert hall close to the beach let out. The concert goers huddled and bundled against the rain and wind, hurrying to their cars to keep from getting cold and wet. A few braver souls stood on the boardwalk and gazed off into the pounding fury of the surf, but they were far from the water's edge. Reaching out into that surf like a finger was a rock jetty. Anyone looking from the boardwalk out to that jetty saw a fool standing on the end of it, risking his life in the storm. That fool was me.

As the waves crashed around me, I realized what it was I hadn't been able to express to my friend. An awareness of nature meant a total immersion in the natural world—just as I felt out there on that rock jetty, buffeted by the wind and rain of a great storm. I had to be on the end of that jetty, feeling the waves pounding against the rocks, vibrating my very bones, tasting the salt spray, my flesh welcoming the hard wind, growing stronger with every surge. I had to be in it so completely that my senses screamed at full tilt.

I can't pass a pond and say, "Gee, that's a nice pond." I've got to be *in* it, feel the warm ooze and the cold depth of the water. I've got to meet and touch its denizens—a frog, a catfish. Anything less than this complete saturation is hollow to me—it is less than the full awareness of nature of which every human being is capable. Without making this connection to the wilderness, we might as well be walking through a museum with nature behind glass.

Next time you take a walk, no matter where it is, open up and relax. Find that "eternal now" Stalking Wolf taught me to see. Dive in. Take in all the sights, sounds and sensations you possibly can. By following the points and understanding the ideas in this article, you will find your awareness increases tenfold. As you wander you will know where the closest deer are or what the birds are telling you and each other. You'll open up a new dimension to your life.

For more information on Tom Brown's Wilderness School, write to: Tom Brown, Tracker Inc., Dept. SA, P.O. Box 173, Asbury, NJ 08820. SA

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TEXACO





Great Divide

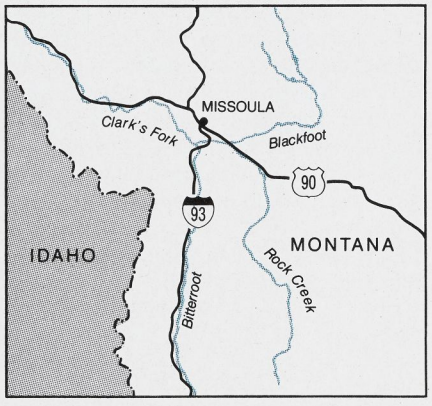
(Continued from page 104)

rainbows in the 10- to 15-inch range; some stretch up to 20 inches. The scenery always reminds me of wilderness even though it isn't.

The Bitterroot, entering the Clark Fork just below Missoula, is one of the best dry-fly rainbow streams in the state. The lower section from Stevensville down to Missoula is best early and late in the season. It is badly dewatered for irrigation during summer and the trout tend to sulk in deep holes. The upper river from Stevensville to Darby offers the finest angling during the hot months; trout will average 10 to 18 inches with an occasional trophy.

The Bitterroot also has the stellar virtue of clearing more quickly than any big trout river I've ever fished. Spring runoff starts later and ends sooner on the Bitterroot than on other streams in the area. A heavy rain that will kill the flyfishing in the Clark Fork for three or four days will only dampen the Bitterroot for a day. The river also warms earlier in the spring and stays warm longer into the fall. The spring dry-fly fishing in April and May, *before* runoff, is some of the best I've encountered anywhere. Just this spring I put my canoe in at Stevensville and floated down to Florence on a warm April day. Aside from three or four half-frozen whitefish outings, I hadn't fished since the fall before. On the tenth cast a rainbow weighing about 2 pounds took a Goofus Bug. It jumped and squirmed and dove its way alongside the boat for a quarter of a mile before I finally could convince the fish that all I really wanted to do was let it go. After I slipped it back into the water, I looked up and watched the sun backlighting the Sapphire Mountains to the east. It wasn't until I'd dropped my gaze to the barren cottonwoods on shore and contemplated them for a while that I could convince myself that it was really Income Tax time and not the end of July.

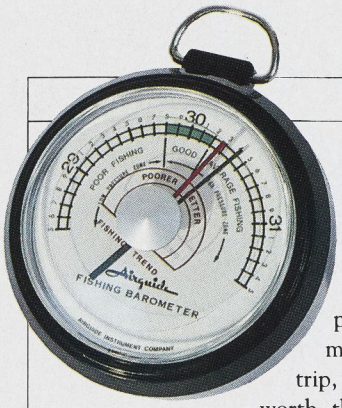
Streamside Anglers, a guide-and-tackle shop in Missoula, does more guiding than any other outfit in the area. It is run by a couple of dedicated flyfishermen, Frank



Many outstanding trout streams can be located just outside of Missoula.

WEATHER WATCH

FRANK GOLAD



PACK A BAROMETER

A barometer may not be an essential piece of equipment on a field trip, but it can be worth the trouble of taking one along. Why not just rely on weather reports from TV, newspapers or the radio? Because these are general views or summaries, dealing with conditions that are hours behind current weather patterns. Having a barometer will not let you predict local conditions with pinpoint accuracy, but it will tell you of impending changes.

Two important factors to watch are barometric pressure and wind direction. A reliable barometer will monitor major changes in atmospheric pressure, or incoming highs and lows. A simple strip of white cloth attached to your vehicle's antenna will notify you of shifting winds.

Falling barometric pressure is usually a sign of inclement conditions, while rising pressure means better weather is on the way. You should also know that winds blow clockwise and slightly outward from a high-pressure front, and counterclockwise and inward around a low. If the high is strong, the air in a nearby low will flow with greater velocity. A drop in pressure with strong shifting winds means rain or snow is approaching.

Always remember that winds shift; fronts stall; other fronts can impinge; and terrain—such as a mountain range in the path of an approaching front—can alter weather conditions.

READING THE WEATHER

WIND DIRECTION	BAROMETRIC READING AT SEA LEVEL*	WEATHER
SW to NW	30.10 to 30.20, steady	Fair, no change for a day at least.
SW to NW	30.10 to 30.20, rising fast	Fair, rain possible in 48 hours.
SW to NW	30.20 or higher, steady	Fair, little change in temperature.
SW to NW	30.20 or higher, falling slowly	Fair for 48 hours, with rising temperature.
S to SE	30.10 to 30.20, falling slowly	Rain within 24 hours.
S to SE	30.10 to 30.20, falling rapidly	Rain in 12 or more hours, with strong winds.
SE to NE	30.10 to 30.20, falling slowly	Rain in 12 to 18 hours.
SE to NE	30.10 to 30.20, falling rapidly	Rain, wind within 12 hours.
E to NE	30.10 or higher, falling slowly	In summer, breezes, rain not likely; in winter, rain in 24 hours.
E to NE	30.10 or higher, falling rapidly	In summer, rain in 24 hours; in winter, rain or snow and windy.
SE to NE	30.00 or lower, falling slowly	Steady rain for 24 to 48 hours.
SE to NE	30.00 or lower, falling rapidly	Rain, high winds, clearing within 36 hours.
S to SW	30.00 or lower, rising slowly	Clearing within hours, fair weather for a few days.
S to E	29.80 or lower, falling rapidly	Storm approaching, with clear weather in 24 hours.
E to N	29.80 or lower, falling rapidly	A nor'easter, gales, heavy rains; winter, heavy snows and cold.
Shifting to W	29.80 or lower, rapidly rising	Clearing, with colder temperatures.

*In mountainous regions a barometer must be adjusted; see instructions packed with your barometer.

CLOUD FACTS

Low Clouds—When low cumulus clouds fuse, unsettled, rainy weather will develop. When these clouds appear in the west or northwest, with strong surface winds coming from the south or southwest, sudden, squall-like conditions are likely. There may be short, hard-driving rains, then clearing and cooler temperatures.

Morning stratus clouds, accompanied by light winds, that break up into puffy patches interspersed with large areas of sunlight indicate a spell of fair weather.

When a nimbostratus overcast develops and clouds approach from the south or southwest, expect steady rains with poor visibility. After this cloud cover breaks, look for a rise in the temperature.

Middle Clouds—When *altostratus*, *altocumulus* and *stratocumulus* clouds join, creating an overcast, it is obvious that bad weather is on the way. Clouds forming a sheetlike or stratified layer, moving from the south or southwest, with surface winds veering and becoming westerly, mean rain or snow with reduced visibility within six to 12 hours. After the precipitation, expect warmer temperatures, southwest winds and partly cloudy skies. If clouds form rolling patterns or large patches that move rapidly from the west or southwest, you may be in for brief, hard-driving rains. If the winds shift and come in from the northwest, squalls are a possibility. They will be followed by clearing and cooler weather. When clouds cluster during midmorning on a warm and humid summer day, with tufts extending from the clouds' base, thunderstorms and strong, gusty winds are approaching. If clouds lower and become darker in the south or southwest while surface winds veer from the northeast to the east and southeast, look for bad weather in a matter of hours.

High Clouds—When *cirrus*, *cirrostratus* or *cirrocumulus* clouds are thin and bright white, with westerly winds, look for fair weather. However, if this cloud cover fuses, thickens, and lowers, and the winds come in from the east, steady rain may arrive within 10 to 24 hours. As this front moves out, expect warmer, fairer weather.

Combinations of wind, clouds and temperature—indicated by changes in barometric pressure—will cause a wide variety of weather conditions, from fog to tornadoes or hurricanes. This is the fascination of studying meteorology: When you think you have all the answers, nature comes along with another variable.


Stratus

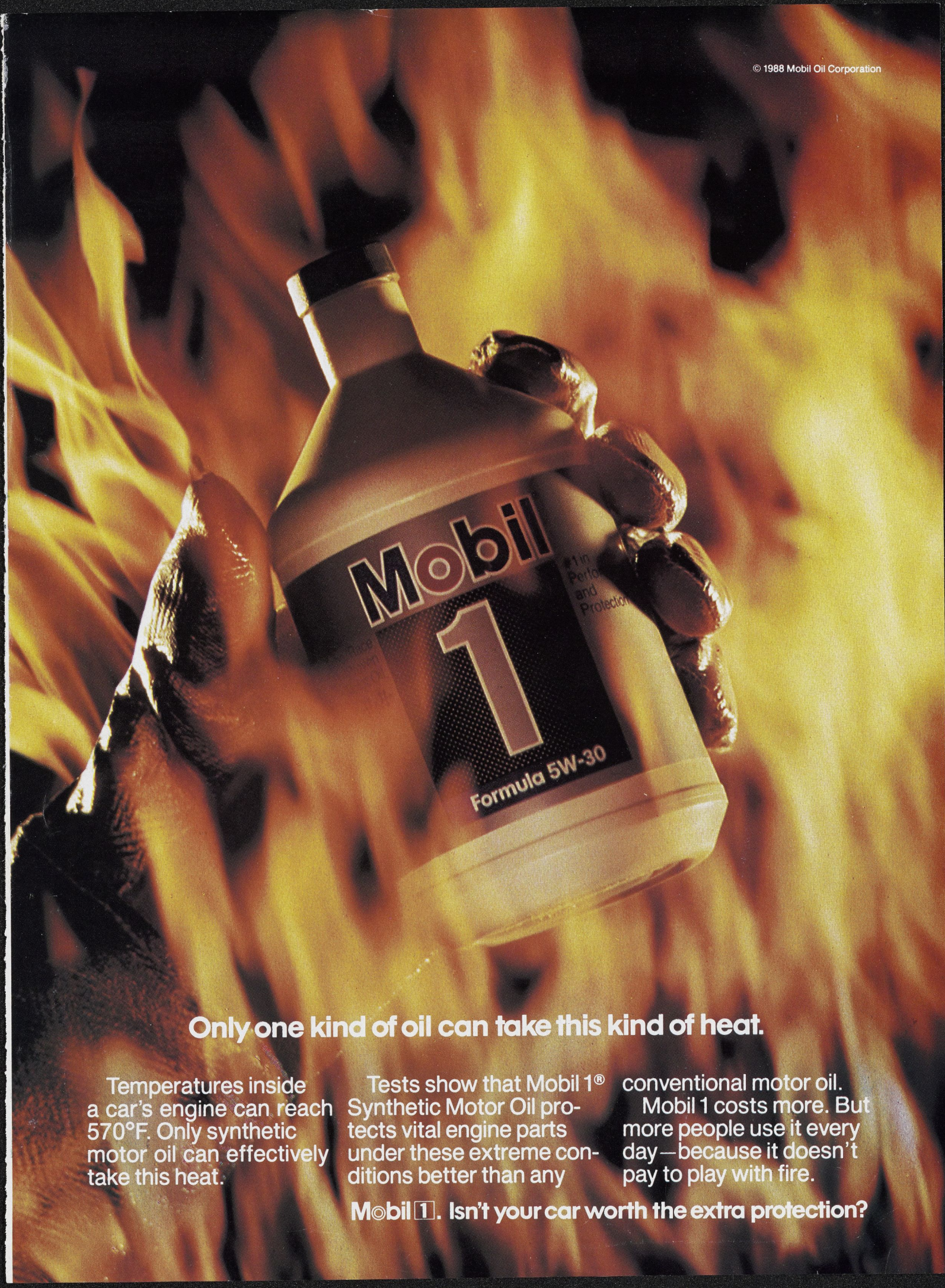

Nimbostratus


Cumulus


Cumulonimbus


Stratocumulus

Cloud photos courtesy NOAA



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Wading Turbulence

H.G. Wellington

The Anglers' Club Bulletin
Vol. 69, No. 2 Winter 1991-92

On the stream which I regularly fish, for several years certain places seemed to me unapproachable. These were mainly the broad, flat, shallow tails of the largest pools. It simply did not seem possible to attain a fishing position without scaring and scattering the large fish that almost always could be seen feeding there.

I was so frustrated that it drove me to re-examine my natural wading procedures, and to adopt very different ones.

When a normal walking stride is used to wade, the wakes that are formed behind each leg intercept each other and create a severe turbulence. Additionally, as the legs pass each other they push water ahead and form an upstream bulge.

In a current these disturbances are, perhaps, of minor significance since they are swiftly swept downstream. But on a flat surface these ripples travel ahead of the wader for a very long distance.

The commotion of wading can easily be halved by the simple expedient of side-stepping—of drawing the trailing leg up in the eddy behind the leading leg. If the pace is slow, the wake behind the advancing leg will subside and smooth out before the trailing leg is brought forward. By this method I have found it possible to advance slowly into the stillest pool without causing any visible upstream ripples.

Wading across a current creates even more turbulence than advancing into one. Whenever possible I plan my crossing so that I am angling diagonally downstream. Very occasionally I trace a V-shaped path, half obliquely upstream, halt downstream and across. Both are infinitely quieter than a direct crossing.

When a fishing position has been attained the casting motion itself usually involves some sway down the legs and may again produce upstream ripples. These also can be minimized by casting from the sideways position and by making a conscious effort to keep the lower half of the body perfectly still.

helicoptered to a tent camp on the Krevitz, consisting of two sleeping tents and a cooking tent. The best pool, very wide, on the river is a mile downriver from the campsite. At this point I must warn all fishermen that the wading is treacherous - no gravel-slimy rocks - deeps holes. Spikes on wading shoes are a must and no one is allowed to fish without a guide to hold on to and lead you out to the fishing spots. Even with your wading sticks the guide is a must. The fishing requires very long casts to reach the fish. "Long Range" two handed rods were very much appreciated by several who brought them.

We spent one night with three guides who spoke no English, so a Russian Berlitz Dictionary saved us. To reach the Umba you can walk approximately four miles or go down the rapids two or three miles in rubber rafts - a great experience.

The other River, the Varzuga, which is very rapid, long and wide, with a large population of smaller fish in the five to ten pound range, is reachable only by helicopter, as we did one day. The camp has five or six tents and a superlative cook, she having learned her trade in France. Again, the wading is rough and each sport has a guide by his side. This year the plan as now set forth is to have all three camps in operation, so that everyone can fish all three rivers during their stay and transportation will be provided.

In conclusion, I have fished many rivers - Canada - Norway, Scotland - England and Iceland - but never have seen rivers with such potential and challenge. The country is magnificent- Northern pines - birch trees on the shore - clear water - the midnight sun setting behind the forest at 12:30 A.M. Bird life on the rivers - terns - gulls -cuckoos calling at night - a caribou on the shore line. Insects were no particular problem. No black flies. Thousands of mosquitoes, which were very effectively dissuaded from attack through the use of "Repel", a relatively new (I believe) bug juice formula, sold by Orvis.

Guides and all personnel - friendly - dying to please in every way. Fishing whenever (guides always available) you wish. Tremendous potential to be the salmon fishing Mecca of the future. An exciting challenge to the true fisherman - an adventure you won't forget.

"Bolshoi - Spasiba" - Many thanks to the Soviet Sports Connections (whatever its present name) and to Dick Talleur and the Anglers' Club for making it all possible.

TROPHY TROUT

BY GARY LaFONTAINE

Gary LaFontaine, *author of the book,* Challenge of the Trout, *has written articles on fly fishing for a number of sportsman's magazines.*

There was one trout last season that was special for me. No other fish of the year was as unexpected as this one, nose up in a riffle no more than 2 feet deep, caught on a day when the sun should have been bright enough to discourage any large trout from rising. But this 20-inch rainbow snuffed a small Gray Wulff, as if waiting for just that fly.

What are the odds of the weekend fly fisherman catching a trout over 20 inches? Well, they're probably the same for the weekend fisherman as they are for me whenever we both fish the standard techniques. When we pop a favorite nymph or dry fly in the easy water of a trout stream, we're really trying to catch small fish. With luck we might catch a 17- or 18-inch trout, but a trout over 20 inches? A fish like that is a fluke—pardon the pun—but only if you use the wrong approach.

I myself landed more than 100 trout of 20 inches or over on a fly during 1977, but I caught all of them while specifically trying to catch big trout.

Most of the time I don't go after trophy specimens. During the season I spend as many as 160 days fly fishing for trout, but only twenty or thirty of these are devoted to hunting big fish. The rest of the time I prefer to pop a fly over rising or nymphing fish, sacrificing any chance of a trophy for the challenge of working individual trout.

There are three reasons I don't catch big fish with these general techniques:

First, I'm usually not fishing where big trout live. To me the only bad trout fishing is no trout fishing at all. Sometimes my wanderings lead me to swamp springs so narrow or to mountain rivulets so cold that no fish could grow over 12 inches in them. Nevertheless, many of my days are happily spent at secret places in pursuit of these 6- to 12-inch brutes.

The trophy specialist, though, doesn't waste time on small, infertile waters. He sticks to the big rivers or big lakes, places where the deeper water stays near the ideal 55- to 70-degree feeding temperature. Or else he fishes the rich, spring-fed streams or ponds. In these waters he increases his chances for a lunker.

Second, I'm usually not fishing when big trout are feeding. There's a basic biological rule: Small trout feed most of the time and big trout don't. A 20-inch fish takes its meals in big lumps, generally preferring minnows or crustaceans rather than insects. Since each feeding effort by a large trout results in a lot of nourishment, it actively forages less than the fingerling that sucks in hundreds of mayflies. So, to catch large trout, it is necessary to become a hunter, more than a fisherman, picking a likely piece of water and working it, staying at the spot as long as you believe a fish is down there and will sooner or later decide to feed.

Sometimes I fish with this kind of patience, staking out a spot and waiting for the feeding rhythm of the trout. Usually, though, grabbing angling time in two- or three-hour clumps, I refuse to depend on the fickle habits of a large trout. Instead, I chase after the more reliable, average fish.

The third reason I don't catch big fish is that *(Continued on page 79)*

It takes special determination—and special techniques—to catch a giant fish

PHOTO BY ROBERT AMFT

Pistols for Two

BY E. B. MANN, ASSOCIATE EDITOR

The words *Code Duello*—or Code of Honor—conjure up romantic images of other times, when gentlemen, provoked by the slightest insult to an ancestor or the honor of a lady, would as soon draw a weapon and kill as come up with a scathing reply. Stories of duels and their hideous outcomes—particularly of the famed Hamilton-Burr confrontation—are the favorite fairy tales of American history. Few today appreciate the subtleties of the Code and prefer to imagine scores of men slain at the whim of their neighbors.

Actually, the rate of mortality in duelling was surprisingly low; statistically lower than the risks involved in driving a car. The Code itself offered many "outs" far short of homicide. The recipient of a challenge could decline on the grounds that the challenger was beneath his notice, socially. (This was risky, since friends of the challenger might consider it a slur on their own status and might themselves become challengers.) Some men—Benjamin Franklin and Daniel Webster, among others—rejected challenges simply because they were morally opposed to duelling. This took courage of another sort, since rejection of a challenge inevitably evoked charges of cowardice.

Even after a challenge was accepted, the Code permitted numerous alternatives. The seconds had to attempt to effect a reconciliation. An apology, even a slight change in the wording of the offensive statement, might do it. One man, challenged for having said that a certain person "was not fit to *(Continued on page 99)*

Did the recently discovered secret trigger-set device in the pistols used by Hamilton and Burr determine the outcome of this famous duel?



ILLUSTRATED BY DICK LUBEY

Trophy trout

(Continued from page 58)

I'm usually not imitating the food the big trout eat. Big flies for big fish; most of the time this is true. Flies for trophy trout only are tied on hooks as large as 3/0 or 4/0. Even dry flies tailored for trophy fish often resemble drowned feather dusters more than insects, and are tied on No. 2 or No. 4 hooks.

When I fish for trout in a stream or lake, my flies are usually within the standard range of sizes—12, 14, and 16. For general fly fishing, I frequently go to smaller hooks than this, especially if trout begin feeding heavily on small insects, but I seldom use larger hooks.

As you can see, the odds of catching a large trout with the general techniques of fly fishing are quite poor. Considering the results of my experiences, over a hundred days a year flogging the rich waters of Montana, the realistic chances might be one solid hook-up of a big fish for every 100,000 casts.

The alternative to these odds, of course, is my experience of fishing specifically for large trout. During these trips, approximately thirty days a season, the 100 trout caught represent a fish for every 300 casts.

For the angler who is perfectly content pursuing average trout, who has no compulsion to hook a monster, the general techniques perform best because they produce a greater number of fish. But for the angler who is willing to sacrifice the faster action for a chance at a 20-inch trout, either in the East or the West, methods tailored for this trophy hunting provide the only realistic hope.

Following are six methods for catching large trout. Most fly fishermen will not try to master all six of them, but among them there's enough variety so that one or more should appeal to any angler in search of trophy trout.

1. The spawning run. Twice a year, for rainbows in the spring and for browns in the fall, a group of men gathers at the Missouri River. Some come only two days a week, some drive out after work every day, and some stay for the whole month, but all of them are regulars.

We spread out on those long riffles downstream from Hauser Dam, everyone double-haul casting with High Density sinking lines and big flies. Some of us prefer imitative streamers that represent sculpins or suckers, while others use gaudy steelhead patterns.

In the past five years I've caught two trout over 10 pounds and many over 5 pounds here, but all of us in the group have lost fish that were bigger than that. The techniques for fishing a spawning run often baffle the angler who is used to light tackle. The equipment is designed to sink a fly to the bottom, the only place the trout concentrate. A rod that casts a No. 8 or No. 9 line, a 30-foot shooting head with monofilament running line, a short 3-foot leader, and a weighted hook are used to sweep the fly along the riffle.

One of the reasons that big trout are vulnerable during the run is that they don't hold in the usual spots. Instead of hiding in the heaviest cover or the deepest holes available, they gather over riffles of moderate speed.

The technique for working these areas appears basic. The fly is allowed to swing through the run as the line drags, but it requires skill to keep the fly bumping the gravel. Ideally, the depth of the swing—controlled either by changing to a faster or slower sinking line or by casting at a greater or lesser angle upstream—starts tapping the fly along the bottom just as the drift passes the angler's wading position.

Any river with a holdover population of trout produces its own spawning run. The largest fish, many of which spend the summer months in the big, slow-moving water downstream (the transition zone where the river gradually grows unsuitable for trout) travel up to the smaller headwaters. For a brief time these fish become available to the fly caster.

2. Minnow imitation in rivers. Minnows become increasingly important in the diet of a trout once it grows past 12 inches. These baitfish divide into two general categories: the ones that escape by swimming, such as shiners and darters, and the ones that escape by hiding, such as sculpins and suckers. The ones that hover near the bottom of the river, weak swimmers that depend on concealment, are of greatest importance in the feeding scheme of large trout.

The technique for imitating these bottom fish is the toughest of the specialty tactics to master, but for a devoted trophy hunter, the fly caster who stalks large trout all the time, it's an essential technique. It's the most consistent method for catching big fish because it doesn't depend on rare moments of heavy feeding activity. Instead, it triggers a strike by offering the trout an irresistible victim.

The fly fisherman tries to simulate the struggling motion of a bottom minnow with a fly of the proper shape, such as a Muddler or Spuddler. Instead of working the pattern with a steady retrieve, he lets it bounce and flutter downstream with the current, a tactic called a "stutter drift."

The technique requires a long rod (9 or 10 feet); a line with a fast sinking, 10-foot tip section; and a 3-foot leader. This combination of tackle not only carries the fly deep, but it allows the precise line mending that controls the stutter of the pattern, a motion halfway between a swim and a dead drift.

Unlike the technique for fishing a spawning run, the stutter drift doesn't swing the fly through an open run or riffle. Each presentation is planned so that the imitation drifts close to, or even underneath, overhanging cover. The correct placement of the cast accomplishes two things: It allows enough time for the fly and line tip to sink to the bottom before reaching the target, and it delays drag until the proper moment.

The fisherman casts up and across, aiming above the target. He mends line as the fly drifts downstream, delaying the drag to allow the fly to sink to the bottom. As the fly bounces near the target, hopefully within the vision line of a fish, he lets the drag take over for a moment. Then he quickly mends line again to counteract the effect of this drag.

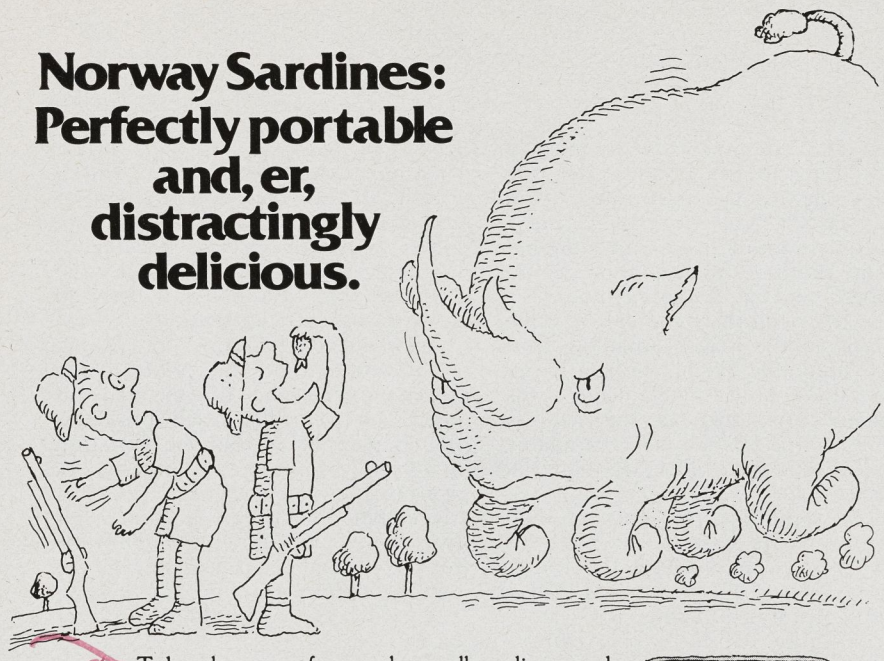
The momentary pull of the dragging line lifts the fly off the bottom. The quick mend, killing drag, causes the fly to drop feebly. This combination of rise and fall mimics the action of a struggling minnow, the stuttering progress of the fly advertising a natural vulnerability.

This tactic can be used at any time of the day, but the fly has to be worked at the edges of good holding areas. The best spots in the stream—undercut banks clogged with roots, fallen trees hanging in the water, underwater ledges in a run—are the hardest to fish because of the snags, but the fly has to stutter as close as possible to tease trout out of these secure holds.

3. The super hatches. A major hatch of large insects—one of the so-called super hatches—isn't the same phenomenon as those everyday emergences of aquatic insects that trigger the evening and morning rises. An ordinary hatch involves a minor species, whether mayfly, stonefly, or caddisfly—a significant population of insects emerging sporadically over a period of days or weeks. This doesn't create a large enough food source, however, to make a 20-inch fish switch from a fish to an insect diet.

Two factors that raise a particular aquatic insect species to the "super" status are size (for example, the salmon fly of Western trout streams is matched by a No. 2 hook), and numbers. But these giant aquatic insects also emerge on a different schedule. Since there's no way for

Norway Sardines: Perfectly portable and, er, distractingly delicious.



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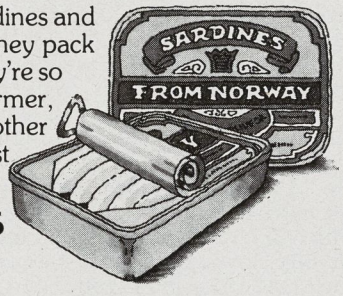


NORWAY SARDINES
Because Smaller is Better.

flies to escape from the water unobtrusively, nature insures survival through mass exodus. Instead of emerging sporadically, the entire population of the species erupts in a coordinated blitz. A percentage of the hatching group lives to mate and reproduce because this glut satiates fish and birds.

These super hatches place a tremendous amount of food on the water. Huge trout that seldom rise will roll and splash on the surface in a feeding orgy because, for a brief period, they're able to forage efficiently on emerging insects.

A trophy specialist learns how to take advantage of major hatches. First, by studying the insect population in rivers that harbor big trout, he figures out the emergence dates of the giant species. Just as important, he also discovers the types of water, such as pools, flats, or riffles, that these insects prefer as habitat.

It's not enough, however, just to be on the right water at the right time. The angler also has to use a fly that imitates the insect the fish are feeding on. The proper pattern has to be the same size, shape, and color as the natural (relative importance in that order).

There's also a big difference in the way an experienced fly fisherman fishes the hatch. The beginner gets swept up in the frenzy of the moment, slapping casts wildly on top of every rise form. The trophy fisherman works only the spots that are likely to hold large trout, drifting the fly over one or two fish.

4. Lake fishing. A fly fisherman will probably never catch a world record brown or rainbow, but in large reservoirs and lakes there's at least that chance a fly caster will hook a 30- to 40-pound fish. A group of lake specialists in Colorado, for example, regularly nab trout that come close to this heavyweight category.

The effective angling strategy for big fish is remarkably similar for lakes at any elevation as long as the surface is cool enough to hold trout. This method depends on the fact that the top 2 or 3 feet of a lake are not stagnant. This layer is controlled by the wind, especially on big, open bodies of water.

This upper layer carries organisms that have no self-locomotion, such as midge pupae and drowned terrestrials. All of this flotsam, pushed against the windward shore of the lake, attracts schools of small forage fish. These small baitfish, whether alewives, smelt, chubs, threadfin shad, or shiners, attract trout.

Fishing the windward shore of a lake is best at dawn and dusk, or on overcast days when the sun doesn't penetrate deep into the water. It's also best, naturally, when a stiff breeze kicks up the surface. Under these conditions the trout push into the shallows and herd any nearby school fish against the bank.

Why don't more fly fishermen catch big trout in lakes? The rain storms, chilly winds, and odd hours are one reason. Miserable weather, the worse the better, regulates the prime angling in shallow water. As long as the surface temperature is comfortable for trout, approximately between 50 and 70 degrees, the conditions can never be too rough for a big fish specialist.

IT'S POSSIBLE to fish a shoreline by wading, but a boat provides more mobility. With a boat, the caster can work the coves, moving constantly to locate concentrations of trout. Also, he can fish off the mouths of inlet streams, where a feeding zone is formed as the incoming current hits the wind-pushed current.

A fly that properly imitates a school minnow is important for this type of fishing. A white-and-gray streamer with a slim outline simulates the shape and color of these open-water baitfish, but overall length is critical also. A school of 3-inch alewives, for example, demands a streamer with a total wing length of 3 inches.

This lake prospecting works not only in cold-water impoundments that support trout, but is a deadly method for those two-tier lakes that stratify, locking warm-water fish in the top layer and cold-water fish in the deeper layers. In the spring and fall, during the turnover that mixes the temperature levels, the shoreline tactics offer the fly caster a rare opportunity to catch the large trout of these warmwater impoundments.

5. Night fishing. Fishing at night is not for everyone. Some people find no enjoyment in tangled leaders, unseen snags, voracious mosquitos, and strange noises in the dark—but then, there's no accounting for the odd preferences of fishermen. It's sufficient to note that a few fly casters love the excitement of it, and most don't.

Actually, night fishing is one of the easiest times for fly fishermen to catch large trout. On warm nights in summer, the fish, especially browns, feed voraciously. In darkness these trout have neither the natural caution nor the fussiness that make them hard to fool in daylight.

The tactics are also relatively simple, and the tackle is sturdy since there's no need for delicate presentation. You need nothing finer than a 10-pound-test leader tippet, weight-forward line, and No. 2 or larger flies. For surface fishing with hair bugs or poppers, the basic cast is across stream, the retrieve slow and steady to avoid those missed strikes caused by erratic motion. For deep fishing with a streamer, the basic cast is down and across, the line allowed to swing around until it hangs straight downstream.

The best nights are the blackest ones, moonless or cloud-covered. Surface fishing is more successful if the water remains cooler than the

air. If mist is rising off the top, indicating the opposite, deep-water techniques work better. The most productive hours are between 2 A.M. and dawn.

Those deep, wide pools that hold untouchable trout during the day are the prime water at night. The fish prowl the shallows, grubbing out crawfish and sculpins, or busting shiners on the flats. They feed largely through the sense of feel, the lateral line picking up vibrations in the water. They key on the beat of a swimming fly or hair bug until close enough to see the silhouette.

We've found a way to avoid many of the frustrations of night fishing. We pitch a tent and build a fire next to a promising hole on a river. In between the 1- or 2-hour stretches of casting, we sip coffee or play cards. With a place to go to untangle lines or tie on new flies, we have the excitement of night fishing without most of the disasters. Usually, one of us will nail a big trout.

6. *The storm front.* There's a 25- to 45-minute period when a fly fisherman can be 25 percent certain to hook at least a 20-inch trout. This 25 percent chance, on any suitable trout stream East or West, offers the angler probably the best odds available. This peak period occurs in the summer months, during the heavy thunder and lightning of a storm front. But don't rush right out and try this, because without certain precautions, this becomes a very foolhardy venture. There's no likelier place to be electrocuted in a lightning storm than out on a trout stream.

I found out about the mad feeding binges triggered by lightning storms by fishing through them; as a matter of fact, by purposely going to the stream any time one of them seemed imminent. By pure luck I survived three years of these thunder-and-lightning trips, catching trout whenever I reached water in time for the heaviest crashes.

THESE feeding sprees break what I always considered a firm rule: It is possible to catch a lot of trout or to catch big trout, but it's not possible to catch a lot of big trout.

Thunder and lightning, along with pouring rain or hail, create an ideal opportunity for feeding. Heavy clouds shut off most of the sunlight, and precipitation and wind block off even more of it by churning up the surface of the river. All of this mixing saturates the water with oxygen. In the underwater darkness, suddenly a safe environment for moving trout, the vibrations of the thunder spook schools of minnows from the shallows into the open stream.

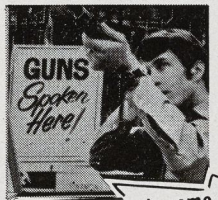
During a heavy storm front, the feeding aggression wipes out any native caution in a fish, and even the 10-pound-plus giants of a river can be found prowling at this time.

The spots to fish during a storm are deep pools, with the fly cast across stream and worked in stuttering twitches. A large streamer or bass bug that imitates a stunned and struggling minnow, fanned along the banks and brought back towards the middle of the river, works beautifully in these places.

Not wishing to press my streak of luck, I no longer fish in the open during lightning storms. However, rather than abandon such a bonanza, I go to the big pools formed by highway and railroad bridges. By staying under cover and casting outward, I manage not only to fish safely but to stay dry while catching trout. [Editor's note: There have been reports that lightning may have a greater affinity for graphite rods than for other kinds, so you might want to keep this in mind if you do decide to fish the storms.]

The long periods of futile casting between fish are the toughest part of hunting trophy trout. Dogged perseverance alone isn't enough. You must concentrate every moment.

This intense concentration inspires an unrealistic confidence in me, all the blank casts of the day failing to shake the belief that the next cast will hook a big fish. As long as this feeling stays with me, this type of fly fishing resembles a divine mission rather than a form of recreation. It has to be that way—in trophy fishing there can be no halfway commitment.



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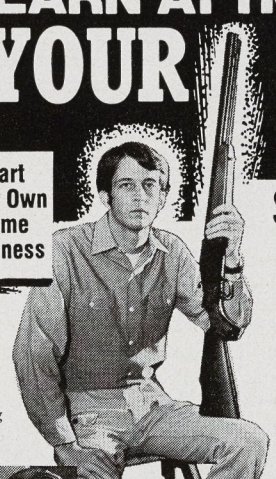

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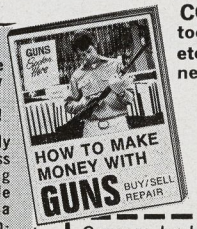

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Fishing the Piddle

BY ED ZERN

The fly fisher's birthplace is where the expert takes you this month





Zern's trip to the British Isles was a combination of indoor work and outdoor play. After an interesting salmon conference, the Fishing Editor enjoyed catching a grayling on the Test, left, and just Piddling around, above

Last September I went to Scotland to attend the Second International Symposium on Atlantic Salmon—"Atlantic Salmon In The World Of Tomorrow" was the official title—held at the University of Edinburgh, and opened by the former Prime Minister Lord Home, pronounced "Hume" (or possibly it's Lord Hume, pronounced "Home," a confusion no more shameful than some famous Englishman whose name I can't think of's inability to tell Biddle from scrapple), who told the assembled scientists and sportsmen of fishing adventures on his family's stretch of the Tweed, including a story told by his grandfather of some nighttime poachers who spent four hours hand-lining a snaffled salmon so large they were obliged to cut it into chunks to carry it away, leaving on the bank the tail section, which weighed 34 pounds. (It's not my story; go argue with his Lordship.) All this was by way of his introduction of the keynote speaker Prince Charles, who is either a serious and knowledgeable salmon angler or has a serious and knowledgeable salmon angler on his speech-writing staff, or possibly both.

The conference went on for three days and was attended by about 250 persons, including delegates from Norway, Ireland, Iceland, France, West Germany, Canada, and the U.S., a number of concerned salmon anglers, and a sprinkling of British commercial fishermen. No one but the latter had a kind word to say about netting salmon at sea, but the villain of every session was the drift-netter and his gear, which because of its complete lack of selectivity could conceivably and unwittingly wipe out or at least seriously damage the entire basic salmon stock from a particular river.

In his summation, Sir Hugh Mackenzie stressed three points: the need to recognize that the Atlantic salmon is not a homogenous species but that each river supports a separate strain of *Salmo salar*, with distinct genetic characteristics, and that efforts to transplant or restock a strain from one river into another may be unsuccessful; the need for phasing out not just drift nets but *all* sea fishing beyond the estuaries of a particular river; and the need for more research, especially into the types of estuarial and high-seas salmon ranching and farming now being practiced experimentally in Iceland, Norway, and by Unilever in Britain, which if successful enough, could eliminate the economic base of high-seas netting and organized large-scale poaching.

The net (if you'll pardon the expression) conclusion seemed to be that with efforts underway to restore a number of rivers, especially in the U.S., with most forms of pollution being abated, and with stricter regulations being applied to netting except in Ireland and a few other areas, the outlook for continued and even improved salmon fishing seems favorable but by no means to be taken for granted; eternal vigilance seems to be part of the price of Atlantic salmon, and improved commercial harvesting technologies are a constant and almost unpredictable threat to the resource. The conclusion of the con- *(Please turn the page)*

WATCH THE BIRDS CATCH MORE FISH

Look up when the fishing's slow. Birds can be eyes in the sky that lead you to fish. A pictorial guide

By JOHN WEISS ILLUSTRATED BY GEORGE LUTHER SCHELLING

My friend Lou Harper is not an easy man to discourage when it comes to fishing, and neither am I. But once when we were fishing Dale Hollow Reservoir, which straddles the Kentucky-Tennessee border, both of us came close to throwing in the towel.

Anyone familiar with Dale Hollow knows it is never easy to fish. Its water is extremely clear, and because of that most of the resident smallmouths and largemouths spend their time in the depths. It takes light spinning tackle, spiderweb lines, and tiny lures to catch them. That's what Lou and I were using. Even so, we were well into our third day and had caught nothing more than a few 10-inch bass.

I suggested that since the squirrel season was open why not head for the dock, uncase our shotguns, and work some of the nearby ridges where the forest floor was littered with hickory and beechnut cuttings. Lou reeled in his plug, started the outboard motor, and pushed the throttle lever forward.

We were skimming across the glassy surface in the direction of Star Point Camp when a pair of belted kingfishers appeared high overhead. I watched their effortless movements for a few seconds, but I wasn't much interested in them.

Then something happened that made me completely forget about squirrel hunting. It was also something which over the years since has had a profound effect on my angling strategy.

The kingfishers, which by this time were 100 yards or so away, suddenly dived straight for the surface, skimmed it briefly, and instantly were airborne again, each with a threadfin shad clenched tightly in its auburn-colored beak. That's when Lou swung the wheel hard. Seconds later he stopped the motor, reached for his spinning tackle, and tossed a small gray plug almost exactly on top of the receding ripples where the birds had touched down. Lou let the lure sink a few feet, made two turns of the reel handle, and almost had his rod taken away from him by a gutsy smallmouth.

"Grab a rod!" he yelled as his light stick doubled over. Seconds later other birds that I couldn't identify appeared from nowhere and began skimming the surface.

For unforgettable minutes both of our rods danced under the pressure of rambunctious bass. During that brief time we boated and released nine smallmouths averaging about 2½ pounds each. Then the action stopped.

It was early fall, and the bass apparently had abandoned their usual haunts along steep shoreline structures and were schooling over mid-lake bars. We figured that whenever a surface-swimming school of baitfish ventured near, the bass rose from the depths and slashed into them. Then the birds arrived to pick up floating bits and pieces of mauled shad.

Once we had doped this out, we knew what to do. Each time we spotted birds diving to the water we'd rush to the area as fast as we could. Usually we'd get in half a dozen casts before the bass retreated to the depths. Then it was only a matter of waiting until other bass rose to chase other baitfish. The location of the school was signaled to us each time by enterprising scavengers on the wing.

Truthfully, neither Lou nor I can boast much about our angling ability during that Tennessee adventure. It was the belted kingfishers, as well as other bird species we saw, that must be credited with our success. They showed us where the bass were. In the years since then I have made a special effort to watch for birds when I'm fishing.

According to "The Audubon Illustrated Handbook of American Birds," there are more than 800 species

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John Weiss has written more than 300 stories on the outdoors. He is author of "Advanced Bass Fishing"

pound every hour.

Ed nodded agreement. We climbed a steep rise and walked into a small clearing. It had been tough slogging even for two keen and slender 17-year-olds, and we sprawled on a sloping slab of damp granite, where we ate our breakfast of sandwiches and soft drinks.

Few words were spoken. Ed and I had hunted these pine-studded hills and thicket-chocked valleys together before, and a lot of talk was not necessary. Earlier in the season, we had taken a large buck from the same area, and we knew we had an excellent chance of getting another deer before the season ended.

Only a week before, I had laid my sights on a magnificent buck and was ready to squeeze off the trigger when Ed had appeared on a hill behind the animal. I had lowered my rifle, waved frantically for him to take cover, then cursed my bad luck as the buck, finally sensing trouble, hightailed it into the deep woods.

Later we discovered Ed had been standing near the edge of a 20-foot cliff and had not seen my signals or the buck directly below him.

I was lost in these thoughts as we ate, and at first did not sense a movement near us.

Below, at the edge of the tilted clearing, stood a huge pine, its tip shrouded in mist. Its wide and heavy boughs bent to the ground to form a doorless evergreen tent. Something moved enough to make a bough tremble. I stopped eating and watched intently. Another movement. Then another. Silently, I signaled Ed and snatched up the Enfield.

"You take the left, and I'll take the right," I said.

We spread out. Five seconds and five steps later, a gray-brown object appeared in an opening in the boughs. I saw the haunch of a resting deer that probably had heard our approach.

"I see it!" I said.

"Where?" Ed asked.

"There it is," I replied as the brass buttplate of the Enfield contacted my shoulder and as I saw the center of the haunch cover the open sights. That deer was ready to bolt. I didn't have a clear shot that would kill, but I had to stop it before it jumped up and into the dense bush. I couldn't see if it was a buck or a doe, but that didn't matter because we had never had a bucks-only law in our area.

I squeezed off the trigger and the woods exploded.

"I got it," I cried, exhilarated.

We ran to the tree. Ed was a few steps ahead.

I cannot recall the exact words that came from Ed's terror-stricken face.

"It's a man!" I vaguely recall him screaming. "You've shot a man!"

Beneath the boughs lay a man of about 60, his face white and twisted in pain. He squirmed horribly as a circle of deep red widened quickly just above the knee of his thick bush trousers.

"You shot me," he cried hoarsely. "You shot me in the leg."

Ed was beside him instantly, tearing off a belt for a tourniquet and yelling urgent instructions. I heard my rifle clattering across the rock ledge where I had flung it with all my strength.

"Help," my mind screamed. "Get help."

I took one more horrified look and began to run.

My recollections of the next few hours seem to run at triple speed; I recall a wild one-mile run through the woods, a startled motorist flagged down on the Trans-Canada Highway, sirens from an ambulance, and the man's pale features as he was wheeled urgently through the emergency ward doors. Then I recall the interrogation room at the Ontario Provincial Police building.

Giant fingers, cold and invisible, seemed to be squeezing my lungs as I sat there. My breath came in gulps and my stomach fluttered as I gave the two police officers my story. I knew nothing about rights and lawyers, and was too heartsick to care. I told them everything without thinking of getting legal help or even of calling my parents. They wrote my story down on large sheets of white paper, and I signed the last sheet.

"I'll never touch a rifle again," I blurted.

"Yes you will, son," one of the officers said. "It was an accident. Everything will be okay."

Not until the black-and-white police cruiser stopped in front of our brick-front middle-class bungalow did my head begin to clear. I thought of my father, recovering from leg surgery, and how angry and hurt he was when I bought that surplus rifle. He had quit deer hunting because he considered it dangerous. The money I had spent on the rifle was to have helped us buy new fishing gear.

I knew I was about to break the heart of the one man I truly loved and respected. I wished desperately to avoid him and to run to my mother's arms and cry like I had never cried before. But something



told me that I could ease at least part of my pain by going to him and breaking the news like a man.

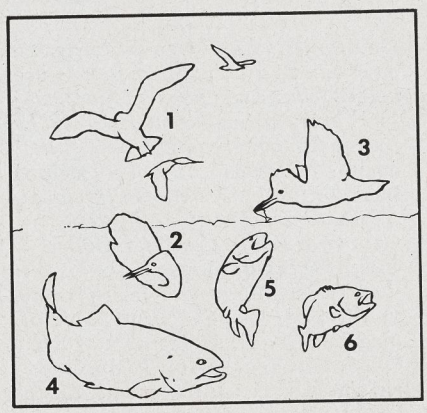
The house was quiet. He was alone in the living room, unable to move about much because of the operation.

"Dad," I whispered, fighting to keep my voice from breaking. "I shot a man in the bush. He's hurt bad, and the police are outside."

He stared in disbelief, his mouth vainly trying to form words. I sat down beside him. He murmured something about his world falling apart. I saw anger erupt on his face. Then he grabbed me around the shoulders and pulled my head

(continued on page 106)

Herring gulls *(1) and other species of gulls are a sure guide to fishing when large numbers of them begin to wheel and dive to the surface. The* **Western grebe** *(2) which paddles around likely areas looking for prey, bears watching when it dives beneath the surface and comes up with a baitfish clutched in its beak. Another guide in the sky is the* **belted kingfisher** *(3). It feeds on baitfish it sees when lightly skimming the surface at high speed. Surface activity by any of these birds can mean that gamefish are rising from the depths to forage. The forage might be smelt, herring, threadfin shad, various minnows, or even small gamefish. In the West, lake anglers should look for* **coho salmon** *(4) in particular, as well as* **brown trout** *(5) and rainbows below active gulls. Various members of the black bass family, including* **smallmouths** *(6) may be working beneath belted kingfishers. On tough-to-fish impoundments such as Dale Hollow, the swoop of a kingfisher over mid-water structure can be the tip-off to fast action when smallmouths have deserted shoreline cover. The same goes for largemouths*



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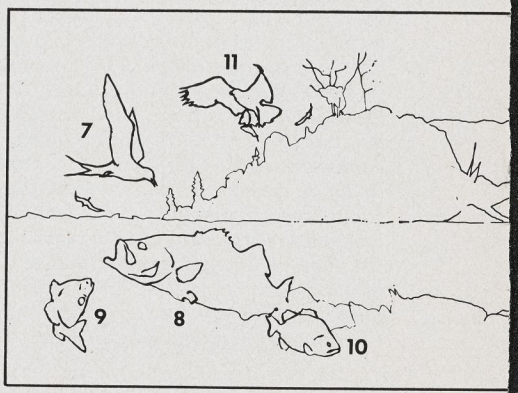
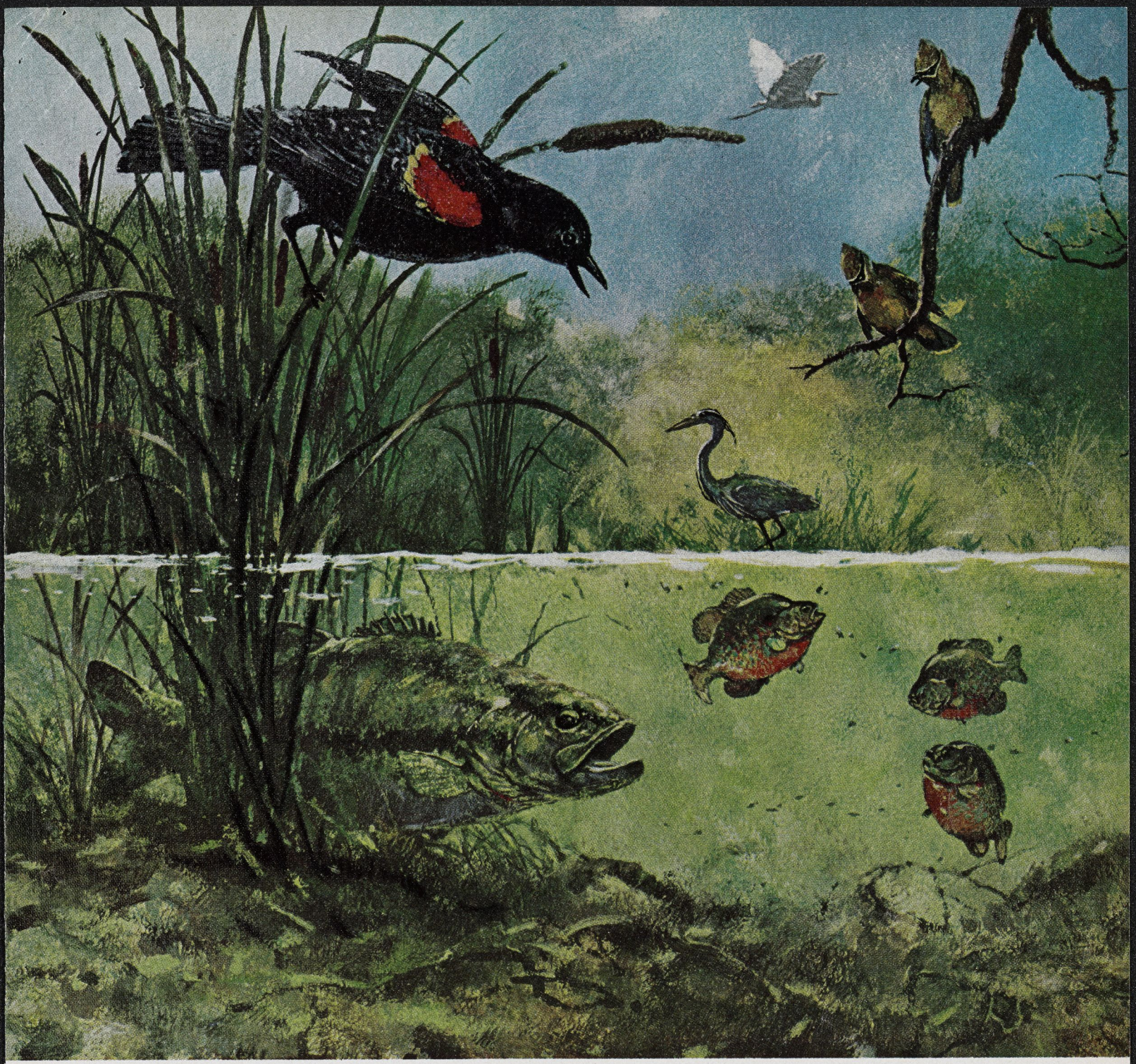
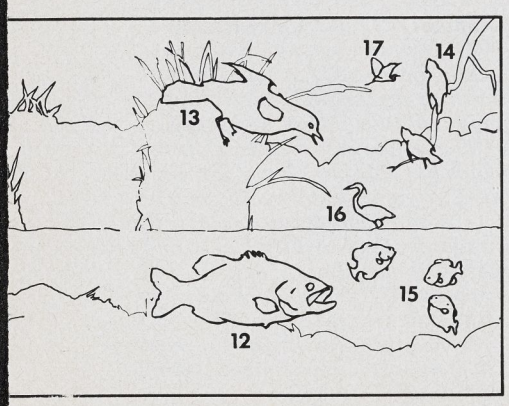
Common terms *(7), sooty terns, and gulls can be invaluable guides to areas where fishing can be good, particularly over mid-water structures where forage fish congregate. Using gulls and terns to locate schools of* **striped bass** *(8) is widely done on freshwater impoundments such as Santee-Cooper in South Carolina. Called jump-fishing in some areas, this productive technique calls for the use of field glasses to spot distant flocks of birds feeding on surfacing baitfish. Once they sight the birds, anglers race to the area at top speed and cast beneath the birds before frightened baitfish flee and the stripers chasing them go down. Other fish that can be found in similar fashion are* **white perch** *(9) and* **white bass** *(10). The presence of a swooping* **osprey** *(11) is a less certain sign that feeding gamefish are nearby. Ospreys, or fish hawks, feed on baitfish and small gamefish that make up the principal diet of many species of fish sought by anglers. On a slack day, when fish are hard to find, an angler could do worse than cast over a wide stretch of water where a lone osprey has been circling and diving in hopes of catching his dinner*







A clever way to locate **largemouth bass** *(12) on a still day is to watch the behavior of* **redwing blackbirds** *(13) that feed heavily on moving insects. If you spot one of these birds periodically flitting to and from a clump of cattails or patch of lily pads, chances are something in the water is creating enough disturbance to make insects become airborne. That something is quite likely a bass or other gamefish bullying about down there, trembling the stalks of aquatic vegetation to which lakeside insects often cling. Another sometime-feeder on insects that can lead you to fish is the* **cedar waxwing** *(14) A concentration of these birds along the shore of a pond, or around a cove in a large lake, can point to an area where* **pumpkinseed sunfish** *(15) and other panfish are likely to be near the surface feeding on insects. A wide variety of birds that feed on insects can serve the same purpose. Shoreline wading birds such as the* **great blue heron** *(16) and the* **common egret** *(17) can be helpful to anglers in much the same way as ospreys. Their presence quite likely indicates that forage for gamefish is available in the area.*

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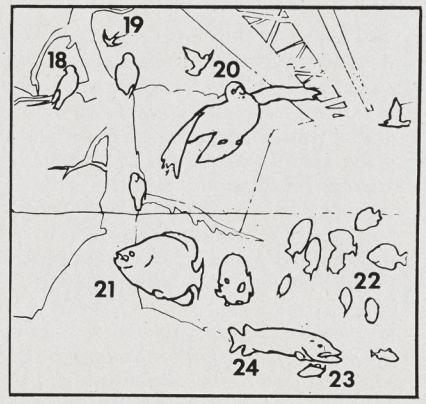

The observant angler who spots an area where birds are nesting over water is likely to have found a hotspot. Some birds to watch for in particular are **tree swallows** *(18) and* **barn swallows** *(19). These often can be found around dead trees or on the undersides of bridges.* **Rock doves** *or common pigeons (20) also often roost on the beams of bridges. Waters beneath bird roosts usually offer good fishing because bird droppings create a superabundance of aquatic organisms—both plant and animal. Fish of all kinds are drawn to the area, creating a prolific food chain ranging all the way from tiny minnows to panfish such as* **black crappies** *(21) and* **bluegill sunfish** *(22). It's not uncommon to find* **yellow perch** *(23) in such areas. Lurking on the periphery may be big predators, including* **muskies** *(24), and various members of the black bass family. Generally, the best area for panfish is directly beneath a roost and close to the surface. The predators tend to lurk deeper and possibly even slightly downstream from them. Keep a watch on sheer cliffs that rear up along the shorelines of some lakes. Nooks and crannies in them are often the homes of many different species of birds.*

of birds in the U.S. Many of these birds commonly live and loaf near water where they feed predominantly on baitfish, insects, and aquatic life. The species that are most likely to help anglers include gulls, terns, kingfishers, redwing blackbirds, grebes, herons, egrets, and ospreys.

There are numerous pocket-size guidebooks available that can be useful in identifying these species and understanding their behavior. I recommend "A Guide to Field Identification of Birds of North America," published by the Golden Press, because the illustrations are in color and the book can easily be slipped into a tacklebox for ready reference.

Undoubtedly the most popular type of bird-watching done by anglers is looking for gulls, common terns, or sooty terns on larger reservoirs when fishing for white bass, striped bass, or any of the black bass species. In fact, an increasing number of anglers each year fish this way. The practice is known in some areas as jump-fishing.

To do it, an angler positions his boat near mid-lake bars, reefs, or perhaps over river channels running along the bottom of a reservoir. These structures are easily located on contour maps, by random searching with depth-finders, or by scouting for a concentration of boats in which anglers are playing the same game. These mid-lake structures are where large schools of gizzard shad, threadfin shad, herring, and various other baitfish commonly hang out.

Then the anglers begin searching the sky for signs of birds beginning to group. They especially keep a lookout for large flocks of birds diving to the surface. This is a sure indication that gamefish have risen from the depths to slash into the baitfish.

I also recommend keeping an eye out for lone birds flying high. When white bass, stripers, or members of the Micropterus clan begin slashing into forage, sentry gulls have a way of communicating the event to others of their kind from great distances. Traveling birds, therefore, may lead you to where the action is. At Santee-Cooper in South Carolina I have seen stripers, for example, rush to the surface to chase schools of blueback herring at times when only a couple of birds were in the air. But when the feeding frenzy really began it seemed like large numbers of gulls suddenly appeared out of nowhere.

When birds start diving to pick up dead or crippled baitfish, anglers get to the areas as fast as they can since these surface-feeding sprees usually don't last long. It's necessary to get there quickly, skirt the action, and make as many casts as possible before the fish go down. Anglers generally use lures closely resembling the baitfish the gamefish are feeding on. If a line breaks or a reel malfunctions, they set that particular rig aside and grab another.

Binoculars play an important role in jump-fishing. Mid-lake structures frequented by baitfish may be widely scattered, so it's not unusual for fishermen on larger waters to watch for birds as far as several miles away. I use Bushnell's 9 x 36 Custom field-glasses. Bushnell's 8 x 30 Expo binoculars are good; they are waterproof and will bob right to the surface if accidently dropped overboard. Another favored brand is Skipper MK1 by Swift, which uses naval-type optics.

Spotting gulls at larger reservoirs is only one of many ways anglers tuned in to the habits of birds can find fast fishing. Last spring, for example, I was fishing Table Rock Lake in Missouri. I was working from a johnboat and was out for largemouth bass. Redwing blackbirds showed me where they were.

Along the bank of one embayment, where there were thick clutches of cattails and bullrushes, I saw some redwings perched on stalks at the water's edge. Occasionally they'd leave their perches and flit about just above the water's surface.

I knew that redwings feed primarily on mosquitoes, gnats, and similar winged insects. I also knew that they almost always go for insects that are flying rather than those that are stationary. Since there was no wind that day, the thing that puzzled me was what was causing the insects to become airborne once in a while.

I flipped the switch on my electric motor, eased in close for a look, and got the answer. The water was shallow and clear. Using polarized glasses, I saw four bass cruising the edge of the shoreline. I estimated them to be about three-pounders, and guessed that they were on the prowl for small bluegills, minnows, or maybe crayfish or frogs. As they bullied about, brushing against the cattails and weed stems, small clouds of insect rose into the air. When this happened, the redwings left their perches and fed on the flying insects.

From then on, the bass fishing that day was almost too easy. I checked the shorelines of every small cove in that area of the lake. Everywhere I found redwings on the feed, a few casts directly beneath them produced strikes.

The presence of redwings along banks, particularly where there are weedbeds and similar cover, can also be a good indication that there are panfish nearby. Almost any species of insect-eating birds that seem to be gathering along shorelines are worth watching.

One farm pond I fish regularly holds some of the largest redbreast sunfish I have found anywhere. But since the water is extremely shallow, the fish never seem to stay in one place for long. For many years, finding the fish usually required fishing the entire pond experimentally. This took a lot of time.

Last summer, however, I hit upon a shortcut. There are always cedar waxwings hanging around the pond, but I hadn't paid much heed to them. It was purely by accident that I happened to be flyrodding when half a dozen of the birds flushed almost at my feet near a thick stand of reeds. I caught some redbreasts right there. I moved down the shoreline, flushed more waxwings, and again caught sunfish. Now, whenever I visit the pond, I first sit on a nearby knoll and carefully glass *(continued on page 122)*

☐ SMALL GAME

BLUNT HUNT FOR COTTONTAILS

Bowhunting for rabbits sharpens you up for big game, puts meat in the pot, and gives you year-round sport

By RUSS TINSLEY



The cottontail was suspicious but not frightened and played hide and seek among the briers. I would glimpse the rabbit, then it would disappear, only to reappear in a nearby opening.

The animal easily could have raced safely to the next brierpatch, but it seemed amused by the game. I wasn't. Anticipating where it would show was a frustrating series of bad guesses.

This went on maybe two or three minutes, but it doesn't take much to wear my patience thin. Finally I said to hell with it and decided not to wait for a sure shot.

My opportunity came almost at the moment I'd made up my mind. The rabbit hopped through a narrow pencil opening and stopped in the fringe of the tight-crocheted branches. Only its head was showing.

I drew the bow, took quick aim, and released the arrow. It hit the briers and went sailing in one direction while the startled creature went another.

I cussed my impatience and ineptness. The range was about 10 yards, ridiculously close. If I'd bided my time, I could have gotten a clean shot.

But the way I play this game, the rabbit wins more often than not.

That's part of the charm. Unless the critters are plentiful and dumb, I figure a couple bagged during a morning or afternoon is a respectable score. And sometimes the sport resembles pitching horseshoes with more near misses than ringers.



Tremendous shock power of blunt tip is much more effective than cutting edge of broadhead on some small game. Be sure blunt tip is weighted the same as your standard target, field tips, or broadheads. Camouflage net cover for bow is valuable asset when trying to get those close shots. Many favor instinctive shooting over bowsight

Yet it is a challenge and great fun. While big-game hunting has received most of the ink, what with its glamour and special seasons for archers, many bowhunters have quietly been enjoying the superb sport of hunting small game. And their ranks are rapidly growing, thanks in part to the opportunity.

This opportunity involves being able to hunt where riflemen and even shotgunners can't, such as some wildlife management areas, state parks, private lands, and even near suburban sprawl. Many large "country" developments are right up against inhabited areas so that firearms hunting would be hazardous or illegal. So the archer with his short-range, silent, and safe weapon has things to himself. Small game is often abundant.

A big-game bowhunter who hasn't so far consid-

Russell Tinsley is a professional outdoor writer with many magazine articles and books to his credit. His latest volume is "All About Small Game Hunting in America"

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DROP CAMP WAY
(continued)

in which a guide or guides stay with the hunters or fishermen. There may also be a horse wrangler and cook. These full-service hunts are much more expensive than drop-camp trips. Even these operators, however, will sometimes provide a means of transportation and rent equipment if they happen to have them available.

The best bet is to know what you want to hunt, where you want to go, and how much service you require. Then write or telephone for information and rates. "Hunting" is available from The National Rifle Association, 1600 Rhode Island Avenue, N.W., Washington, DC 20036. If you want to locate an operator without buying the directory, it's best to write to the conservation department of the state or province and ask for a list of outfitters and guides. In most cases, an operator who handles hunters in the fall also handles fishermen during the spring and summer.

WATCH THE BIRDS, CATCH MORE FISH
(continued from page 81)

the shoreline cover with binoculars, memorizing those places where cedar waxwings are feeding. After that, it's usually only a few minutes before I have a deep bend in my rod.

During the summer I also spend some time fishing that stretch of the Ohio River that serves as the northern border of Kentucky.

Bass are the primary target of most anglers, but I also enjoy good panfishing. I've fished almost everywhere on the river, but there are specific places where I find large bluegills. I've found few of these hot spots on my own, but many have been revealed to me by pigeons.

Many highway bridges and railroad trestles span the water. Nearly all of them have resident pigeon populations. The birds roost on metal struts and I-beams underneath the bridges and trestles.

Each bridge or trestle may be several hundred yards long, but there are 10 to 20-yard sections where the birds roost. The bluegills are always directly below the roosting sites, and the reason is easy to understand.

The birds' droppings fall into the water, creating a rich supply of organic nutrients. These nutrients foster a very prolific food chain (both plant and animal) that attracts baitfish and panfish.

Such locations are good to try for larger gamefish that may be lurking around. Near one railroad trestle I boated a large string of bluegills one afternoon. I was using popping bugs. Since I didn't care to clean more panfish that day, I switched to heavy baitcasting tackle and began casting diving plugs along the concrete foundations of each trestle support.

On the second cast I hooked into an 11-pound muskie. An hour later I hung another that I estimated to be about 15 pounds. The fish swam around a support column, however, and rubbed my line against the cement until it broke.

Another place where this highway-bridge fishing pays off is Kentucky Lake in the Land-Between-The-Lakes area of western Kentucky. Nesting swallows make cone-shaped mud houses on the understructure of bridges spanning the many small tributaries that feed the lake. Beneath these mud houses are concentrations of minnows, and—often as not—hundreds of crappies that have been drawn to feed on them.

Lakes and reservoirs in hilly or mountainous regions frequently have shorelines of sheer rock walls. Nooks and crannies in these walls are often the homes of many different bird species, so I never pass these areas without making a few casts. On many occasions I've caught smallmouths or spotted bass.

In the swampland reservoirs of the Southeast, herons and egrets standing long-legged in weedy coves, or ospreys circling overhead, are often a tipoff that largemouths are nearby. These birds consume large quantities of baitfish such as shiners, various rough fish, and even panfish and small gamefish. The same types of forage are highly rated menu items for bass.

In the West, coho and kokanee salmon as well as various trouts can be found by watching gull activity over large reservoirs. An inconspicuous Western grebe, paddling about and periodically diving beneath the surface, can also lead the way to these fish.

All of this should not be taken to mean that birds should dominate an angler's attention. There are many ways to find fish, and the most consistently successful anglers are those who are able to locate cover or bottom conditions that various species prefer. Successful fishermen also realize the importance of presenting lures or baits correctly.

But no matter what fish you're after, or where you may be fishing, keep an eye out for birds. If the action has been slow, birds may give you a clue where you can load up your stringer.

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BREAK THE RULES & CATCH MORE BASS

If you rely on chiseled-in-stone fishing tips to pinpoint the best times and places to fish for bass, you're all wet. Here's new, computer-tested information that tells you precisely when and where to catch largemouth bass.

By Larry Mueller



PHOTOGRAPH BY FRANK SARGEANT

Twelve noon and clear skies. The bright sun is beating down. "Naw," my buddy said, "the time to catch bass is early morning or late evening. Everybody knows that. There's no use fishing now. I'll stay in the cabin and eat lunch."

I hurried to the west shore of the lake—the side the sun had heated all morning. My buddy would have split his sides laughing. "Fish the shady places, if you're going to fish at all," he would have said.

I cast my floating diver and wobbled it slowly past a stump in the hottest shallow water the lake had to offer. Had I gone crazy? A four-pound largemouth didn't think so. It splashed water all over the bank in its haste to hit my lure. By 12:25, I caught four bass weighing from 2½ to five pounds, and went back to the cabin to eat my own lunch.

Why were the bass active under these conditions? The real answer is that it was early April in Illinois. Why did my buddy think I was insane to fish during midday? Because he had acquired all of his bassing knowledge during the summer months. This incident took place almost two decades ago, and I was just beginning to learn that no bass fishing tip is absolute. The chiseled-in-stone truisms that most of us follow just don't apply all the time. Some of these beliefs are factual, however, but they apply only at certain times of the year.

Until bass-fishing information is sorted out and properly dated, much of it is downright contradictory. "Always fish the shady side of a stump," for instance, but last March, I caught a three-pounder on the sunny side. "Fish when the barometer reads high or is rising." But the barometer read low after a storm last July, and the river bass went on a feeding spree below a wing dam. And why didn't that weather front in July drive the bass into deep water? A similar storm in late April did just that.

I could go on and on. Every time I encounter conditions that produce surefire fishing, I find out at another time that the same conditions ruin the fishing. The inverse is equally true. What ruins fishing one month enhances it another.

Confused? Join the club! Some very knowledgeable people belong. I recently talked with a very savvy fisheries biologist who was chock full of statistical correlations between weather conditions and the feeding activity of bass. The conversation was lively until I mentioned the turnaround times when bass reverse their response to changing weather conditions. There was a moment of confused silence before the biologist changed the subject rather than admit that he didn't understand what I was talking about.

I didn't know what turnaround times were either, until I got involved in a computer study of fish behavior. Clyde Weder, a camp operator on seven fee-fishing lakes, called me about the possibility of scientifically analyzing what turns fish on. Give or take a little for the fisherman's skill, most of his customers were experiencing roughly equal success on any given day. There has to be something about each day, Weder reasoned, that makes fishing good, bad or indifferent.

Inadequate data collection provided little information the first year. Then Steve Dickman, a chemical engineer with considerable biological background and access to a computer, began fishing Weder's lakes. Weder interested him in the study, and the pace quickened. By the end of the season, Dickman had a mathematical formula that he used with over 85 percent accuracy to predict how many fish would be caught per rod on any given day in Weder's lakes.

To shorten a long story, I urged Dickman to design a simple slide rule embodying his formula to go with a book called *The Calculating Fisherman,* which I was writing about the fishing system that evolved from the computer study. Everything was going fine with the book, but then Steve called. He had developed the slide rule, but it only seemed to work with summertime data.

"When I plug in spring or autumn conditions," Steve told me, "the slide rule says fishing should have been bad when Clyde's customers caught the most, and good when they caught the least."

Of course! What we had understood only vaguely about bass reversing their responses to conditions was being pointed out emphatically by the computer. And it didn't

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PHOTOGRAPH BY THE AUTHOR

Scent Trails

If you play your cards correctly, you can bring a big buck right to your stand with a sex scent, but if you use these scents incorrectly, you'll see neither hide nor horns.

By Bill Wilzbacher

At 7:15 that morning, I heard a rustling sound to my right. I turned slowly and saw a buck walking at a fast pace toward me. He was 30 yards away, and he had his nose to the ground. The buck was following my trail like a beagle on a rabbit. I had laid a sex-scent trail about 90 minutes earlier, and the buck was coming along it step by step, precisely the way I had laid it in the pre-dawn darkness.

I first saw the whitetail at about 30 yards, and I watched him cover about 10 yards more until he was passing my stand. Not once did he raise his nose off the ground. His nostrils were flared, engulfing every delectable whiff of the sex scent. His neck was swollen from the rut, and hair stood up on the back of his neck. Black streaks ran over his tarsal glands down to his hooves. The buck was convinced there was a doe ready to be serviced. He was going to fulfill the mating urge, and nothing was going to stop him.

I slowly rose to my feet and drew my Wing Slimline bow. I angled the arrow in behind his front shoulder, and the buck broke for heavy cover a few yards away. And then, silence! Was he down for good? I decided to wait 20 or 30 minutes before checking it out. I sat down again and started thinking about what had happened.

At that time, I had been bowhunting for six seasons, and this was the first trophy buck that gave me an opportunity for a shot. Previously, I had gotten my share of shots at small bucks, mostly spikes and forkhorns, but the big ones had eluded me for a long while. After I started using sex scents, I started seeing bigger bucks regularly, and I have lured six bucks within bow range in the past 10 years with these scents.

These scents aren't infallible. All the bucks in the woods will not beat paths to your stand just because you are using one of them. Even with a good scent, scoring on a buck still takes a lot of planning, and you must have a thorough understanding of the whitetail in order to use a scent effectively.

I'm convinced that a $3 bottle of good sex scent is a wise investment, but there are many hunters who scoff at the idea. I think there are two reasons behind all the doubt. For one thing, the labels and printed directions (if any) of the brands I have examined do not go into detail about how to use them. Space on most labels doesn't allow it.

Second, some advertisements for these scents are misleading. One advertiser tells you to simply sprinkle a few drops around your

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continued from page 69

take us long to make the necessary corrections in the design of the slide rule because the computer data pinpointed the turnaround times. The first occurs at spawning time. The second takes place when cooling water in the autumn falls below the largemouth's preferred temperature.

To understand turnaround times, it's necessary to know what the preferred temperature is. Because fish are cold-blooded and their body temperature is about equal to the water temperature, many anglers believe fish are comfortable no matter what the water temperature is. They aren't, and this goes deeper than mere comfort. The preferred temperature of a species coincides with the average peak activity temperature of the enzymes in the fish's digestive system. In other words, the preferred temperature of a fish is the temperature at which its body most efficiently turns food into energy. This varies a few degrees from north to south, but for bass at Weder's lake in Grantfork, Illinois, it is about 73°.

Most bass spawn in the spring at 65 to 70°. By the time they finish, the water temperature is climbing above the preferred level. In the autumn, the water temperature again drops below the preferred level.

With this information, turnaround times suddenly become simple. Before spawning, anything that warms the water improves bass fishing. After the spawning period and throughout the summer, bass fishing is improved by anything that cools the water down toward the preferred temperature. In the autumn, after the water has cooled below the preferred 73° (plus or minus a couple of degrees locally), anything that rewarms the water improves fishing.

Turnaround times are simple to pinpoint. Just measure water temperature a few inches below the surface. Spring and autumn warming occurs first in the shallows, and bass seek it out, so there's no need for deepwater readings.

When the turnaround period is detected, it's also time for a turnaround in angling tactics to match the reversal in bass response. In fact, the really observant fisherman adjusts his tactics continuously.

Early in the year, when the water is first warming, the fishing hotspots are sun-drenched shallows under high-noon heat. Topwater or shallow-diving wobblers are great baits at that time. As the season advances, the shallows warm up earlier in the day, and wider areas of water increase in temperature. You can then fish during a longer midday warm period. And you can fish farther from shore with deeper-running wobblers, spinners and spinnerbaits. Just before spawning time, fishing may be good close to shore at almost any time of day.

Keep in mind that "warming" is the key to good fishing before spawning takes place. Adjust tactics to the degree of warming. If conditions are cooling the water, expect poorer fishing.

After the spawning turnaround, the water has become a little too warm, especially in the shallows. Bass are less inclined to feed near the shore during midday. Morning and evening become the preferred times because they're cooler. The hotter it becomes, the shorter the early-morning and late-evening feeding periods.

During these brief feeding bursts, use any of the shoreline lures that were effective earlier. But if you plan to fish a longer portion of the day, your tactics must change to include plastic worms, deep-running jigs and other bottom-bumping lures. The bass are found in deep-schooling areas—any place deeper than surrounding water. These include such places as streambeds submerged by impoundments. Good spots often can be found merely by fishing deeper off a point of land.

During the summer, the key word is "cooling." Any condition that cools the water improves fishing and prolongs the feeding period, especially in the shoreline areas where most anglers choose to fish. Rising water temperatures during the summer slow down the fishing.

After the autumn turnaround, water temperatures are springlike, but the trend is opposite. The water is warming in the spring while it is cooling in the fall. And, you should return to prespawn-tactics.

The preferred temperature of a fish is the temperature at which its body most efficiently turns food into energy.

Any angler who is aware of the turnaround and changes his tactics accordingly will find it easy to catch bass. But Steve Dickman's fishing formula goes beyond these basics, and so can any angler who pays attention to details.

The computer program included fish physiology data such as the enzyme-activation temperature, so the computer "thought like a bass." The computer correlated the catch records of each day of the test period with water temperature, air temperature, barometric pressure, whether the barometer was rising or falling, the condition of the sky, wind speed and wind direction.

It became obvious that some things aren't important enough to the fish to be worth consideration by the computer or by fishermen. Those who recite: "Wind from the east, fish bite the least," will be surprised to learn that wind speed and direction have very little influence on bass behavior. Wind direction is only an indicator of the presence of other weather factors that really do influence fish: barometric pressure, sky conditions and air and water temperatures. Don't forget the turnarounds in this context. Easterly winds usually occur with sky conditions (overcast, rain, fog, etc.) that are cooling. That would slow down spring and autumn fishing as the old adage has it, but an easterly wind would *improve* summer angling precisely because it usually is accompanied by cooling sky conditions.

A rising or falling barometer isn't very important either, but actual barometric pressure is a significant factor. Air pressure influences the depth to which free oxygen diffuses in water. Fish breathe this free oxygen so, when air pressure decreases, they often move into shallower water to find the amount of vital oxygen they need.

Water temperature also influences the amount of free oxygen available to fish. The warmer water becomes, the less oxygen it holds. So, once again, we have to fine-tune our tactics according to turnaround times. In the cool spring and autumn periods, bass have adequate oxygen at the depths they prefer. They are lively and can be taken with a great variety of lures—almost anything, in fact. But during the hot summer, reduced free oxygen causes bass to limit their feeding excursions into shallow water. Too much exertion without enough oxygen tires them quickly. They soon return to deep schooling areas where they remain largely inactive to limit their need for oxygen. At this time, plastic worms or jigs-and-eels crawled or jigged very slowly are most effective.

Air temperature and sky conditions are closely related, of course, and the computer found both to be highly significant. The computer study found that air temperature is an indication of whether or not the water will be cooling or warming in the immediate future. And, sky conditions largely determine air and water temperatures.

Sky conditions have by far the greatest influence among all the factors affecting bass behavior. And, sky conditions do quite opposite things on one side of the turnaround times than they do on the other.

Summertime conditions stack up this way: sunny and bright (poorest fishing), rain (more than twice as good as sunny), cloudy (a little better than rain) and cloudy within five hours after rain (the absolute best overall summer situation, usually 1½ times as good as cloudy or rain, and 3½ to seven times as good as sunny).

Before the spawning turnaround, sky conditions stack up quite differently. Worst of all is cold rain. Fishing then is even worse than it is when it's sunny in the summertime. Almost as bad is cold and cloudy, but slowly worked lures may catch a few bass on deep structure. Bright and sunny with warming water is as good as a cloudy day in the summer. The fish are caught in the shallows. The very best condition in this period is a warm rain.

After the autumn turnaround, cold rain and cold and cloudy tie for poorest, comparing to summertime bright and sunny. Bass can be caught in deep water by fishing slowly, however. Bright and sunny compares with summer rain, and the fish are caught in shallow water, especially at the edge of drop-offs. Warm rain compares to summertime rain—about equal to a bright, sunny autumn day. No autumn period is as good as the period within five hours after rain during summer, or warm rain during the prespawning period.

When we say conditions are good or bad for bass, we really mean how easy or difficult it is for us to catch fish. Better-than-average anglers don't give up just because conditions are poor. They modify their tactics and fish slower and on deeper structure when conditions make the fish sluggish. Seldom does a bass angler go home fishless if he stays in tune with the ever-changing conditions preceding and following the turnaround times.



(The Calculating Fisherman, the author's book on turnarounds, is available—fishing slide rule included—for $9.95 from Weder Sales, Route 1A-TM, Highland, IL 62249.—The Editors.)

above St. Anthony. Much of the land in this section is privately owned, but landowners often permit access to anglers who ask permission. The fish are a trifle smaller than in the special-regulations section upriver, but there still are many large rainbows and there are a lot of fish.

"Let's cross the river," Lawson suggested. "There's a place down a little that I want to show you."

In the cloudy weather, mayflies began to emerge and the trout went to them hungrily. We used several different flies, but a Pale Morning Dun worked best.

As I looked up and down the river, I could see hundreds of rising fish. The waves grew higher. We could no longer see our dry flies: Sometimes they floated, but often they drowned. We struck when a fish slashed anywhere near where the artificials should have been. Often it worked, and the beautiful silvery rainbows would leap high into the air.

When the wind started to blow hard enough to support a long section of my fly line and leader as if it were a flag, I called to Lawson: "How do you propose we fish in this?"

"Let's get out of here," he boomed.

We reached the car and turned back to look at the river. "Surf," said Lawson. "It's not unusual to have wind but we've got an ocean surf going."

I picked the wrong morning to compare the most popular section of Railroad Ranch water to the spots we had fished. As I had expected, the area was unbelievably crowded. Even worse, I later learned that while I was off fishing, Al and our other cronies had hit an unexpected bonanza when they hiked into a section of ranch water that receives little attention. When I joined my friends at noon, Al reported that a freak brown drake hatch came off in the morning (it normally is an evening affair) and triggered the trout into a feeding frenzy.

I made up for the morning's frustrations by hooking and releasing a double-digit number of rainbows that still hadn't had their fill of brown drakes. Among them was a 22-inch trout. We saw only two other anglers while we fished.

The Henry's Fork, both in and out of the ranch, has a reputation as being some of the toughest water in the country. Trout have a great deal of natural forage and in August, especially in the slower water, the hatches can be complex. For example, trout could be feeding on any of three stages of two types of blue-winged olives. But things are not that sophisticated at other times of the year. Keep your strategy simple and you will improve your chances of success.

There is one more area of the Fork worth exploring. From above Island Park Reservoir to the outlet of Henry's Lake, the quality of the fishing depends upon transient fish from the reservoir. Fishing is closed from the lake outlet to Big Springs, which is a major spawning area. Rotenone, a low toxic insecticide, was used in the reservoir in 1979, and it will take a couple of years for Island Park to revive. A lot of fishermen hope it will be soon—a 20-pound rainbow was taken from the impoundment.

Wild fish, big fish and spectacular country—the Henry's Fork has them all. And if you take the time to explore and do a little hiking or floating, it also offers quality angling in solitude.



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When The Big Bass Bite

Most bass fishermen head out on their favorite lake and hope the largemouths have the feed bag on. But if this hit-or-miss angling isn't for you, try predicting exactly when big bass will hit. Here's how.

By Rick Taylor

Who among us at day's end has not been witness to a gorgeous stringer of bass that were, unfortunately, in someone else's possession and that had, reportedly, stopped hitting just before we arrived? It's bassing's equivalent of the gutter ball, and it leaves even the best feeling the worst.

Perhaps the main reason this happens can be found in our granting too much power to the fish. How many times have you thought: "The bass will bite when they get hungry, and there's nothing I can do about it. So, I'll just go at my convenience and hope to hit it right?"

The fact is that bass don't always dictate policy. In an 18-month electroshocking study at Crab Orchard Lake, fisheries biologists from Southern Illinois University found that largemouths —regardless of the season and in spite of an adequate food supply—had empty stomachs approximately 50 percent of the time. And of those that did contain food, 90 percent of the time it was only one item.

Now, if these bass were free-thinking, warmblooded creatures like you or me, they'd be continually scouring the shallows, and nothing edible would be immune from attack. But they are coldblooded and much more susceptible to outside influences. They not only take on the temperature of their environment, but the mood as well. If conditions aren't favorable to a successful feeding venture, a lunker, starving or not, will simply shut down its metabolism until conditions change.

And therein lies the key to predicting the best times of day to go for big bass.

Take a sunny day in the early spring, for example. Despite the intense sunlight, prime time rarely occurs at the traditional times of first or last light. It usually happens right in the middle of the day, when the sun is strong in the shallows. These rays heat the water and promote zooplankton reproduction, which in turn brings up baitfish to feed on the microscopic animals. Most big largemouths discover this phenomenon early in life, so don't bother being there at other times. (The same can be said for the wiser angler.)

This "heat-of-the-day" period bears out historically as well. In a survey I conducted among 20 top professional bass fishermen and writers, 16 said that in 50° or colder water, they've had the best luck between 10 a.m. and 4 p.m., with the emphasis on noon to 2 p.m. (The other four experts favored early morning, but two admitted having few occasions to fish very cold water, as they reside in the Deep South.)

Of course, this 10 a.m. to 4 p.m. stretch is just a range. It does not mean that any single bass is active for six straight hours every day. On the contrary, a radio-tracking study by Mississippi State University biologists on Loakfoma Lake found that in 40° water, largemouths averaged only about 30 minutes of activity out of each 24-hour period. So, although prime time is figured out pretty well, you may have to fish a number of unproductive hours to pinpoint it.

When the water warms to 50°, however, bass activity periods increased to about 2½ hours out of each 24, according to the MSU study. The exact times were not given, other than to say all occurred during daylight hours. But it's safe to assume that midday was the top fishing time.

As a lake's base temperature approaches 60° and bass enter the spawning period, midday still offers the best fishing opportunity. The back end of a sun-baked, wind-sheltered cove can see temperatures in the high 60s, putting the entire food chain into gay profusion.

But this is no longer the only time.

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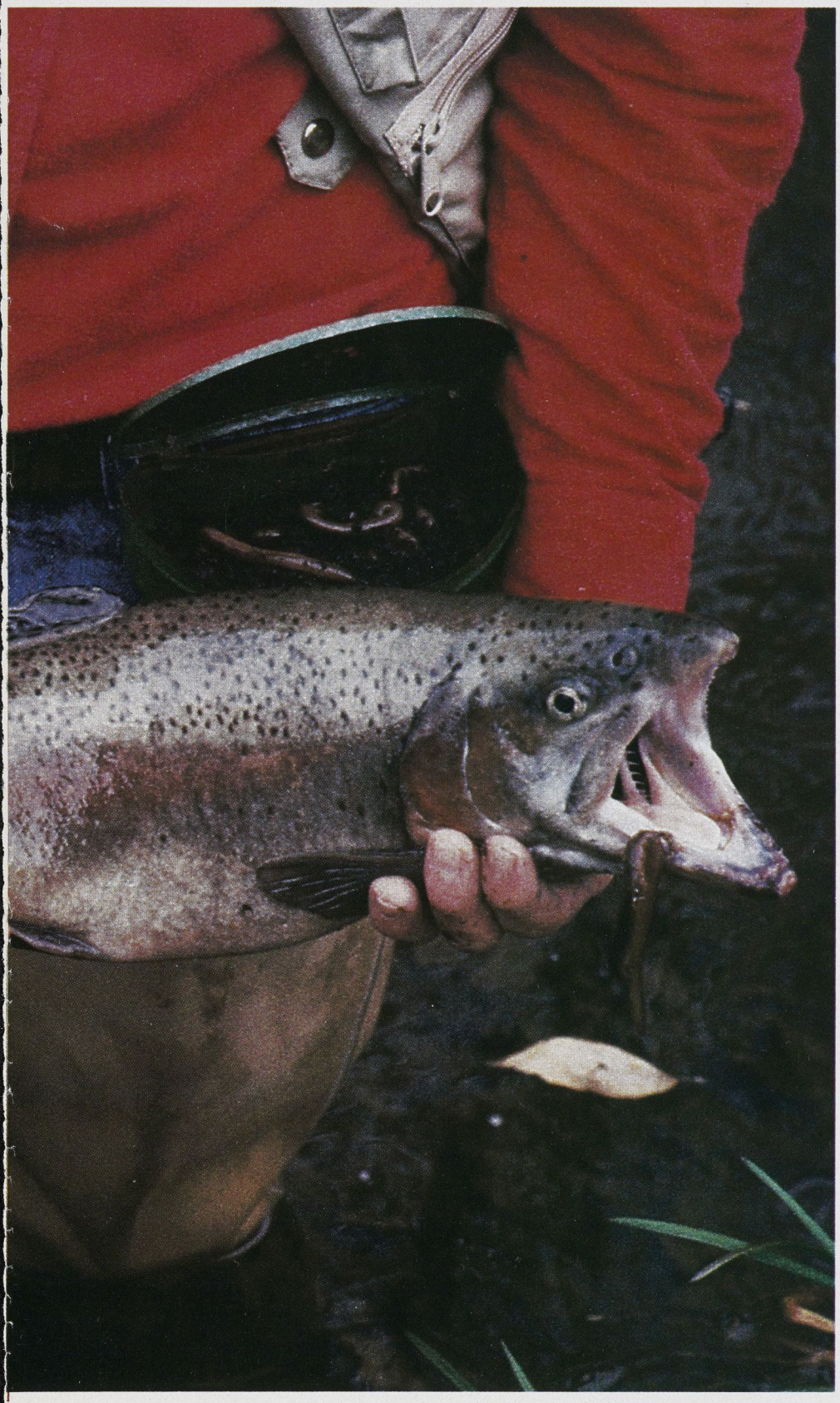
PHOTOGRAPH BY KITTY PEARSON-VINCENT

Bass are most active in late spring. Nine active hours occur during daylight.

Gets The Worm



Last March, the conditions along California's eastern Sierra Nevada illustrated what trout fishermen from east to west must face every year early in the season. A heavy snow pack was starting to melt, and though the skies were deep blue, the streams were roily, off-color, and very cold. Trout like these refrigerator conditions as little as we do, but fortunately they still have to eat no matter how cold the water is. The only difference is that they won't eat very often and won't travel very far for a meal.

Delicate dry flies aren't the answer under these conditions, nymphs and wets are little better, and spinners and spoons move so swiftly in high currents that they receive little attention. The answer is the angleworm. Properly weighted and presented in front of the fish at a speed even his slower-than-summer reflexes can handle, it's deadly.

It's easy to understand why angleworms are such a good natural bait, particularly in the early season. Heavy rains wash worms into the rivers and streams, and trout eat the worms. It's been going on ever since fish and worms first graced Earth. Early in the season, it's too cold for terrestrials such as grasshoppers and crickets to be out. About the only place to find them is in a local bait shop. The fish seem to know this, too, and show a marked preference for worms.

There was a half-foot of snow lining Independence Creek this day, and the wind cut like a knife through long underwear and a thick down vest. Slipping into an opening among the thick willow stands lining the stream, I threaded a worm onto a No. 8 baitholder hook, pinched a small split shot 12 inches up the line, and pitched it into the current. The brownish stream rolled the offering into a deep pocket guarded by a downed pine tree. Immediately a sharp *tappity-tap* was transmitted through the rod tip to my half-frozen fingers, and I gave the fish a little line. A few seconds and a couple of taps later I set the hook, and shortly a 15-inch-long native brown, with red

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WHEN BIG BASS BITE

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With crayfish, frogs, salamanders, and many other species popping out of the lake bottom, plus terrestrial creatures crawling, flying, and washing in, the food supply is growing and scattered. The bass' metabolic rate is also higher due to the warming water, so more shopping trips to the shallows are needed.

This is evidenced by the MSU study, which showed a bass' total active hours to be about nine at this point. And, for the first time, one of those hours occurred at night. Apparently, light becomes a more important factor as the water temperature approaches 70°—an ideal temperature.

The experts in my survey still liked midday the best, with dawn a close second, followed by dusk. No one would rule out the possibility of bass biting at any time during the day, but nighttime was hardly mentioned.

So, outside of the noon-to-early-afternoon hours, on sunny days in mid-spring, bass fishing success seems to improve during low-light periods, particularly at dawn. The action can be good at any time of the day when fishing under overcast skies, particularly on the heels of a warming trend.

Ah, late spring and 70° water! The weather. The fishing. *The deception.* Many folks think the "when-to-go" element doesn't matter much now because they can hit the water just about any time of day and catch bass. But they're quite probably getting fooled. Usually, the true rewards await he who hauls buns out of bed before eastern's glow. With the food supply exploding and temperatures virtually ideal, these two variables become less dictatorial of bass behavior. Light takes over the palace.

The lower the light intensity, the greater the visual advantage a bass has over its prey. Just about every aquatic creature on the bass menu sees well in bright light. But while the bass' eyes quickly adjust to the dimness—getting as much as 30 times more sensitive—most of the entrees become as blind as a bat. There's no better time for mighty mouth to fire up the eating machine than at dawn, dusk, or night, or on overcast days.

Not surprisingly, the Loakfoma study showed late-spring bass to be active an average of 15 hours each day (the highest of the year), with nine occurring during the day and six at night. Considering all the angling pressure many waters receive during daylight in the late spring, after-hours fishing may be your best strategy.

Midday still holds promise, though, as the ideal water temperature and powerful sunlight can have zooplankton reproducing at an incredible rate. Most of the newly hatched fry—from shad and bluegills to crappies and the bass themselves—should be roaming the shorelines and feeding heavily on zooplankton at this time of day. Besides, midday is midway between the dawn and dusk prime times, making it the logical lunch hour for these hyperactive bass.

The experts surveyed preferred the period from first light to shortly after sunrise, followed by post-dusk, night, and midday.

With summer comes a major adjustment to the prime time schedule. Nighttime is the best time to go, especially in the clearer bodies of water. The MSU researchers discovered that of the 13 total activity hours (a slight drop from late spring), nine took place at night and only four during the day. This was in 80° water. At 85°, seven active hours took place at night and only two in daylight. In 90° water, three active hours took place at night and just one occurred during the day.

Cooler water in the shallows is probably one reason summertime bass favor the after-hours period. Water at 80° or more is getting a little beyond the point of maximum metabolic efficiency, and 90° is approaching lethal levels. Surface waters can lose 5° or more under the stars, making them far more tolerable for feeding bass.

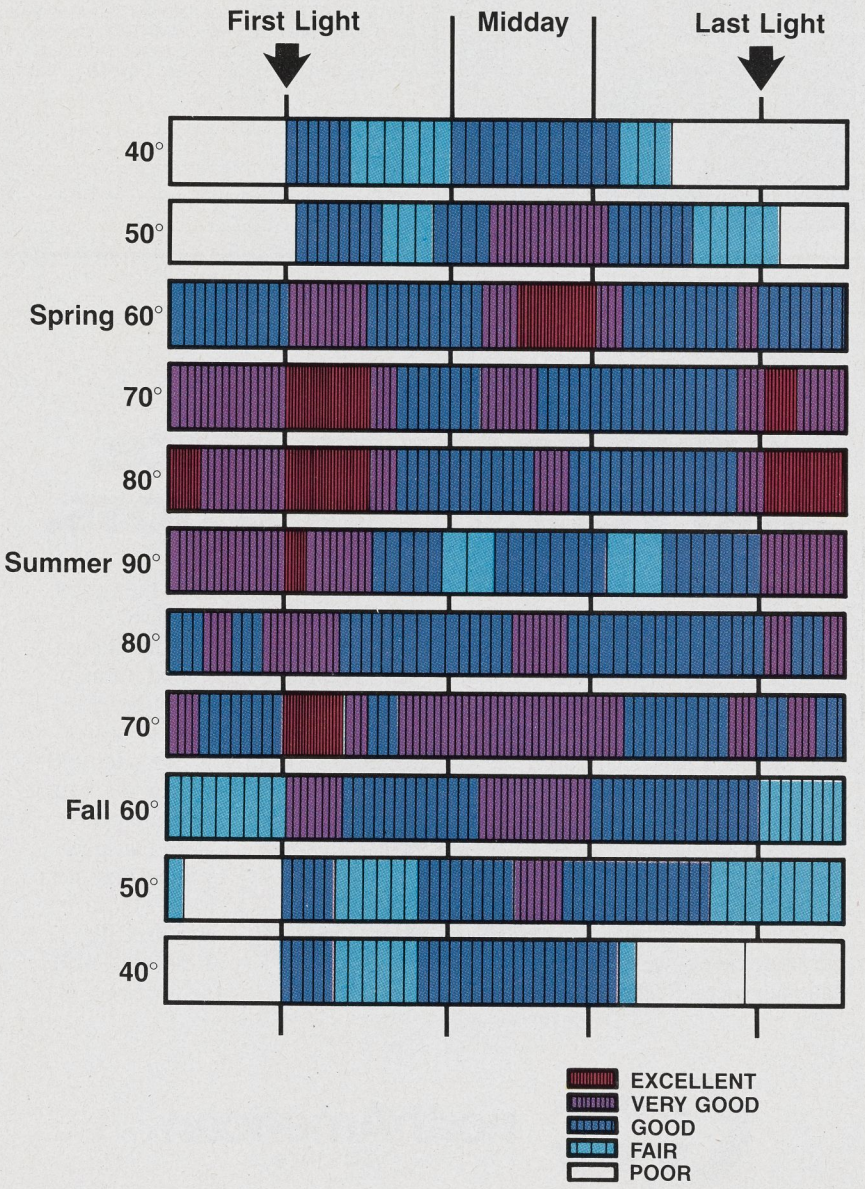
Exactly which parts of the night are best is difficult to pinpoint because very few anglers study it like the day. Scientifically and logically, however, we can divide it into three parts: the beginning, the end, and the middle. The transition of lighted water into dark water at dusk can be a strong feeding stimulus, with relatively warm shallows a possible negative. The hours before dawn offer cooler water plus a last chance for any night-owl bass that didn't fare too well earlier in the night. And midnight may be the time for an in-between-meals snack.

The best daytime hours are, of course, first light to a few hours after sunrise. The shallows are at their coolest temperatures of the 24 hour period—baitfish start moving and the bass still holds a visual edge over his optically inferior prey.

Virtually all of the experts selected night and dawn as their favorites, with the first few hours after dusk close behind.

By the time we've entered early fall and the water is back down to 70°, bass are usually poised for the final fling. Temperatures are ideal, oxygen is plentiful, and, although down somewhat, the food supply is relatively abundant. Consequently, light becomes the major, if not the only, consideration for selecting the best times.

Once again, first place goes to dawn. Few things in the underwater world are as dra-



Based on radio-tracking studies and a consensus of expert fishermen, here are the prime activity times of largemouth bass.

to be a sufficient distance away, the McManus family would spring into action. Coats would be thrown on, hasty goodbyes shouted, and we would charge out the door of the Burford cabin and race for home.

On the Tuesday night in question, the wolves, for some reason known only to themselves, did not raise their usual ruckus. Cleetus stood outside until he frosted over without hearing a single wolfish yip. "Cain't hear 'em, Pa," he reported. "They could be anywheres."

"Maybe you all should spend the night," Mrs. Burford suggested.

"Thank you, no," Mom said. "We'll go home."

"Wha . . . ?" I said. "We don't know where the wolves are! You gotta be kidding! Wild horses couldn't budge me out that door!"

Five minutes later, we were scurrying along the trail toward home, walls of darkness towering above us on both sides. The wolves, gaunt and hungry, their black lips curling over their white fangs, could be lying in wait for us anywhere, watching for any telltale signs of weakness in this herd of hurrying humans. *Crouched beside the trail, the leader of the pack points to the small human lagging farther and farther behind the two larger ones. "That's the best bet," he says.*

"Wait for me," I hissed through frozen breath, as the long legs of my mother and The Troll churned up clouds of powdery snow in the distance.

I caught up with them at the bridge, where they stood panting and gathering their wits for crossing this last but major obstacle to safety. I stared glumly at the lacework of logs, whitened by snow and ice, outlining the dark and gaping holes.

"Remember," Ma said. "Just one step at a time. Keep your balance and take it nice and slow. I'll go first and . . . !"

At that instant, from the darkness of the trees right above us, came the loud hoot of a wolf!

"The wolves!" I screamed. "They got us!"

As a mist of snow settled around my small, defenseless body, I vaguely made out the darting, hurtling, leaping, bounding figures of my mother and The Troll midway across the bridge. They sailed over an open expanse of darkness, scarcely touched down on an icy log, then took off again, zagging and zigging in midair, picking out occasional footholds as if by radar. It was a remarkable exhibition of athletic prowess, something I had never before detected or even suspected in either my mother or The Troll.

The wolves hooted again above me.

"Wolves don't hoot," I said to myself. "Owls hoot." Everybody knew that except, apparently, Ma and The Troll. I felt a little guilty, but still, a small boy snowbound in a remote valley of the Rockies had to invent his entertainment as he could.

I inched out onto the icy bridge.

Autographed copies of The Grasshopper Trap *($15) by Patrick F. McManus can be ordered from the author at Box 13237, Spokane, WA 99213. Other available McManus books are:* A Fine And Pleasant Misery *($14),* They Shoot Canoes, Don't They? *($14), and* Never Sniff A Gift Fish *($15). Prices include fourth-class postage. Canadian residents, please send U.S. funds.*

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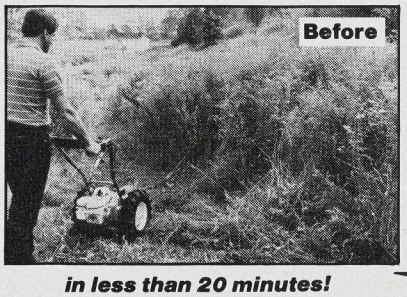

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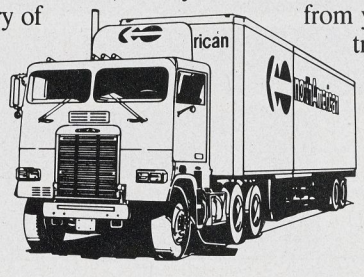

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matic and as quick to stimulate as night turning into day. Next is a three-way tie among sundown, night, and, making its first appearance in a number of months, midday. Just as in the spring, sunlight creates plankton, which draws baitfish, which lure hungry bass, which in turn can be caught in sun-soaked shallows.

Actually, this early fall period has no predictably bad fishing time of day or night—just some that are more likely to produce than others. The choices of the experts in my survey covered the spectrum, and that fell right in line with the Loakfoma Lake study, which found early fall bass to average about 12 hours of activity in each 24. Of those, nine occurred during daylight hours, three at night.

However, as temperatures continue their seasonal decline into mid-fall, a more distinctive prime time pattern develops. At 60°, night bassing is about over for the year.

The MSU biologists found that total activity dropped to only five hours each day in mid-fall. Remember, however, that that's an average. During rotten weather and plunging water temperatures, the bass may not be active at all, while under the reverse conditions they might turn it on for 10 hours of each 24. The experts picked dawn as a good time but gave preference to midday.

The trend continues on through late autumn, with midday becoming more important with every degree the water cools. With the water temperature at 50°, most of the experts chose noon to 3 p.m. first and dawn second, with many feeling that any daylight hour had potential. At 40°, they pretty much narrowed it to just midday and dawn. The MSU study revealed only one hour of activity per day at 50° and none at 40°.

Selecting the best times of day to go after a lunker bass doesn't always have to be a hit-and-miss proposition. Try looking at things from the fish's standpoint. Energy, not food, is the most important concern. True, taking in food gives bass energy, but going after food—even just entering a positive feeding mood—takes it away. Too many misses, and the bass dies.

So, it learns to hold off turning on until conditions are the most favorable. In cold water, for example, bass are too sluggish to go one-on-one with a baitfish in open water. The best bet is to find a baitfish in the shallows, where he can corner it or use the surprise of ambush.

Of course, the baitfish aren't always in the shallows. They are faced with the same dilemma as bass: Why waste energy coming up here if there's nothing to eat? So, they also bide their time in deep water until conditions are right. In cold-water periods, that's usually midday, when the sun has had time to generate a plankton bloom. Up comes the bait, up comes the bass, in comes you. Bingo!

In warmer periods, the bass like to stack the deck mostly with light. Bass instinctively know that they can see better than their prey in low-light situations, so these are often the favorite times to come shallow. On other occasions, temperature or oxygen may force changes in the feeding schedule. A rise or decline of a certain forage can be a factor. So can angling pressure. Look at the whole picture—from the bass' perspective. Maybe you'll see something that makes "I'll go when I can go" obsolete.



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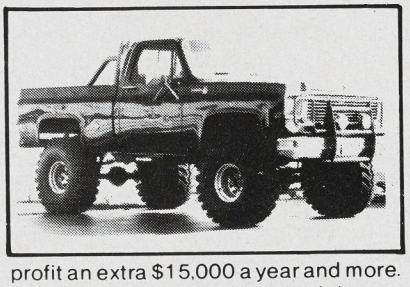

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EARLY TROUT

continued from page 67

spots gleaming in the morning sun, was lying in my creel. It was the first of many trout that fell to an unglamorous opening day angleworm.

Though it may appear simple at first glance, properly fishing worms early in the season is more difficult than simply threading a worm onto a hook, attaching lots of lead, and heaving it into your favorite stream. The best worm fishermen approach the game as meticulously as does the most ardent flycaster. This attention to detail pays big dividends.

First, the worm itself. Avoid like the plague the small red worms sold by the jillion all over the country. These worms are fine for panfish and tiny step-across creeks, but as trout bait they aren't worth much. They die quickly on the hook, and their small size makes them hard to get onto a decent trout hook anyway. Night crawlers are okay, especially if you can collect them on your front lawn. For trout fishing, I prefer medium-size crawlers to large or jumbo-size ones. The smaller worms don't string out as much in the water, and large worms can even be too much meal for the slowed-down trout of opening week.

The best choice is a fat and lively three to four-inch common garden worm. They can be dug from gardens, compost piles, and the like, and are easy to keep alive. They also seem to be just the right size for early spring trout. The best worm spot I ever saw was a local turkey farm. The turkey droppings and washed-into-the-soil poultry food made those the happiest worms in the country, and my grandfather, father, and I could fill a couple of coffee cans with them in less than an hour. The day that turkey farm became a shopping center was a sad day for my family's trouters.

There are two general problems encountered by spring trout fishermen. First you have to find the fish, then you have to present the bait as an attractor rather than as a repellent in a river or stream that's more than likely high, off-color, and cold as ice.

As the season shifts from the depth of winter to the promise of spring, trout concentrate on the bottom in areas where the water is relatively warm compared with other sections of the stream. The deeper holes or smaller side pockets are good spots to begin prospecting, especially in the late afternoon and evening after the sun has spent some time baking things a bit. In the morning, however, active fish are more likely to be in small pockets along the edges of faster currents, the tails of long stretches of pocket water, the shallow sides of bends in the river, and undercut banks. You can usually forget the riffles and fast water now. For one thing, it's still cold, and the effort to hold in the current is more than these sluggish fish find pleasurable. Oxygen-rich riffles may hold a lot of fish during the heat of summer, but don't bother trying these spots in early spring. You won't find it too rewarding.

If such holding areas are on the side of the stream that receives early morning sun, so much the better. These areas will be a few degrees warmer than nearby faster, deeper water, and fish holding there will become active earlier than will the trout in the deep pools. These spots also typically hold lots of submerged rocks, boulders, brush, and trees—perfect cover for hungry trout that lie in ambush as the current washes breakfast by.

As the air and stream begin to warm during the day, trout will begin to actively search for food. Nothing suits their fancy more than a fat garden worm washed into the current by spring runoff. Knowing the sections of river that will probably hold trout early in the year is half the battle. The next step is to show that your worm is an easy, succulent meal.

Though a fly rod makes an excellent worm-fishing rig under many conditions, 99.9 percent of the time you'll find spinning tackle much more appropriate. Match the rod and reel combination to the water. I often pack along two different outfits on the same trip: one a small ultralight rig 5¼ feet long with the reel full of four-pound-test line, the other 6½ feet long with six-pound-test line. If the stream's unusually clear, narrow, and bare of shoreline cover, I use the ultralight rig. When there are a lot of large submerged boulders or tangles on the bank, the river's high and fast, or I need to dapple the bait in and around snags, the long rod comes into play.

The best worm fishermen approach the game as meticulously as does the most ardent flycaster.

A variety of hook sizes is taken along, ranging from No. 6 to No. 12. Bronze baitholder hooks are the best (in styles such as the Eagle Claw 181F), and I use a small Eze-Lap diamond sharpener to touch up the hook point before fishing it. Which hook size you use depends more on the size of the worms than the size of the fish. As a general rule, go as small as possible.

Tie the hook directly to the end of your line and clip off the tag end closely with the nail clippers. Next is the question of weight, perhaps the most important part of the whole setup yet the part most often ignored by inexperienced anglers.

Stop and think about how a worm acts when it's washed into the stream. In quiet water it simply sinks to the bottom, wriggling for all it's worth until it's worn out, dead, or eaten. In swifter currents it's the same, except that the current adds some action, moving the worm along the bottom or spinning it around eddies and backwaters. In any event, unless the current is acting upon the worm, the only action the worm generates is its wriggling.

Therefore, the best way to interest a hungry trout with your worm is to present it in as natural a manner as possible, allowing the current to do the work for you. That's where proper weighting of the offering comes into play.

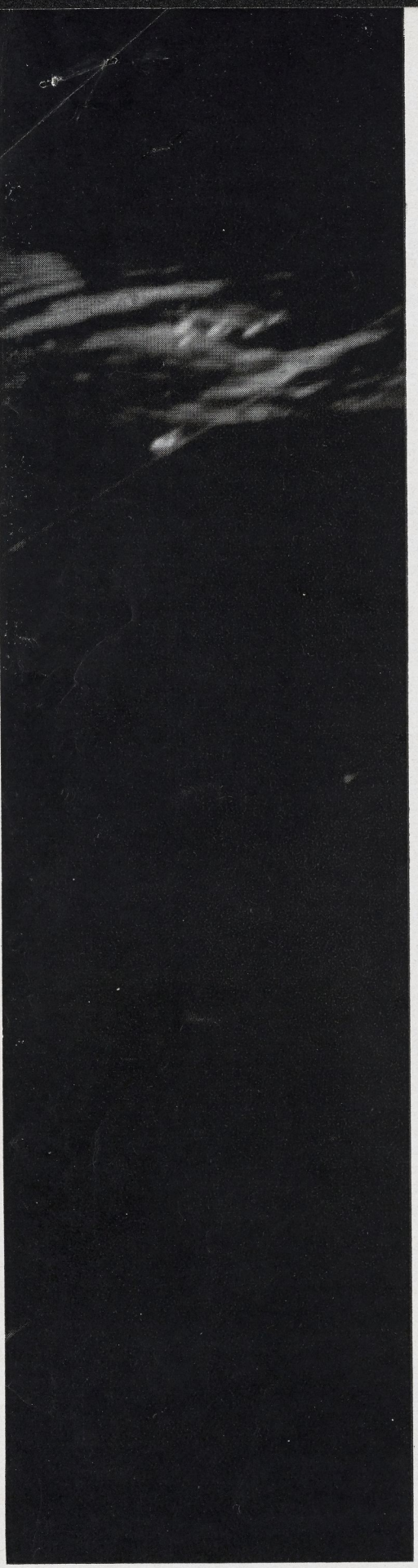
Depending on the situation, pinch on one or more small split shot 12 to 18 inches above the hook. Use just enough lead to get the worm to the bottom but not enough to keep it from naturally washing along, bouncing off the bottom as if there were no weight involved at all. Though in theory it sounds simple, it takes a practiced eye to look at a stream or specific stretch of water and select the correct amount of weight right off the bat.

You can do two things to help solve this dilemma. First, carry several different sizes of split shot along, from BB to No. 3. Second, use the type of shot that has two small nipples protruding away from the groove cut into the lead to accept the fishing line. By pressing these nipples with needle-nose pliers, the individual shot can be removed from the line without having to retie the entire setup. When fishing a stream with lots of different sections—deep holes, cutbanks, shallow pockets, and so on—you can quickly add or subtract weight as needed.

The rod and line will also add some drag to the action of the worm as it rolls along unless the tackle is manipulated to compensate for this. By pointing the rod tip at the cast as soon as the bait slips below the surface, then following the worm downcurrent with the rod tip, most of this drag will be eliminated. Take in any excess slack in the line with the thumb and index finger of the left hand, using this bit of line as a telegraph receiver for the slight *tap-tap* that indicates a trout has taken the bait. Control of slack line is critical. Too much, and the bait or split shot will slip into snags and hang your bait up, or you may miss the feel of a strike; too taut a line, and the worm won't get deep enough. Keep the line just short of being taut. Then, the bait will drift naturally and you can detect most strikes either by feel or by seeing the line twitch where it enters the water.

A saying that my grandfather hammered into me rings true when worm fishing: "If you're not losing a few hooks, you're not catching trout." Resign yourself to replacing more than a few hooks and sinkers during the day, and write it off as part of the price to be paid for catching trout this way. You've got to fish right on the bottom, for that's where the fish are. It's also where old tree limbs, sunken brush, rocks, and who knows what else is waiting to gobble up your tackle like Pac-Man. Don't be afraid to let the bait drift right under overhanging brush, into and around logjams, and under cutbanks, either. I've made countless casts into places where I knew I was going to get hung up even before I cast, and many times that's all that happened. Every now and then, though, instead of tying on a new hook, I was trying to get a good fish out of that spot.

This point was made rather emphatically one spring while fishing a small stream that wound its way through a meadow of lush green alfalfa along the eastern edge of Colorado's Sangre de Cristo mountains. It had been two hours since the last strike, and I was getting a bit worried. Rounding a hairpin bend in the stream, I came upon a "do or die" lie along the far bank. The current was slowed by a sunken log, and the water had cut its way under the bank to form a deep, slow run. Overhanging willows formed a solid protective canopy, the thin ocher tips touching the water in a tangled dome a couple of feet from the shore. It was the





Mike Lembeck uses his audiphone to unlock valuable secrets from San Diego's famous bass lakes

Amazing Story

A dedicated biologist's two-year study reveals some positively amazing facts on bass behavior

Homer Circle

Photos by Glenn Lau Productions

Most savvy bass fishermen know that "finding the pattern of the day" is the most important factor in catching bass. What they don't know is that most savvy bass already have the fisherman's pattern and buzz off the instant they detect his presence.

Wise fishermen, for years, have been super-quiet lest a bass hear the noise of their boat, oars, motor—even talking. But they haven't been wise enough. Now we know that just the intrusion of an artificial lure, or a live minnow, can spook a bass and void chances of catching that fish.

This and other enlightening aspects of bass behavior have been turned up in our annual quest into the secret world of the bass. Most of this year's knowledge has been gleaned from the studies of Mike Lembeck, a dedicated biologist.

Also, some additional findings will be listed in an addendum. These are aspects of bass behavior your Uncle Homer has observed while trying to outsmart Ol' Anviljaw wherever I found him.

Lembeck, 34, resides at Lakeside, California, just a short spurt from San Diego's famous bass lakes, from whence odds say the next world-record bass will be caught. Here, for two years, he has systematically and scientifically studied bass behavior.

His findings are fresh and unbiased because the bass he observed are in wild habitat, unaware that they are under surveilance. And there was no way they could find concealment from Lembeck's snooping.

You see, he had surgically implanted into each bass's abdominal cavity a miniature radio transmitter. This system of sonic telemetry has been used for years to study sharks and whales. Only recently has science produced transmitters small enough for freshwater species.

The procedure is simple, yet exacting. Each transmitter is tuned to have a different beep count. By timing 20 beeps with a stopwatch, it is possible to positively identify each bass.

I watched as Lembeck lowered over the side of our boat a directional hydrophone, which looks somewhat like a padded funnel at the end of a broomstick. This is an underwater microphone which registers the strongest signal when pointed directly at the transmitter.

Listening through earphones and pointing the hydrophone toward shore, Lembeck studied his stopwatch as he counted 20 beeps. Once he ascertained the frequency, he thumbed through a notebook and said: "The bass we've located is a male, 2½ years old, and it's about six feet to the right of that brush pile."

"How do you know if that bass carrying a metal transmitter in its innards is reacting like a wild bass?" I asked.

"Here's how," Lembeck replied. "By observations, we know that transmittered fish, on several occasions, have fed within two days after surgery. Five bass were captured two to three weeks after the transplants and all were in excellent condition, totally healed.

"And here's the clincher to prove normal behavior. My records show that bass with transmitters were caught at essentially the same rate as bass without. You see, the transmitter is only 2½ inches long and requires only a 1-inch incision. The entire operation takes less than ten minutes. So, it's not a debilitating experience."

Each fish was pinpointed by triangulation, and as many as 30 bass in one reservoir were followed at one time. Their locations were marked on a topographic map, and several different males were located closely enough to be caught from their nests for recording pertinent data.

And, mark this: Bass were located 99.8 percent of the time!

To date, 147 largemouth bass have been transmittered in six San Diego-area reservoirs, and the study has been funded by the farsighted San Diego County Fish and Wildlife Committee.

continued

Most of the plantings were made in El Capitan and San Vicente reservoirs, and the bass ranged from a small 1¼-pounder to a 14-pound giant. To set the scene of the studies, let's take a quick look at each reservoir and its makeup, so you can relate the conditions to lakes in your area.

El Capitan is a moderately deep body of water with about 500 surface acres. You'd call the water unclear, slightly on the murky side, ideal for those fishermen plying the 10.7 miles of shoreline. It is open to public fishing three days weekly, from spring through fall.

San Vicente is a deep, clear reservoir with approximately 950 surface acres and a total of 16 miles of shoreline, including an island in the center with about two miles of fishable shore.

There is an abundance of rocky structure, with some brush and trees in shallow areas. Five major arms lend variety. It is open to public fishing four days weekly, from early fall through late spring.

I list these characteristics so you can keep them in mind for comparisons with similar lakes you might be fishing.

Now, let's examine Lembeck's revelations.

FEMALE BASS ARE THE GADABOUTS

While largemouth bass tend to be individualistic, each with its own behavioral pattern, the two-year study shows that, in general, it is the female who does most of the roaming.

Movement shows two distinct modes. Some bass prefer to travel along the shoreline, close in, while others, those that journeyed farthest, chose the open water. It was quite common for big females to move two to three miles, with a daily average of about a half mile. At times they coursed the length of El Capitan about twice weekly.

Males stayed put, especially during the spring months before and after spawning. They did not begin moving about until early July, even though their spawning activities were long past. The males displayed singular preference for wintertime galavanting.

Morning and evening, just as most fishermen know, were the most active times for movement. However, there was decided movement by some fish around high noon. Very few bass were active at night.

DEPTH PREFERENCES VARY WITH SEASONS, NOT DAILY

By using a sonar fish-finder, Lembeck was able to register the depth preferred by transmittered bass. It is interesting to note that individual fish seldom showed any depth difference during the day. Once they chose a depth, whether for comfort or food, they stayed with it.

There were, however, marked depth differences throughout the year. In El Capitan, the lake with less clarity and depth, bass stayed at a shallow six- to 12-foot level from January through May. In early June, they moved down to deeper levels, like 12 to 22 feet. Water normally stratifies with the thermocline at about 22 to 25 feet.

In San Vicente, the deeper, clearer lake, bass sought a similar level to that in El Capitan, five to 12 feet, from spring until fall. In early August they moved deeper, 15 to 20 feet.

However, when San Vicente destratified, or went through the early-winter turnover and the temperature was the same top to bottom, bass sought depths of 35 to 60 feet. The colder the winter, the deeper the bass seemed to level out.

Thus, bass fishermen everywhere would be wise to carefully check the depth at which they catch most of their fish and keep notes. As with El Capitan and San Vicente, no two lakes are alike, and the peculiarities of each must be learned if one is to fish it effectively.

CLOUD COVER, SUN, WIND, RAIN HAD NO EFFECT ON BASS

One of the more surprising discoveries was that bass displayed no noticeable preference for or against sunlight. They did not select the shady side of structure nor did they go deeper to avoid bright sunlight. This certainly is contrary to general belief.

Also, the appearance of cloud cover, rain, even winds up to 25 miles per hour had no effect whatsoever on bass, including those in shallow water on windward shores. In other words, the world of the bass is little disturbed by elements in the world of man.

BASS SHOW HANGOUT PREFERENCES, SEASONALLY

At certain times of the year, bass showed definite preferences for special areas, especially in El Capitan, the shallower and murkier of the two lakes, and more typical nationally.

In this lake, during December, the highest concentration of bass appeared in one of the arms called Conejos. After that month, this arm was seldom visited. Why?

Only the bass know, and fishermen should remember.

However, the concentration shifted to the shallower north end during January, and it remained there until mid-June. By mid-July the bass disappeared and remained elsewhere until early November when they again frequented this area.

CHOICE OF COVER TYPE VARIED WIDELY

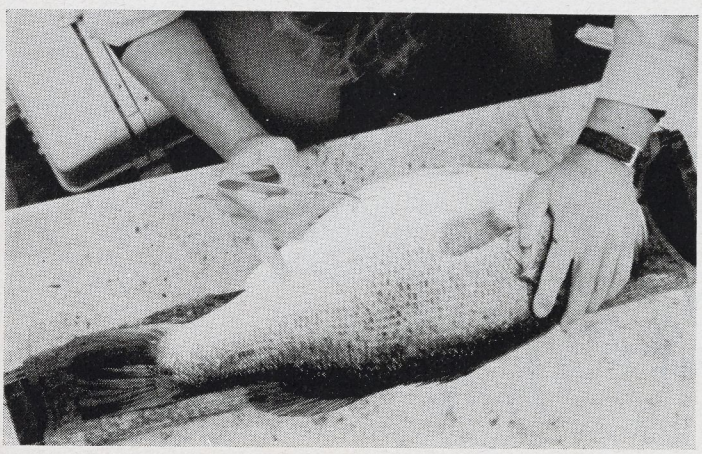
Some 73 bass were charted in less than 200 spots along El Cap's 10.7 miles of shoreline. Most of these spots would be easy for experienced bass fishermen to identify because the cover was obvious.

Other hangouts were less obvious but spots which all bass fishermen should look for. These were a couple of small rocks at water's edge, a single bush, an indentation in the bank, a steep-dropping shore, an underwater ledge or a clustering of cover below the surface.

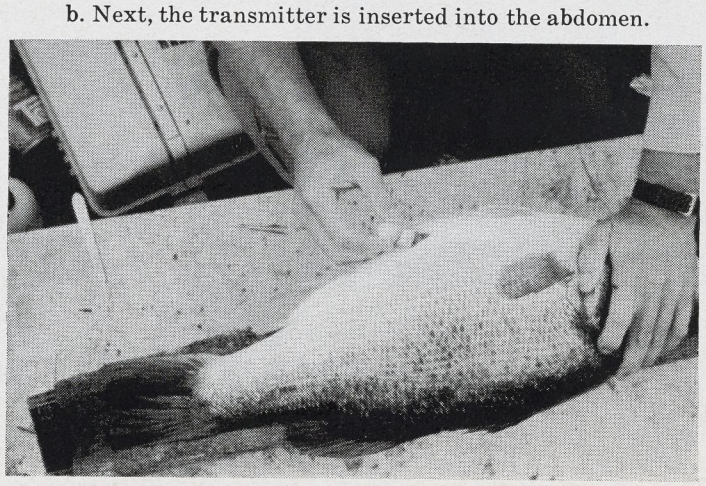
The choice of cover varied with individual bass. Some chose rocky areas more often. Others showed a prefer-

Mike Lembeck's Method of Implanting a Miniature

a. Only a small, harmless incision in bass is needed.



b. Next, the transmitter is inserted into the abdomen.



ence for brushy cover, while others wanted a total absence of cover. Some stayed in dense weeds, while others chose sparse weeds.

Lembeck was unable to find any correlation between size, sex, time of year or density of cover chosen. He could only conclude that bass are essentially a cover fish, except for those which choose the wide open spaces. One would almost think they had been patterned after humans.

BIG BASS DID SHOW PREFERENCE FOR CERTAIN SPOTS

In San Vicente, the clear, deep lake, the bigger bass favored rocky reefs a few hundred feet off shore. These spots were comparatively shallow and had whatever it took to hold these heavyweights for long periods of time.

They stayed here from July through October and seldom moved very far away. Other fish that had been roving would appear and seldom leave. They obviously were in a feeding mood because one of these reefs produced some bragging-size catches.

The California limit of bass is six. Here are limit catches registered on four consecutive days by Lembeck: 29 pounds 14 ounces; 36 pounds 5 ounces; 29¼ pounds; 32 pounds 11 ounces; and 21 pounds 1 ounce. These were found in the "honey holes" bass fishermen look for but rarely find.

All in all, bass in El Capitan, the cloudy one, did more roaming and Lembeck had no idea where they might show up from one check to the next. However, the bass in San Vicente, the clearer one, showed a tendency to stay in a spot for a day to a few months before taking off. They also returned to these places at later dates.

SOME BASS SUSPEND, AWAY FROM COVER

Perhaps it had something to do with less visibility, or the individual bass, but in El Capitan especially, and in San Vicente to a lesser degree, bass were consistently charted away from shore and any type of cover.

They were suspended in open water, generally in five- to 12-foot depths but at times at 20 to 25 feet. Almost every one of El Cap's transmittered bass was observed in open water. Some spent a day or so, others several months.

Some of these bass were charted along the shoreline at times, but others spent all their time in open water. They constantly moved about searching for schools of shad, presumably, because many of the charted fish were under shad concentrations.

Interestingly, those bass which also frequent the shore show a tendency to suspend from late fall to early spring. They then moved shoreward. But, those bass which were long-term suspenders remained in open water from late spring one year to early spring the next. Apparently, only the spawning urge brought them in.

At times of poorest shore fishing, midlake activity was most noticeable as suspended bass fed on moving shad schools. So remember, bass fishermen, when bass aren't on the shore, a good electronic-flasher unit could help you locate shad schools and bass below them.

PROOF THAT THE BASS HAS YOUR PATTERN

When Lembeck first began tracking bass, curiosity moved him to see what success could be achieved in catching transmittered bass. From the beginning, when lures were cast to where bass were located the fish immediately moved out.

At first, this behavior was attributed to natural moving around. But as efforts were repeated, almost every bass they attempted to recapture with artificial lures or live bait reacted immediately by leaving the area.

The few cases when the bass did not move had one thing in common. The bass were in excellent cover, usually dense rock structure, and they were nesting males. Such fish are aggressors in protecting established territories. These fish were caught perhaps because they attacked the lure.

No two lakes are alike and anglers must learn all the secrets of each

However, males, before or after nesting, usually moved out into open water or down the bank when fished for. After a short time they would return to the original spot. On the next cast, however, they would vacate the spot immediately. Once this extreme sensitivity to fishing pressure was established, transmittered bass were only studied, not fished for.

I asked Lembeck: "Suppose a lure was cast far beyond a bass and brought quietly through its hangout. Was this more effective in catching the bass?"

"Not at all," replied Lembeck. "The instant any type of lure appeared close to it, the bass would get the heck out of there. Of course, there were exceptions. These were aggressive, nesting or feeding bass. But, as a rule, the greater the fishing pressure the more wary bass become."

When asked if he had a guess as to why bass strike lures, Lembeck replied: "None whatsoever. Only the individual bass knows."

FISH IN DEEPER WATER LESS WARY

As has been mentioned, both reservoirs close down for several months each year. Most enlightening is the behavior of bass as they react to the reappearance of anglers when each lake is reopened.

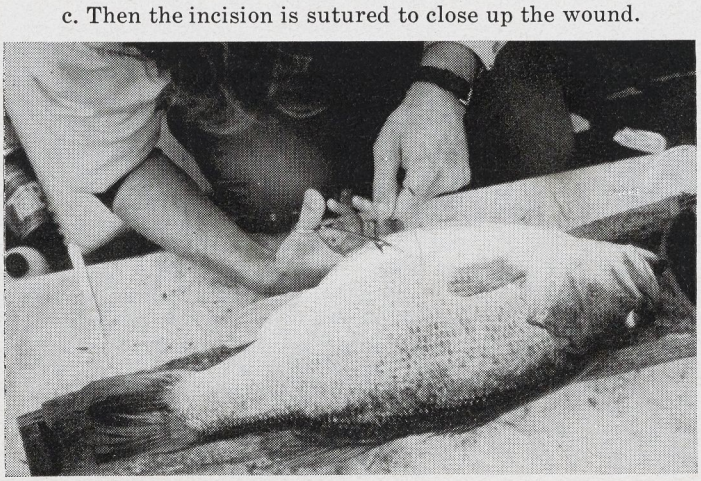
Bass in shallow water areas reacted first, while those in the deeper water took much longer before showing signs of being disturbed by fishing pressure.

Take El Capitan, for example, after being closed for six months. When it opened on March 13, 1975, 23 trans-

continued

Radio Transmitter in a Bass's Abdominal Cavity

c. Then the incision is sutured to close up the wound.



d. With no ill affects, the bass is ready for release.



mittered bass were in locations where they were subject to heavy fishing activity.

By that afternoon, only five had not moved. Ten had taken off for open water, and the other eight had moved substantial distances from their previous location.

When San Vicente had its 1975 fall opening after being closed from the previous spring, 20 transmittered bass were waiting at depths of 25 to 30 feet. Five were in open water and one was in a closed area.

Of the remaining 14, one was caught, one scatted to open water, five moved elsewhere and seven stayed put. The fish that stayed put were in good cover around a rocky reef. Within five days, only one fish remained on the reef.

However, during the three-day closing of the lake, all the transmittered fish returned to the reef, plus one which had not previously been there. Still, when the lake reopened it took only a few hours for all the transmittered fish to depart from the reef. It takes deeper fish longer, but they do react.

BASS RECOGNIZE CLOSED AREAS

In El Capitan, there is an area closed to fishing. It is marked only by a few buoys. So far as the bass are concerned it is like the balance of the lake, with no natural boundaries.

Yet, during the fishing season some bass showed a decided preference for this area and seldom left it. In fact, a couple of males, captured in the open lake and released, went immediately to the sanctuary from where they had ventured. These bass *knew* where they were safe from anglers.

NOISE AND OUTBOARDS HAVE LITTLE EFFECT

On several occasions, Lembeck buzzed bass with a 20-hp outboard engine on his boat. The bass would not move unless the water depth was six feet or less. In deeper water, ten to 15 feet, they stayed put.

However, as Lembeck pointed out, this experiment had no bearing on whether or not the bass would take a lure after being subjected to such commotion. Yet, as many fishermen can attest, bass have been caught with an outboard running, so it can't be a total deterrent.

In looking back over his findings as we discussed them, Lembeck had this to say: "I have tried to be as objective as possible. At times it was difficult not to interject theories or opinions as to why things happened.

"I recognize, for example, that while most fish do move under the pressure of fishing, this is not always the case or fishermen would not catch as many bass as they do. When the project was begun, I had fairly set ideas, as most reading fishermen do, on bass behavior.

"A great deal of information which came, and is still coming, out of our findings, has proven contrary to popular beliefs.

"When our project is concluded, there probably will be six to ten classes into which bass can be loosely grouped. It can safely be said that largemouth bass populations, like so many other animal populations, consist of individuals, so some basic groupings of behavior can be made.

"Because bass population patterns vary, it is a tribute to good fishermen and their learned techniques that they find methods to take bass in a short period of time. This, for the most part, appears to be more or less independent of the overall behavior of the bass population."

Well, there you have it. The results of two years of diligent study done by a man who had nothing to sell, nothing to prove, just a dedication to learn everything possible about a fascinating creature, the largemouth bass.

Some thoughts are bouncing around in my noggin as I look back over Lembeck's gleanings:

Those bass in both San Vicente and El Capitan have the benefit of not only weekly rest periods of four and three days per week, respectively, but also nearly a half year of closed season.

Sun, clouds, rain and wind have no effect on a largemouth's behavior

Yet, they show an amazing alertness to even the intrusion of a lure into their environment. What conclusion are we to draw about bass in reservoirs around our nation where there is no closed period throughout the year?

Are they, because of constant pressure, going to be more alert than these rested bass in San Diego lakes? Or are they more used to fisherman sounds and traffic and therefore more easily caught because they don't spook so easily?

Also, what other conclusion can I reach now except to believe that each day I fish my lures are scaring off dozens of bass I never know are there? Well, for one thing, I am going to do a heap more experimenting, trying to see if I can come up with lures, maybe tinier ones, that won't alarm these savvy bass.

In addition, I'm going to spend a lot more time searching out those suspended bass, especially the ones around shoals, which appear to be not only larger but also less shy. I now know they can be around those shoals more often and stay for longer periods.

I also know this for sure. After realizing that Lembeck's transmitterized bass are but a fraction of the bass in each collecting area, I'm more aware of the difficulty of catching bass in heavily fished waters. I also have more admiration for men who do.

I have admiration, too, for Mike Lembeck and the long hours he has put in performing surgery, bird-dogging bass in fair weather and foul, keeping detailed records and being at the docks to check all bass brought in. He checks them for the presence of a transmitter, notes their physical condition, takes scale samples, examines their diet, and so on.

It is through biologists like Lembeck that we bassin' men will learn things about our favorite game fish that we otherwise would never learn. It is my hope that Lembeck's studies can go on to more revealing data. If any research foundations are interested in his address I shall be delighted to furnish it.

Hundreds of thousands of dollars are being funneled into projects which are of little or no direct benefit to bass fishermen. We need less of these scientific compendiums and more of Lembeck's "what makes wild bass tick" approach.

Now it's time for Uncle Homer's addendum—things I've made notes on while knocking heads with Mister Bass.

Thinking about Lembeck's comment that bass are individualistic, here are two experiences to bear this out.

One has to do with a film we were making on the life of the bass. There were days when we needed closeup shots of a striking, jumping fish; and many days we would have been skidding our wheels had it not been for one bass we called Ol' Charley. He stayed on the same bank, at or near a patch of weeds, and he was always ready to knock heck out of a lure.

Time and again Ol' Charley came through. He either never learned to shy from a lure, or he just didn't give a hoot. Each time we put him back unharmed, he returned to his old hangout, always ready for a future performance. Sometimes he would hit twice in one day. Obviously he was an exception to Lembeck's norm.

Then, there was that six-plus-pounder I caught so many times his mouth was about a third smaller than it should be. Scar tissue, caused by removing many hooks, caused it to pucker. Still it never affected his pugnacity.

He would hit the same lure every day, at the same spot, near a sawed-off stump under which he lurked. Many's the time that six-plus-pound bass lifted a tremendous weight off my shoulders as I visited him, weary and worn after a tense day at the office.

I'm glad he was another exception to Lembeck's savvy bass. I hope to find that same bass under the same stump in the hereafter. It will make eternity a tad sweeter.

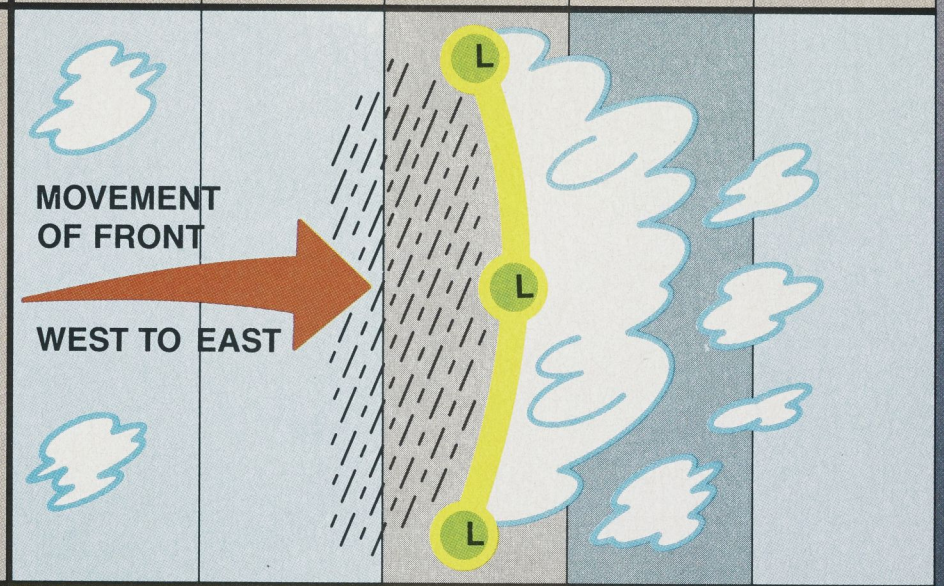
Another insight into the intelligence of individual bass comes from the bass tanks of Glenn Lau Productions, the outfit which produces *The Fisherman* TV show. These bass run from three to over eight pounds and are kept in big aquaria.

(*Continued on page* 94)

Time: Fishing's

Weather's Effect On Water Temperature And Fish Activity In The Spring

	DAY 5	DAY 4	DAY 3	DAY 2	DAY 1
WEATHER CONDITIONS	Cool; NW Wind; Mostly Sunny.	Cold; N Wind; Clear Blue Skies.	Cool; E Wind; Overcast or Rainy.	Warm; SE Wind; Clouds Moving In.	Warming; S Wind; Partly Sunny.
WARMING POTENTIAL	Fair	Poor	Poor	Good	Excellent
FISHING POTENTIAL	Fair	Poor	Good–Fair	**Best**	Good



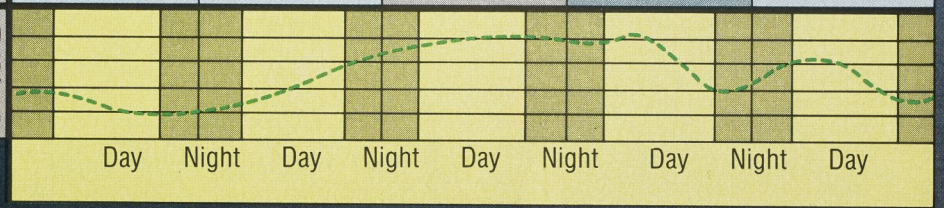
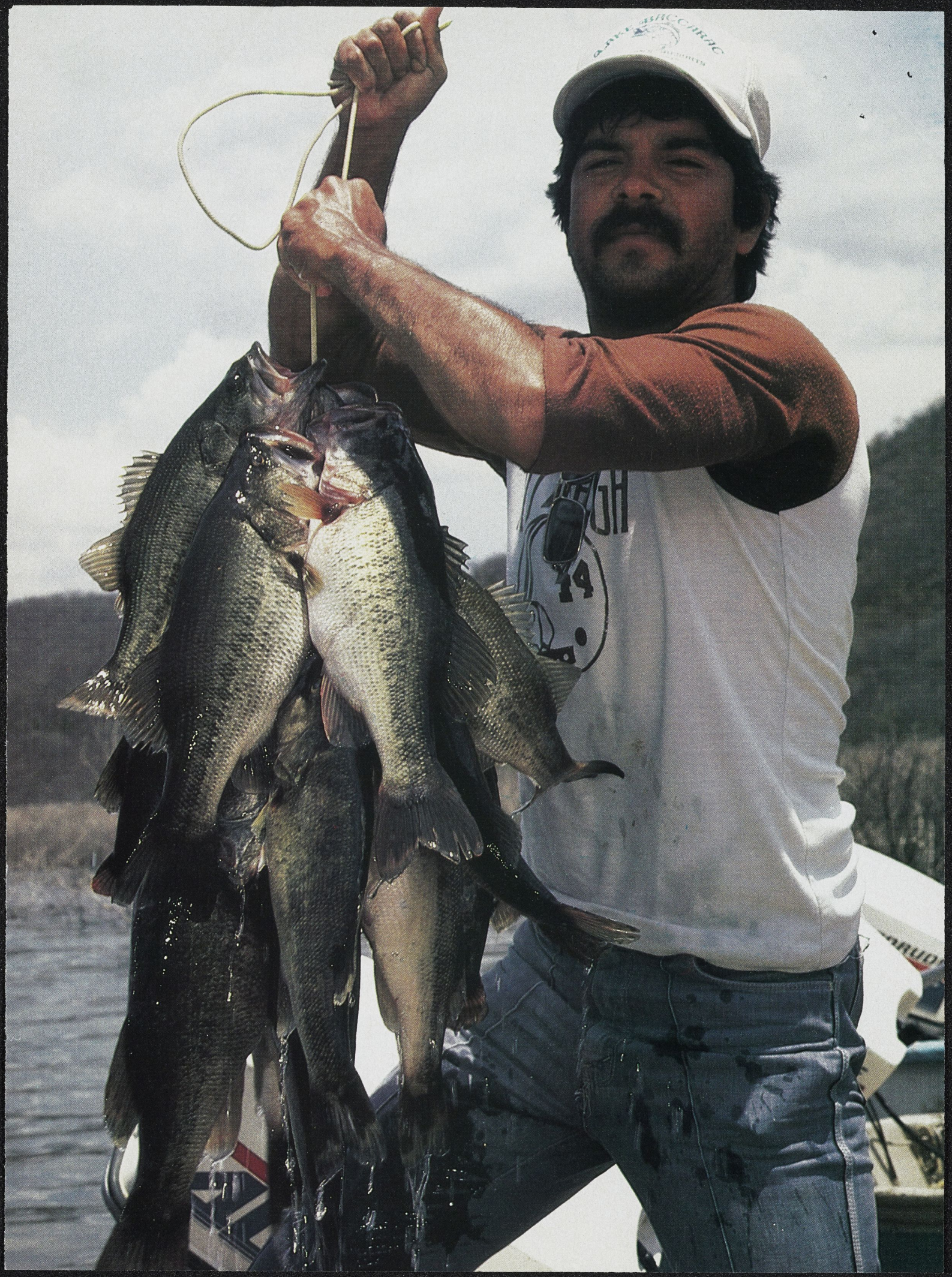


ILLUSTRATION BY NINA WALLACE

Graph relates fishing to rising water temperature in the spring and early summer. Warming water often triggers a feeding spree. In the graph, the angler is, of course, stationary, and the oncoming low-pressure front moves west to east. Note that the second day of the warming trend produces the best fishing because the water warms more than it can in only one day. It's almost always best to fish the tail end of a warming period.



Fourth Dimension

Fortunately, predicting prime angling time is less like gazing into a crystal ball than it used to be.

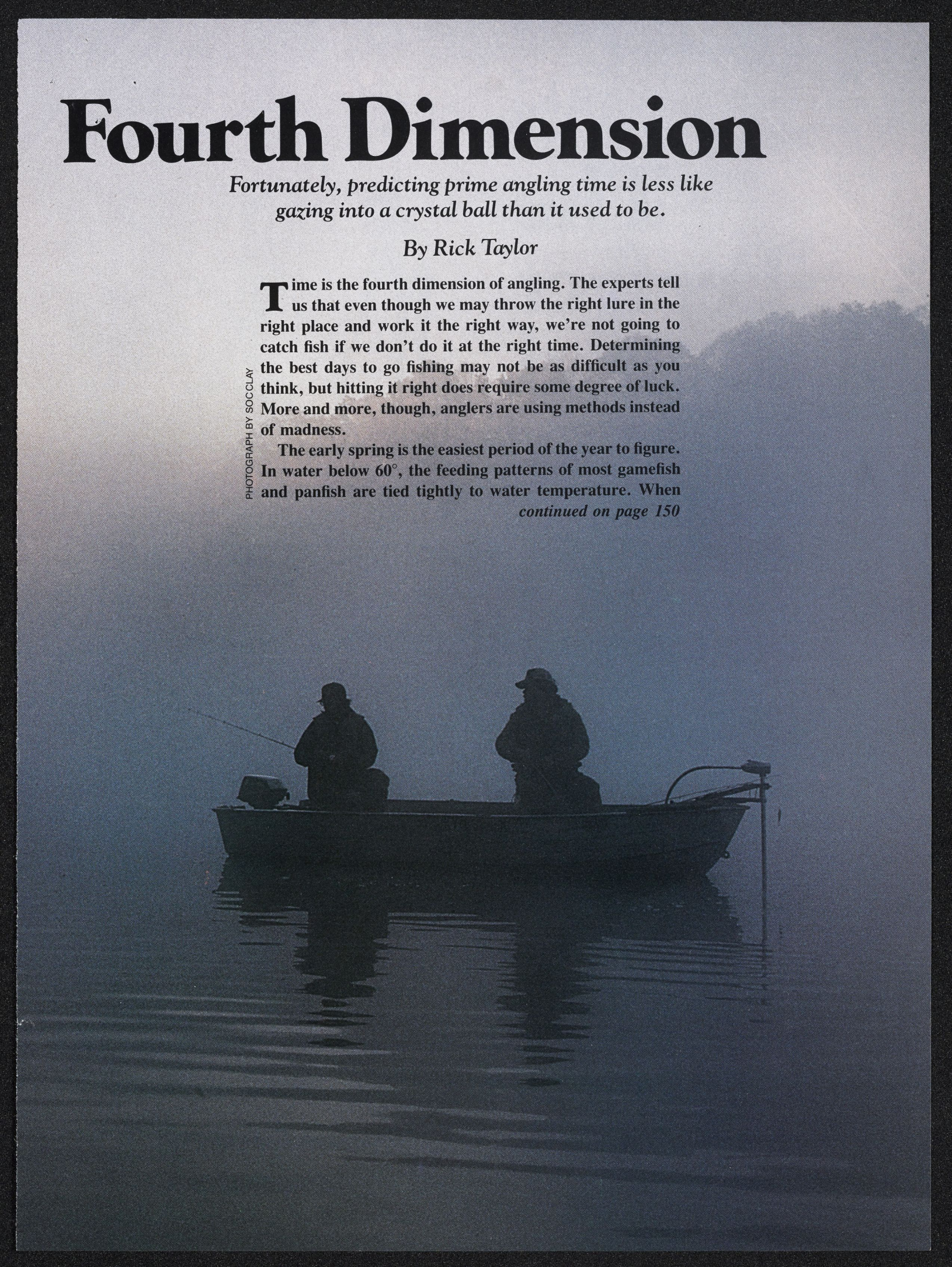
By Rick Taylor

Time is the fourth dimension of angling. The experts tell us that even though we may throw the right lure in the right place and work it the right way, we're not going to catch fish if we don't do it at the right time. Determining the best days to go fishing may not be as difficult as you think, but hitting it right does require some degree of luck. More and more, though, anglers are using methods instead of madness.

The early spring is the easiest period of the year to figure. In water below 60°, the feeding patterns of most gamefish and panfish are tied tightly to water temperature. When

continued on page 150

PHOTOGRAPH BY SOCCLAY



The Perfect Rod

By John Troy

As a young man, I recall struggling with fly rods that were too "soft" or too "stiff"—the idea being that "soft" rods cast wet flies well and "stiff" rods cast dry flies well. Hence, "wet-fly-action" and "dry-fly-action" rods. A noble concept, but flawed. Because these notions have been dispelled during the past 30 years, we can now lay claim to understanding the engineering dynamics of flycasting, and through a complicated series of upper-body gymnastics we can apply these principles to the creation of the perfect rod!

Just as each civilization has its own god (perfect nonetheless), each rod maker claims that it, too, has the *right* god, er, rod for you. These range from teeny three-footers (anything shorter than that I refuse to discuss) to willowy, feathery 12-footers (anything longer than that the telephone company can discuss) that can lay out line almost vertically.

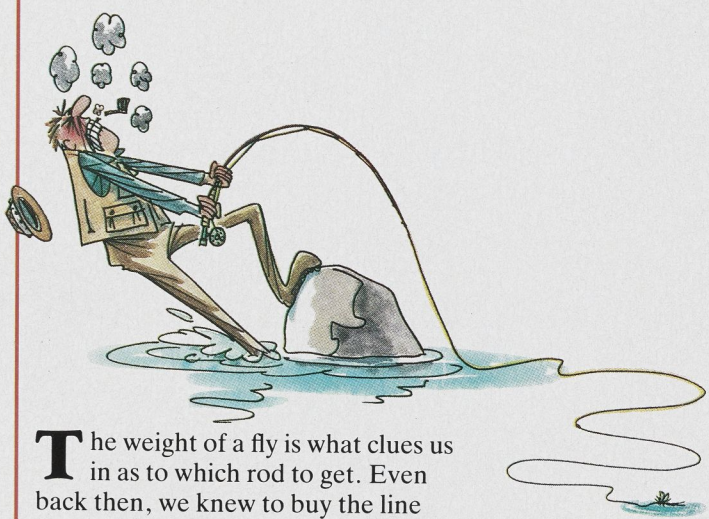
We are surprised to find, though, that many different rod companies buy "sticks" (bare rod shafts) from a single manufacturer, then with some swift magic—magic eyes, wrappings, finish, ferrules, and such—fashion for us rods that are far superior to their competitors' magic rods. Where, you ask, do they get this magic that makes their rods the best? "We," they say, "get it from . . . God." Okay, maybe they don't say *that,* but they might just as well.

If these rods are so perfect, or even slightly magic, how come we (can I speak for you, too?) have such problems casting with them? Is it us? It has been said that each man kills the thing he loves (including a perfect fly rod?). Or is it error on the part of that ethereal culprit who downs 727s and overheats nuclear domes? It's not nice knowing that there is in the whole world only one perfect fly rod exactly suited to your needs, one that balances you out perfectly. Not only is it not easy to find this elusive wand, it's not economical.

Knowing that "the struggle is the thing," maybe it's just as well that we search on—getting us out on the rivers and streams, keeping us tuned to nature.



Spaghetti" rods and "war clubs" were the main fare 40 years ago (except if you wanted to trade in your house or new car for one of the kingly custom jobs), and we soon learned that balancing rod to reel to line to leader to fly to us wasn't easy. As the man walking through a barnyard soon learned, we had to adjust our stride, to set our own pace with each individual rod. We learned to cast slow with "soft" rods and fast with "quick" rods, to play fish on "soft" rods and horse them in with "stiff" rods.



The weight of a fly is what clues us in as to which rod to get. Even back then, we knew to buy the line first and leave it to the rod maker to balance a superb rod to the line. (The real truth, or perhaps a gut tendency, was to buy the rod first, it being the more expensive of the two; or we were forced to buy line for a rod we'd gotten as a Christmas present or at a sale.) This often led to over- weighted rods, as the tendency was (and still is) toward too-heavy lines. So we spent most of our fishing day trying to pry the line off the water's surface.

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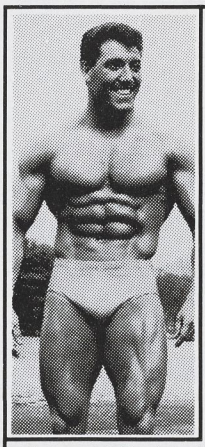

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at high speed. Bomber's Model A and Norman's Little N series are among the best. The new Fastrac line of crankbaits from Rebel were designed with high-speed trolling in mind, but they work well when cranked at high speed. In shad or baitfish-colored hues, these lures can run lightning fast or stop-and-go without canting off to the side or turning over. Many crankbaits don't run true even after careful tuning.

All docks are not created equal. Some are definitely more productive than others for many reasons. There's no doubt that the location of a dock in relation to water depth and bottom structure is of prime importance. Deep water nearby is a definite plus, but equally important is a travel route to the deep water in the form of a nearby submerged point or creek channel. Docks that are exposed to the wind generally produce more fish than sheltered docks because of the current caused by the wind. Docks on permanent pilings provide more underwater cover for the fish than do floating docks, and because they're higher above the water they are easier to fish. Dock owners often sink brush around their docks to attract fish, but it's often too deep to see. One clue to look for, though, is rod holders on the dock. Generally, they indicate that the owner of the dock is an experienced fisherman and has probably sunk some Christmas trees or other cover nearby.

Fishing under lights can be productive all year, but as with any other method, it works best during those times of year when the fish are active and feeding heavily. In the spring, the water is often so stained that lights lose much of their appeal to fish. Also, small baitfish are usually scarce in the early spring prior to spawning season, and this also detracts from the appeal of lights. Summer is a fine time to cash in under the lights. Doing so also avoids sizzling daytime temperatures. Night fishing under lights peaks in popularity during June, July, and August.

But if it's fast action you want and you want it all to yourself, fall's the best time for fishing the lights. Baitfish abundance is at its peak, and moderating water temperatures increase sportfish activity. With everyone else actively involved in hunting season in many states, you'll find the lakes virtually deserted during October and November.

TIME OF FISHING

continued from page 75

it's rising, they're spurred into activity, and you may catch something. When it's falling, fish metabolisms downshift, and you will often come home with nothing.

The trick, of course, is to know what the temperature of your lake or pond is doing. Ideally, you live right on the water and measure the water temperature regularly. Realistically, you don't and have to settle for the next best thing: watching the weather.

What you want to see come your way is warm air and sunny skies. Yes, sunny. For the most part, fish like shade or overcast days. In cold-water periods, however, the sun's warmth is beneficial. The first few feet of water in sheltered coves and pockets can warm by as much as 5° in one day because of the sun's radiation alone.

On the other hand, a brisk wind that brings air that's much warmer than the water is usually the major factor in the overall warming of the whole lake. That warm wind can raise the water temperature maybe 2° each day under ideal conditions.

The first drawing (page 74) shows a cold-front cycle and the effect the weather can have on water temperature. Note that the day with the greatest warming potential (Day 1 in this example) is not necessarily the best one for fishing. The *last* day of a warming trend—just before clouds or rain arrive—is usually your best bet. In the drawing, that's Day 2; the increasing cloud cover keeps the water-warming potential at "Good" instead of "Excellent," but the important factor is the *relative* water temperature. As you can see, Day 2 brings the highest water temperature of the cycle (49°) and should provide the best fishing.

Thus, in the early spring you can hit the best days by fishing during the tail end of a warming trend. The longer the warming trend, the better, because each day of warm air warms the water more, and that increases feeding activity.

One exception is a small body of water when the first day of the warming trend is a real dandy. There's a relatively small volume of water, and most ponds—especially shallow ones with dark bottoms—can warm by as much as 5° from the surface to the bottom in one day. For it to happen, however, there must be ample sunshine, an air temperature at least 20° higher than that of the water, and a little wind to mix the surface water with the bottom water. Such a jump, say, from 48° to 53°, can trigger a feeding frenzy.

Basically, the same rules hold true during the late spring and early summer, but the closer the water temperature gets to 70°, the less they apply. The best days become harder to determine because so many other variables must now be figured into your prediction. These include the onset of the spawn, food availability, water clarity, sky condition, and other factors. Also, so many fish are active so much of the time that there are fewer bad days to make the good ones stand out.

Yet, there are a few things to look for. One is heavy overcast or a rainy day after at least two sunny ones. The sudden low-light condition makes the fish bolder; it keeps them in shallower water most of the day, and they don't hold so tight to cover. Because the bright skies of the previous days made those days less than ideal for feeding, a lot of fish will be making up for lost time.

Another good omen is that the muddy spring water is finally clearing. Even scent-feeders such as catfish have a dickens of a time locating food in suspended silt. When things eventually clear up—which can take weeks or even months—you can bet there will be hungry creatures cruising the shoreline.

There's also that pre-spawn period when the lunkers seem to throw caution to the current. You'll know it when you're in it, but predicting the time is tricky. All fish do not spawn at the same time of year. About

rod and reel and a medium-running Bomber Model A. The average speed of the retrieve was 7.3 feet per second, or about five mph. That seems pretty fast until you realize that largemouth bass can swim 20 feet per second, or almost 14 mph. No doubt they can exceed that in a short sprint. Even your hardest cranking won't keep your bait safe if the bass really tries to get it, and many other predators are fast, too.

Though you can't crank hard enough to keep the bait away from the bass, you can keep it from getting a good look by reeling fast. Fish don't actually think, but their behavior can be conditioned. If a bass has been hurt in the past by an artificial lure, it may avoid similar artificials from that point on. But if the bait comes streaking by faster than it has before, it doesn't look the same, and the fish may strike.

Also, most predators are highly competitive. This competition can be their undoing under the lights where they concentrate. A lure that zips through a group of stripers, white bass, or largemouths is treated the same as the last chicken leg at a picnic. That's competition!

Lures under lights must look very natural or move very fast, preferably both.

Any lure that you use under lights must look quite natural or move very fast, preferably both. My favorite natural-looking lures are jigs and plastic grubs. Both are extremely versatile, but few night fishermen use them. With both I employ one of three retrieves, depending on the circumstances. The stop-and-go retrieve I mentioned at the beginning of the story is effective when fish are actively feeding. I usually fish that way when I first approach a light. Another equally effective method is to let a weighted lure sink to the bottom and retrieve it in a hopping manner. Vary the "jump" from almost nothing to as much as a couple of feet. Still another retrieve is particularly effective in colder water, where fish are more sluggish and less apt to pursue a lure. Then I crawl a shad-bodied grub slowly and steadily across the bottom. Sometimes, I slow to a snail's pace to tempt very sluggish bass.

It helps if the crankbaits used around lighted docks look natural, but the most important requirement is that they run true →



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the best we can do is fish during the new-moon phase immediately preceding the spawning-time full moon. Some species such as bass seem to start spawning during a full moon, and some may be lusty two weeks before it. Besides, the general consensus is that the new moon is the better phase for fishing.

"Stable" is the word for the last part of the summer. The weather doesn't change much, the lakes are thermally stratified, and most fish are in a high-activity mode. However, they have replenished their fat reserves, which makes feeding less essential. This is the season when it's most difficult to forecast the best days much in advance because the pattern doesn't normally change radically from one day to the next.

One thing to keep an eye on, however, is again the moon phase. Many anglers swear by the lunar influence and believe that a new moon or a full moon is best. With so many other variables stable, this may be the time to take the moon phase very seriously.

Another factor is that first major cold front coming down out of Canada. It can hit at any time from late July to September and has been known to drop steamy surface temperatures and raise a few lunkers. If you watch TV or newspaper weather maps religiously, you'll see it coming days in advance. Let it pass, wait a couple of days, and then head for your favorite spots.

A change that is important at almost any time of year is a wind shift that suddenly blows into an area known for good fishing. Let's say that your lake has a marvelous stump field on the southern shoreline and that the wind has been southerly for three days. This kept both the surface and the fishing placid. A new wind from the northern half of the compass will cause waves and currents and bring in plankton and baitfish. It will probably stir up some feeding activity. Especially during the summer, many gamefish establish home territories. Rather than roam the lake and look for the best conditions, they stay put and take advantage of good situations when they arise. When the wind is right, the fish feed, all other factors being equal.

Whether you'll have some very good days in the early fall (when the water temperature is still about 68° or 70°) usually depends on how good the angling was in the previous months. In most lakes, good spring and summer fishing makes for a poor fall, and vice versa. If your lake did have a bad month or two leading up to the fall, and if this was caused by unfavorable conditions rather than a downturn in the fish population, you may be headed for some of the best fishing of the year.

The action will start when that problem clears up. As we just saw, if it was a severe oxygen/temperature tension that turned the fish off, a cold front could throw the switch back on. If high water scattered the baitfish into so much thick, protective cover that the predators couldn't locate them, you'll want to go fishing when the water level drops and flushes the bait into the open. Even if the reason for a bad period is unknown, look for signs of a change, such as shad skittering on the surface, more sea gull activity than normal, or your neighbor →

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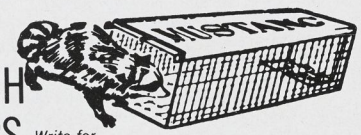

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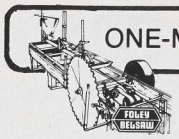

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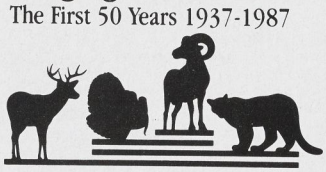

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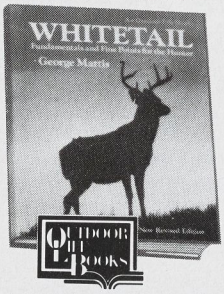

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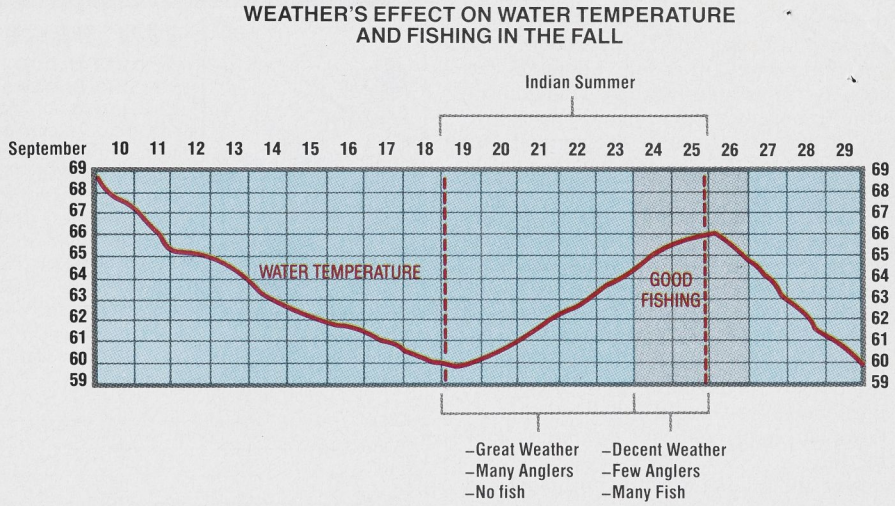


Graph shows that warming after the first cool weather of the fall season is a good time to go fishing. But rising water temperature is rare during a long cooling period.

leaving for his office with boat in tow.

Poor year or not, water temperatures dropping into the 60s in the middle of the fall or a bit later cause fish to feed heavily in preparation for winter. The weather becomes important again but in a somewhat different way. In the spring, we looked for warming periods during a general trend toward improving weather. In the fall, many warming spells are obscured by the seasonal push toward cooler weather. That makes predictions difficult. Remember, the main stimulus is a rising water temperature, which is something you seldom encounter in the fall.

Indian summer (the warming after the first stretch of cool weather) is the best bet, provided it doesn't come too early or too late. Somewhere between mid-September and mid-October is about right in the North, and maybe a month later in the South.

We said that in the spring, the tail end of a warming trend is best. This is doubly true in the fall because you can bet that the weather leading up to a string of bluebird days was cold and that the water temperature was plunging. Fisheries biologists have found that it takes an average fish about one day to adjust to a new warmer water temperature but that it can take 20 days to adjust to a colder one.

The above drawing illustrates a typical Indian summer period that took place in my area. There was a very distinct Indian summer sandwiched into a very cool fall. Warming began on September 19 and ended one week later. The 20th was a beautiful day, and anglers flocked to the lakes only to encounter poor fishing. You can see why. In the previous 10 days, the water temperature had fallen from 69° to 60°. The first warm, sunny day may have been pleasant, but the fish were still in a state of frigid shock.

Despite continued good weather, the fishing was downright drab for the next few days, and folks lost interest. Then, on the 23rd, some walleyes began to bite as the water temperature climbed to 64°. On the 24th and 25th, the weather was amiable again, and the water reached 65°and 66°. Suddenly, largemouths, white bass, crappies, and catfish were hitting our shad facsimiles. Even when the wind shifted to the north on the 26th, dropping the air temperature into the 40s and the water down 1°, the fishing stayed good. Not until the 27th, when the water cooled to 64°, did the curtain finally come down.

Throughout this feeding period, we had a variety of wind and sky conditions, but the fish seemed to ignore them. There was little doubt that the controlling stimulus was the steadily rising water temperature.

Determining the best fishing days is really just a matter of knowing what to look for and hustling out to fish when it happens. Don't fall for the old saying that the best time to go fishing is whenever you can. If it's spring or fall and the weather is right, tell your boss that you have a rising temperature and can't come in that day. If it's summer and Junior has spotted schools of white bass busting shad, say that you need the day off to help your son with a school problem.

Book Of Classic Hunting Tales

The Greatest Hunting Stories Ever Told a collection of classic hunting tales that were selected and edited by Outdoor Life Executive Editor Vin T. Sparano, is now available.

The new 265-page hardcover book offers a total of 28 hunting stories from such well-known authors as Robert Ruark, Teddy Roosevelt, Nash Buckingham, Pat McManus, Ben East and many others. Their tales will pull you swiftly from page to page, whether you're duck shooting in Tennessee or on safari with Jack O'Connor as he hunts leopards, rhinos and lions.

Many of the tales in *The Greatest Hunting Stories Ever Told* were out of print until now, making this anthology a valuable volume for collectors of hunting literature.

Autographed copies of *The Greatest Hunting Stories Ever Told* are available for $19.95 postpaid from Vin T. Sparano, 17 Henning Dr., Fairfield, NJ 07006.

EDITORS AFIELD

ANTHONY ACERRANO

Fishing

Cold Front Bass

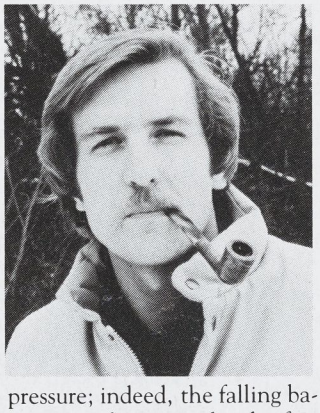
The front moved in during the night, and by morning the rain had ended and the sky was blown cloudless and blue. Slightly after dawn, at the boathouse, a groundskeeper said, "Looks like it's gonna be a beautiful day." I was barely able to suppress a growl. It would be a nice day for lying on the beach, perhaps, or for having a picnic, but unless I missed my guess, it would be a poor day for fishing.

When my guide, Darrell Van Vactor, arrived, we stood on the dock and looked out over the water, which was calm and glassy in the glare of the rising sun. "Blankety-blank cold front," I said. Darrell grunted. "Might be tough."

It was tough. Darrell ran the best of rigs—a high-tech boat, fully outfitted with the latest equipment—and he knew this part of Kentucky Lake far better than most. But even his expertise and energy, and our long hours of hard fishing, barely kept us from getting skunked. Our efforts garnered us only a handful of small spotted and largemouth bass. The sky stayed blue all day, and the sun glared like a lantern. It was a classic cold front day, and there was little we could do about it. The bass fishing was as hard as it can get.

For those unfamiliar with this type of situation, let me explain. A cold front does not necessarily mean cold weather, nor does it imply sitting in a boat while bundled in sweaters, one's fingers and assorted limbs freezing. To the contrary, a "cold front day" can be pleasantly warm and sunny. And in late spring and summer, this is often the case. The condition I'm speaking of here is usually more subtle, although the effects on fishing are not.

Technically, a cold front occurs when a mass of warm air is invaded by a mass of cooler air, which in this country usually (but not always) comes from a westerly direction. The invading air mass may be only a few degrees cooler, but regardless, the disparity in temperatures causes atmospheric turbulence, which results in cloud buildup, rain and sometimes thunderstorms. The cold front is led by a "trough" of low barometric



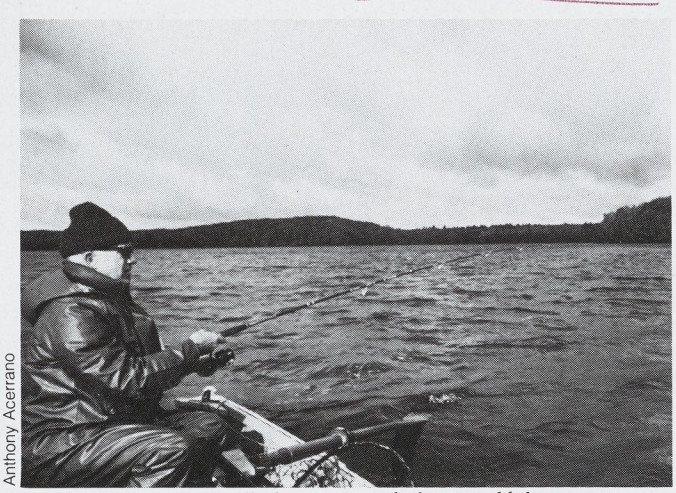
pressure; indeed, the falling barometer often provides the first clue of an incoming storm.

Cold fronts are comparatively fast weather systems and frequently blow in and out quickly, overnight perhaps, or in the course of a single afternoon. While a front is incoming, or even while it is stationary, bringing wind and dumping rain, fishing can actually improve. Bass, sensing the approaching storm, possibly via the change in pressure and the diminished light, often go on a feeding spree. This spree may begin up to 12 hours before the first visible signs of the front and may last, if only in periodic outbursts, well into the arrival of bad weather. Knowledgeable anglers will spend as much of this time as they can on the water, fishing intensely but making sure they get out of the storm's way before their safety is endangered.

Now for the bad news. Once the worst of the front blows past, it leaves behind a high-pressure system that brings bright blue skies, slightly cooler temperatures and a rising barometer, all to the detriment of bass fishing. These conditions may last for only one day (if you're lucky) or for three days (if you're not); or if your fish-karma is truly black, you may get hit with back-to-back cold fronts. Such is the way an entire vacation can be ruined.

Why this aftermath condition is so hard on bass fishing is still open to some speculation, although a few conclusions can be made. First is the matter of light. Fish have no eyelids, nor were they blessed with light-controlling irises such as our own. This means they have little ability to withstand direct light and almost no way to internally control its intensity.

continued



Anthony Acerrano

Bass fishing can really heat up just before a cold front arrives.

reduction in the amount of water entering the Biscayne Aquifer (the natural underground reservoir that provides southeast Florida's water supply) and saltwater intrusion into some freshwater areas.

Hydroelectric Money Benefits Wildlife

Officials of the Bonneville Power Administration (BPA) have signed contracts for $25.2 million worth of new and continuing fish and wildlife restoration programs in the Northwest's Columbia River Basin.

The 142 projects are designed to replace fish runs and wildlife habitat destroyed by hydroelectric dams.

All of this is the result of the 1980 Pacific Northwest Power Act, which established the Northwest Power Planning Council. The council was directed to create and coordinate a fish and wildlife program, with the bulk of the money coming from the BPA.

Among the projects is one that is exploring the effect of the dams on Canada geese; another concerns the impact of dams on big-game habitat; and another deals with restoring a mountain sheep herd living at Lake Koocanusa, a reservoir in northwest Montana created by the Libby Dam.

Thirty-three projects are intended to increase fish runs, and 16 more are aimed at replacing lost runs or restocking damaged runs with hatchery fish.—*John Holt.*

Wild Hybrid Spawn Surprises Biologists

The popular hybrid gamefish known as the whiterock bass (or in some areas, the wiper) is produced in hatcheries by fertilizing eggs from female striped bass with milt from male white bass.

It has been a widely accepted belief among fisheries biologists that there would be no natural reproduction in the wild by these hybrids, though technicians were able to accomplish this under laboratory conditions.

Early this year, however, Texas Parks and Wildlife Department biologists became aware of small hybrids in Lake Palestine, south of Tyler in east Texas. They have now verified that the young fish were offspring of previously stocked hybrids. "They were six to 10 inches long, so they're probably 1 to 1½ years old," reported Phil Durocher, inland fisheries management coordinator. "The last hybrid stocking in that lake took place in 1982," he said.

Durocher said that local anglers helped collect some of the fish, which were then examined with electrophoretic equipment to determine their genetic makeup. "We still don't know if it's the result of hybrids breeding with hybrids, or, more likely, if it's hybrids breeding with white bass."

Durocher pointed out that since Texas biologists made their discovery, they learned that a couple of fish that had been verified as wild-bred hybrids had been found in the Savannah River in Georgia in 1984.

Prairie Preserve Nears Reality

After nearly 20 years of trying to establish a prairie preserve somewhere in the United States, National Park Service officials are finally close to that goal.

About 45,000 acres of tallgrass prairie in Osage County, Oklahoma, could become the nation's first prairie preserve.

The area was originally proposed as a national park, and its designation as a preserve was something of a compromise on the part of conservationists. On a preserve, the Osage Indians, who hold the mineral rights, would be allowed to continue oil and gas exploration and production; hunting and grazing would also be permitted.

Only about 1 percent of the nation's original tallgrass prairie still exists. SA



conditions, including 10 ft. of water.

matic film advance, automatic film rewind and automatic flash. So as well as being waterproof and dirtproof, it's also foolproof.

All of which makes choosing an automatic 35mm camera somewhat automatic too.

Nikon®
We take the world's greatest pictures.®



If bright sunlight bothers a bass, it can either retreat to deeper and darker water or hide in the shade of cover—weeds, logs, lily pads, overhanging cliffs and the like. The clear skies and bright sun following cold fronts throw the maximum amount of light into the water. Fish that normally feed in 12 feet on overcast days may now be sulking in depths of 20 or 30 feet or even deeper, depending on water clarity. Or they might be holding snug against a tangle of sunken brush, clinging to the shade, unwilling to come out even a few inches to chase a baitfish or lure.

Now factor in the barometric pressure. Water is a noncompressible environment in which even the slightest pressure change is noticeable. Extreme increases make bass uncomfortable. Under such conditions divers have observed fish sulking in heavy cover or near bottom, hardly moving a fin, ignoring any food fish or lure that came by. Homer Circle recently told me of seeing bass actually rub themselves against a gravel bar, clearly agitated, as if trying to relieve themselves of some internal discomfort. It's easy to see why fish such as these have little interest in attacking your lures.

So cold fronts will nearly always put a damper on bass fishing. But this doesn't mean the situation is hopeless. Smart fishermen have several options.

Because clear lakes are most severely affected by light penetration, one cold front strategy is to move to a darker lake, where the increased light will be less noticeable. Better yet, if you have the option, move to a pond. Smaller waters seem less affected by both light and barometric pressure, particularly natural eutrophic ponds that have darkly tinted water and abundant thick cover.

If you must fish a clear lake, plan on two lines of attack. First, work the deepest structure you can find: bends in river channels, submerged rock or brushpiles, and breaks at the base of deep dropoffs. Use bottom-bouncing lures such as plastic worms, jigs tipped with minnows or porkrind and spinnerbaits. Work these as slowly and precisely on the structure as possible. If this fails, slow the retrieve even more. Then try smaller lures.

If deepwater fishing doesn't produce, or if you're working a darker lake, head for thick cover in shallow water: heavy pads, stick-up branches and tree trunks, brushpiles, thick weedbeds, any place that provides continual shade. Again, cast tightly to the cover; not inches away from it, but right in or against it. Plastic worms, pork chunks, jig-chunk combinations and weedless spinnerbaits are favored lures since they won't foul in heavy cover and can be fished slowly without sacrificing fish appeal.

Lastly, make it a habit to do some preventive research. Study the weather maps in your daily newspaper and pay attention to radio and TV forecasts. On printed maps, watch for the black line broken by triangular flags, which depicts the leading edge of a cold front. If you see a front blowing your way, try to time your trip so that you're fishing before and perhaps while it's moving in, but not immediately after. If it's impossible to reschedule, don't give up hope; just realize that the fish you catch will be the ones you earn. Patience and a positive attitude may not result in great strings of bass, but they will help in the maintenance of peace of mind—something that's not always easy in the aftermath of a cold front.

◆ ◆ ◆

New Gear

Worm Lotion: Classic Manufacturing Co. Inc., producer of Culprit plastic worms, is now offering a worm lotion under the same trade name. This fish attractant masks the scent of the worms and any amino acids from your hands. It acts as a lubricant on worms that are flipped or jigged and increases light reflection of the worms. Classic Manufacturing Co., P.O. Box 1249, Dept. SA, Clermont, FL 32711.

Orvis "Western Two" Flyrod Outfit: This new graphite rod is bound to attract attention; it's 8½ feet long and throws a 2-weight line, which should appease even the fussiest spring creek or stillwater fisherman. The rod and line match well, and casting efficiency is smooth. An EXR 1 flyreel and double-taper 2-weight floating line complete the outfit. Orvis, Dept. SA, 10 River Rd., Manchester, VT 05254; 802/362-1300.

Coming Soon: Gerald Almy fishes the Trico hatch.

GRITS GRESHAM

Shooting

Super Accurate

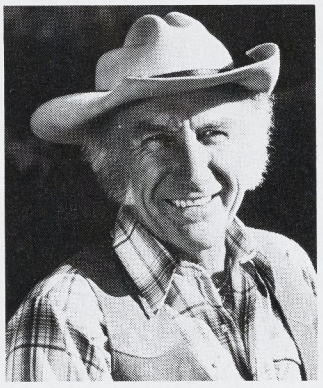
"Shoots good enough t'kill a deer!"

It's a saying that isn't uncommon where hunters gather, and it's a line that tends to make the hackles rise on the neck of one James Kennedy Jarrett. "If 'good enough' is all they want," he emphasizes, "they don't need one of my rifles."

Kenny Jarrett is understandably biased in the direction of accurate rifles. Within the past five years he had held half a dozen world benchrest records, and half of them still stand. All were shot with a rifle he built.

How accurate are Kenny and his rifle? Try a five-shot group measuring just .750 inches—from a range of 300 yards!

His best 100-yard, five-shot group in competition was .032 inches, but he did have a 100-yard sighting-in group, witnessed and signed, that was



0.15 inches. The one group I shot with Kenny's "world record" rifle (fired in the rain by a rank amateur) was a one-hole .321 inches. In benchrest circles, that won't get you a cup of coffee.

All of the above performances were played with a wildcat benchrest caliber, the 6mm PPC. For some of his records Kenny used a custom 62½-grain Watson bullet at 3300 fps, and for others a cus-

continued

Two tough trail bosses!

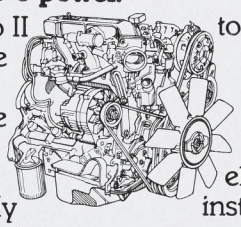
Ford Bronco and Bronco II.

Bronco already leads its class in power. Now there's a powerful new V-6 in trim-size Bronco II. Plus new "Touch-Drive" option to shift to 4WD high at any speed. And Eddie Bauer luxury is offered in both!

You're not seeing double. You're looking at two different size Ford 4-wheelers: big Bronco and the trim Bronco II.

Both have what it takes to make waves—in the wild and around town. And both are offered with the looks and luxury of special Eddie Bauer editions.

New 2.9L V-6 power.



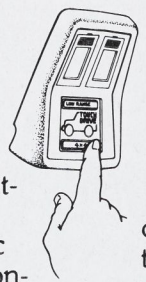
Bronco II breaks loose with a new bigger, more powerful 2.9L V-6. Electronically fuel injected, it puts the fun of 140 horses under your hood.* Nothing in its class can match that!

Big Bronco power.

The standard Bronco engine is Ford's high-torque 4.9L Six. And for the V-8 options, the operative word is "go."

You can go with a 185-HP 5.0L fuel-injected V-8. Or go all the way with a big 5.8L High Output V-8 with 4V carb and 210 horsepower—considerably more than Blazer's biggest engine!*

New pushbutton 4WD shifts at any speed.



Just touch a button in Bronco II's overhead electric "Touch-Drive" console to go from 2WD to 4WD high. The electric shift takes place instantly, clash free, at any speed. Shift back to 2WD the same way. It's no work, all play!

Ford's exclusive new "Touch-Drive" system is optional on Bronco II. Manual locking hubs are standard on both Broncos, with automatic front locking hubs optional on the big one.

Strong suspensions.

Both Broncos are tough, maneuverable, fun to drive. Both have Twin-Traction Beam independent front suspension to absorb jolts, not pass them along. And to help keep wheels glued to the ground for solid traction off the road.

Both offer the class and comfort of the Eddie Bauer models shown here.

Eddie Bauer Broncos.

The luxurious Eddie Bauer editions feature unique two-tone paint and special trim. High-styled interiors with dual Captain's Chairs, tilt wheel, cruise control and more. Plus Eddie Bauer tote and garment bags. And Ford's Extended Maintenance and Limited Warranty coverage. Ask to see this warranty when you visit your dealer.

Best-Built American Trucks.

At Ford, Quality is Job 1. A 1985 survey established that Ford makes the best-built American trucks. This is based on an average of problems reported by owners in the prior six months on 1981-1984 models designed and built in the U.S.

Lifetime Service Guarantee.

Participating Ford Dealers stand behind their work, in writing, with a free Lifetime Service Guarantee for as long as you own your Ford car or light truck. Ask to see this guarantee when you visit your participating Ford Dealer.

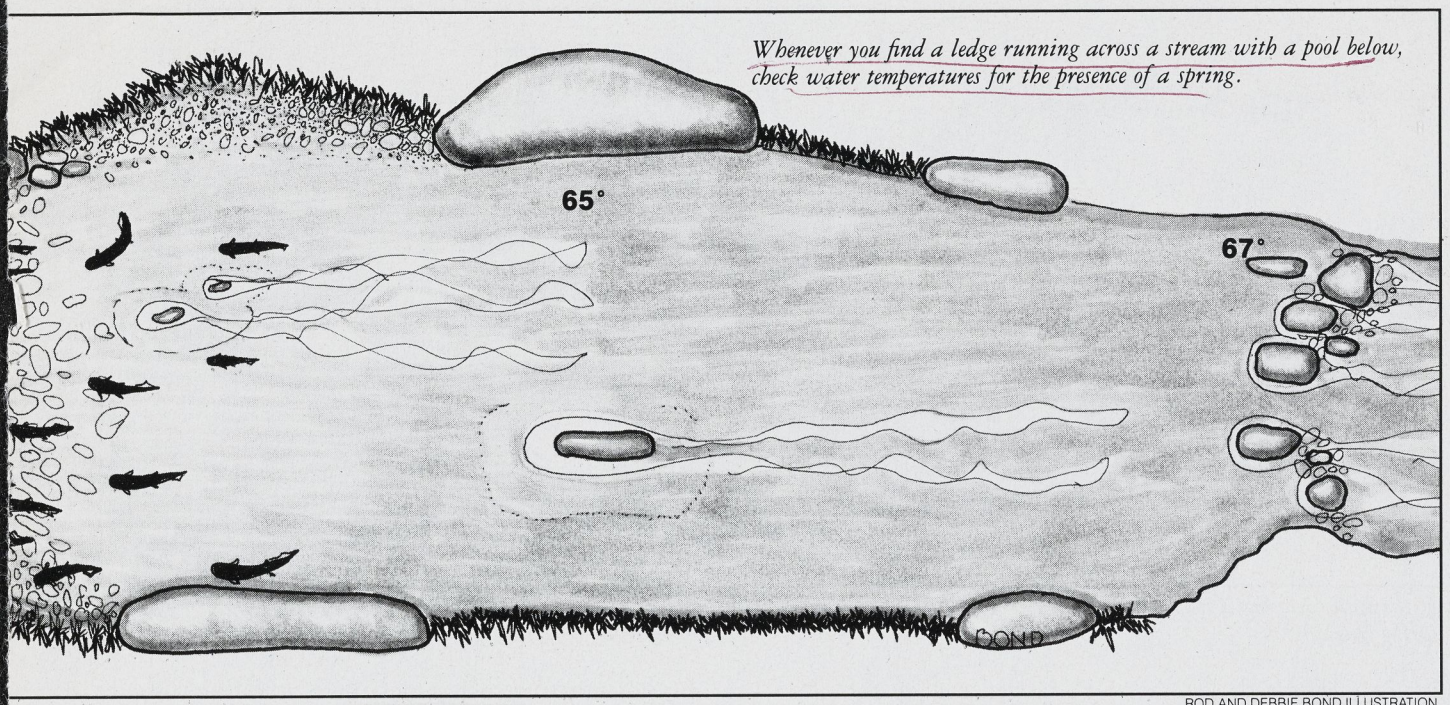
Buckle up—together we can save lives.

*Horsepower based on SAE Standard J1349.



BEST-BUILT Built Ford Tough

AMERICAN TRUCKS



Whenever you find a ledge running across a stream with a pool below, check water temperatures for the presence of a spring.

ROD AND DEBBIE BOND ILLUSTRATION

Water Temperature

Carry a thermometer—find the fish.

GEORGE HARVEY

NOT ONE IN A HUNDRED trout fishermen has the slightest knowledge of the importance water temperature has on fly fishing. In marginal rivers and streams that support trout in the upper reaches all season long but not in the lower stretches, because of low water and high air temperatures during summer, such waters become too warm for trout to tolerate so they migrate. Understanding water temperatures and trout behavior can save you wasted hours and even days of valuable fishing time.

Back in the mid-1930s I worked three summers from May to September on a research project studying the effects of water temperature on the migration and feeding of trout. What I discovered holds true for trout wherever they are found, and this general information will keep you from making the more common mistakes concerning trout and water temperature.

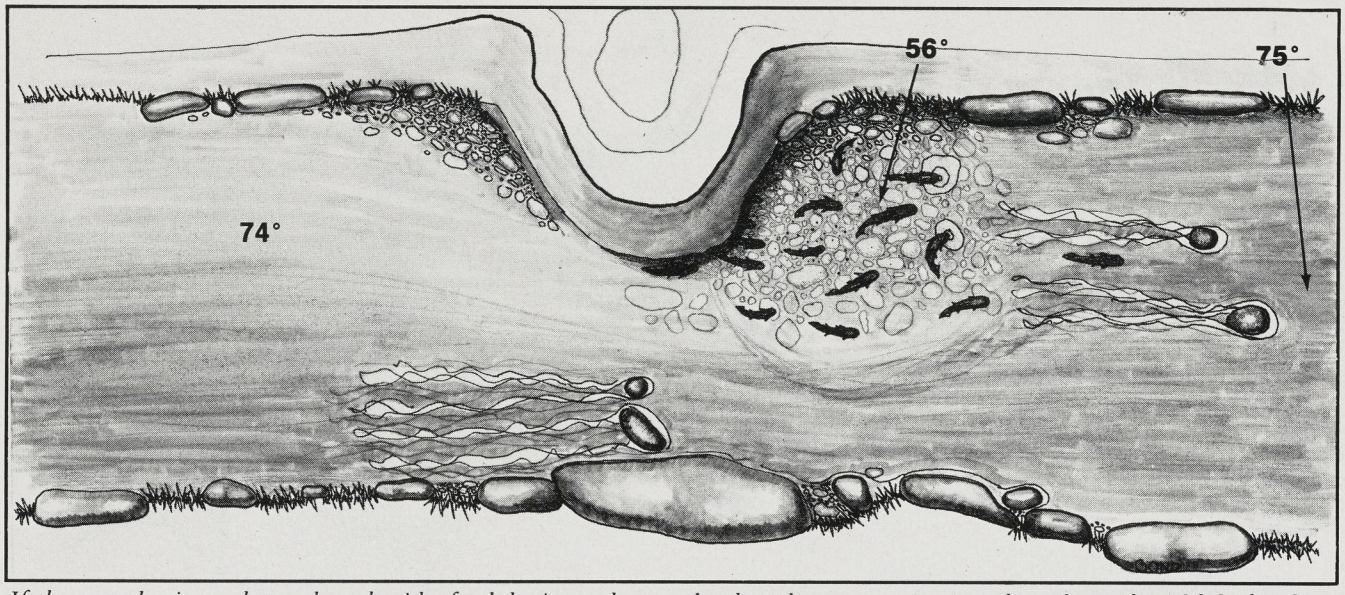
The ideal temperature for brook trout is close to 58 degrees F. and for brown and rainbow trout a few degrees higher. The optimum temperature range for the three species is about ten degrees above and below the ideal temperature. Thus, when water temperatures drop below 48 degrees or reach above 70 degrees F. fishing for brook trout is often poor. In some streams, in heavily oxygenated areas, it may be possible to catch brook trout in water slightly higher than 70 degrees, but from personal experience, I would never choose to fish in water this warm because I know my chances of taking brook trout are sharply reduced.

With brown and rainbow trout the situation is the same, with the optimum temperature range from about 50 to 73 degrees. I have caught brown and rainbow trout in water as high as 75 degrees, but I would never fish by choice in water over 70 degrees or below 45 degrees for any of the three species. After making thousands of water temperature checks over a period of 48 years I am thoroughly convinced the best temperature range for all fly fishing is from 55 degrees to 68 degrees F.

I admit there are exceptions to the temperature range

GEORGE HARVEY, former angling professor at Penn State University, lives in State College, Pa.

DALE SPARTAS PHOTO



If the water leaving a deep pool on the side of a ledge is one degree cooler than the water coming into the pool, you have likely found a spring hole.

I just described. In heavily oxygenated water, for instance, the trout may live and feed in temperatures four or five degrees higher, the same is true when the water is much colder. On a few occasions I have had excellent fishing when the water temperature was in the 30s, but such events are rare.

The observant angler who regularly fishes the streams in his area learns by experience the effect water temperature has on the feeding and migration of trout. If you like to explore new water, a thermometer is a must. During a normal year on all marginal streams I have fished in Pennsylvania, the first two weeks in June is the critical period when trout are forced to migrate to find cooler water. The time may vary as much as a month or more because of elevation or geographic location. It is during this period I have seen hundreds of anglers fishing in water that could not possibly support trout.

The brook trout migration usually takes place when the water temperature rises above 70 degrees and holds for a period of four or five hours a day. The same is true of browns and rainbows when the temperature gets above 75 degrees, but when the brook trout start to migrate, a large percentage of the browns and rainbows in the same stream follow.

When the mass trout migration occurs, sections of a stream that held a good population of trout may in just a few days be completely barren, except at the mouths of cold-water tributaries, in spring holes and in heavily oxygenated areas. Some of the most exciting fishing of the year may be experienced just prior to the mass migration.

When the water temperatures first start reaching the 70 degree mark and hold that high for only a few hours a day, trout start to bunch up in the riffly or heavily oxygenated water at the heads of long, flat stretches. When this happens, trout that were more or less evenly distributed over many surface acres of water are now confined to a very small area. I have on many occasions been able to cast over hundreds of trout without changing my position. At such times the best fishing usually occurs late in the day, when the temperature starts to drop. You will find this bunching up happening on all marginal water every year. On many streams trout cannot migrate to ideal water because of low water, beaver dams, man-made dams and other obstructions. In such situations the trout are forced to stay in water warmer than they prefer.

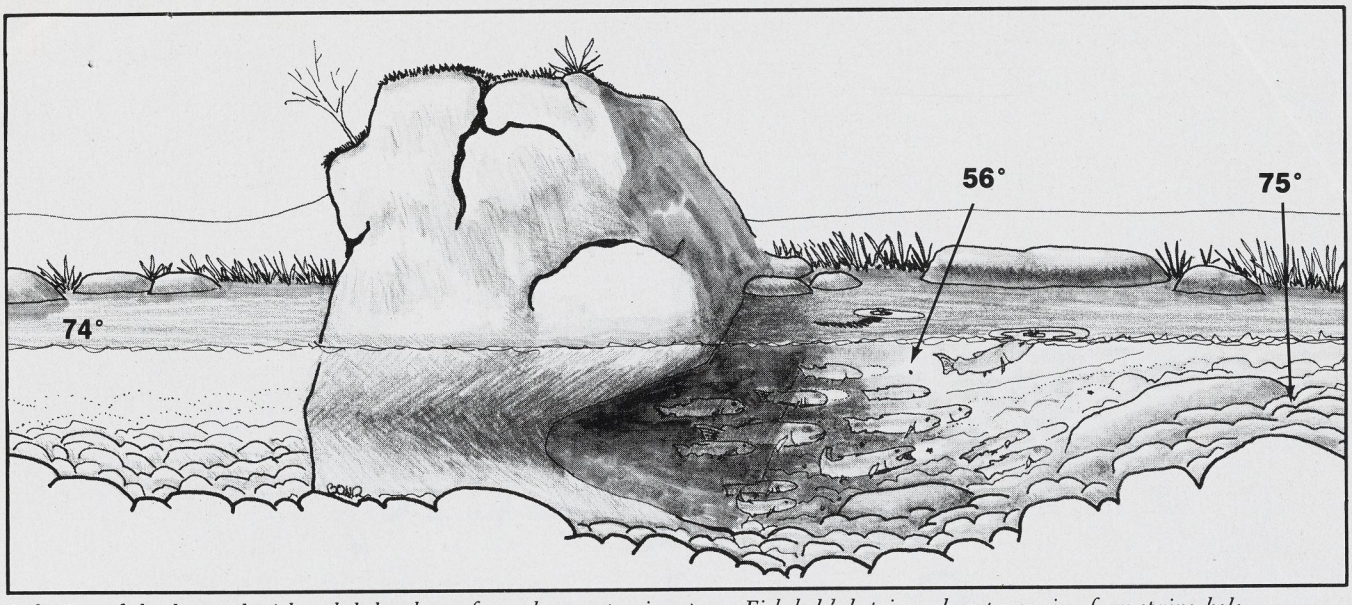
Trout Temperature Behavior

HERE IS A VIVID EXAMPLE of how knowledge, or lack of it, can affect your fishing.

I had two stations on Kettle Creek in north-central Pennsylvania where I had high-low thermometers placed permanently in the stream from early May to September. These thermometers allowed me to check the daily, weekly and seasonal fluctuations in water temperature. One station was located in the riffly area in front of the headquarters cabin, the other above the junction of Hammersley Fork and Kettle Creek.

One Friday evening, in the last week of May, I stood in one place in front of the cabin and easily caught a dozen trout. The trout were concentrated in the riffly or heavily oxygenated water prior to mass migration. When I returned early the following Monday I immediately checked the thermometer at the headquarter cabin station, because Sunday had been very hot, and found the water temperature had been up to 85 degrees during my absence.

I went to the cabin and returned with my fly rod. I made 15 or 20 casts with no results, except one or two small bass. I then headed for the Hammersley Fork station, about four miles upstream. I should add that this was the first sizeable tributary that entered the main stream. There were two other small wet-weather trickle tributaries between the two stations, but they were both dry. I parked the car and walked down to the confluence of the two streams and could hardly believe my eyes. Below, in the first 50 feet of cool water lay at least 1,500



ROD AND DERBIE BOND ILLUSTRATION

Side view of the deep pool with rock ledge shown from above on previous page. Fish hold deep in cool water coming from spring hole.

trout. They were the trout that had migrated up from above Trout Run, a distance of about five miles.

On the following Saturday evening I was again checking the thermometer at Hammersley Fork station and glanced downstream and saw two fishermen working towards me. I sat on a log and waited for them to approach. We greeted one another and I asked "How did you do?" The answer I suspected, but I wanted to hear it from them. They had not taken a single trout, and they found it incredible because they had fished the same stretch of water two weeks previously with excellent results. Both fishermen were from the Pittsburgh area, had the finest equipment money could buy and were excellent casters. They were two tired and disappointed anglers!

I invited them to sit down, introduced myself and told them about the research project I was working on.

They had never noticed the trout congregated at the mouth of Hammersley Fork, and when I told them migration had occured the previous weekend and that there were no trout in the area they had fished, they could hardly believe it.

I then said "If you would like to see some of the trout that you *didn't* catch on your last excursion, walk over and look below Hammersley Fork in Kettle Creek." They did and I can't write the words that came from their mouths! I then explained what had taken place and how important a thermometer is at this time of the season. Had they known, they could have checked the water temperature after ten o'clock in the morning and moved upstream until they found water with a temperature of 70 degrees or below, or fished one of the tributaries and had good fishing the rest of the day.

In the freestone streams among the mountains of north-central Pennsylvania even during the warm summer months it frequently gets quite cool during the night, and water temperatures in the morning may be in the 60s. On a normal summer day when the sun gets up over the mountains it is usually about ten o'clock before the stream temperature rises above 70 degrees. If one were fishing a stream for the first time and simply took the temperature once in the early morning, he could easily be misled. You must check water temperatures after 10 A.M. This holds true on any marginal stream regardless of geographical location, if the nights get cool.

A typical example of complex temperature regimes within a single stream is Hammersley Fork. In the center section of the stream there was a mile stretch of the most beautiful water one could ever wish to fish , but during low water, late in June, it was barren of trout because the water temperatures would rise into the high 70s and low 80s. Above and below this stretch of water temperatures rarely got above 72 degrees, and when temperatures rose higher they only held over for an hour or two a day, not long enough to cause mass trout migrations. At the lower end of this stretch a cold tributary flowed into the center of a beautiful pool. The water in the pool all looked the same, but above the junction the temperatures reached the high 70s and low 80s, and as a result, I could catch brook trout up to where the tributary entered. Above that point I could never catch a trout. Knowledge is a factor in fishing success.

Taking Temperatures

I SHOULD MENTION that it is important how and where you take your temperature readings. Hold the thermometer close to the bottom in riffly or fast-moving sections of the stream for at least three minutes. Buy an accurate thermometer or your readings may be worthless. I have seen some that were off by as much as three degrees, which makes a tremendous difference in your interpretation of what to do.

Spring Holes

IN ALL MARGINAL WATER you can usually find spring holes where trout congregate when water temperatures

Continued on Page 74

High-Quality Sunglasses

Optical-quality polarized glasses: The protection and function they provide make them worth the price.

DEAN K. SCHUBERT

SUNGLASSES SERVE as one of the most fundamental tools that you use in fly fishing. Sunglasses protect your eyes from damage, and they can greatly enhance your ability to focus more sharply at different distances, enabling you to see under dim or hazy light conditions and to see through glare reflected off the water's surface where fish lie. A tool that does all these things is valuable indeed. Yet, all too often I see someone at the local fly shop plunk down $500 for the latest graphite rod and machined reel and as an afterthought spend $8 on a pair of sunglasses. The graphite rod may make him a better caster; a quality pair of glasses can help him become a better fisherman. High quality sunglasses can also help preserve his eyesight for use in later years when spotting a small fly in low light on choppy water can be agony.

Which Glasses?

MOST ANGLERS ARE UNAWARE of the various properties of the different types of glasses and their subsequent advantages and disadvantages. Like any tool, there is no one "right" choice. Choosing the right eyewear for you may be as simple as asking yourself how much you can spend or as compicated as finding a supplier and eye doctor who can place bifocals in your prescription polarized glasses the way you want them.

DEAN SCHUBERT, a northern California fishing guide, lives in Oakland, Calif.

You gain basic advantages from wearing even the least expensive sunglass when fishing, the most obvious are eye protection and the extraordinary increase in fish-spotting ability that polarized lenses provide your eyes. But there may be strong reasons to seek something with better (and often more expensive) capabilities than the off-the-shelf polarized glasses. Let's take a look at some of them.

The primary reason for wearing sunglasses is as a protective barrier against physical injury. Hooks, weighted shooting-tapers, lines and leaders moving at over 100 miles-per-hour can do severe damage to your eye with one misplaced cast. I've seen several people hooked in or near the face on our heavily fished steelhead rivers on California's North Coast. As often as we put flies in ourselves, it's foolish not to wear glasses, even when fishing early morning or evening hours.

A less easily understood danger to your eyes is radiation. Fishing, like sailing, skiing or mountaineering, is a sport in which a great deal of direct and reflected sunlight is present. Our evolutionary past did not equip us to face into glare on a trout stream for four to five hours at a time. Our eyes perceive light in a relatively narrow band of wavelengths, from about 400 nanometers in the violet to about 760 in the deep red. High-energy ultraviolet light (UV), invisible to us from about 280 nanometers to 400, causes painful sunburn. You can sunburn your eyes, too. It's called snowblindness or Keratitis, and its symptoms include reddening of the eyes,

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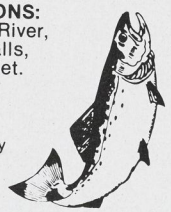

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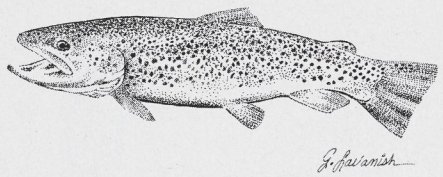

the water reaches to the top of your waders you must turn around and retreat upstream into a swift current. You can quickly bite off more than you can chew when wading, especially when the fishing is hot. In a big river like the Big Horn, Yellowstone, or Missouri you'll be in for a long swim, at best, if you become trapped in this situation.

Other bad spots to avoid are obvious drop-offs and pockets at the head end of islands or log jams. The current hollows out depressions in such spots. In fast currents they are especially dangerous.

Tailwater rivers can be dangerous, especially when released water rises rapidly. I use reference points such as rocks, water lines and other objects that reveal water level changes. Don't get so engrossed with your fishing that you neglect to retreat as the water rises. Wait and you may become trapped on a bar or island and have to swim for shore.

If you do become trapped in deep water, over your head, keep calm and tread water while facing downstream. Don't panic-flail away while swimming for shore. Face downstream, push off rocks or other obstacles and estimate how far the current must carry you before the stream shallows. In most rivers, you'll be quickly carried into shallow water at the tail of a pool. Often you can touch bottom just enough to work your way to shore. If you *do* need to swim for it, use a sidestroke with a scissors kick. I find this by far the easiest way to swim with all my gear on and holding my rod.

When you reach the bank, peel off your waders, wring out your clothing and reclothe yourself before you become chilled. Even during the summer months hypothermia can be a danger. Back inside your waders you will warm up, although you are still wet. Neoprene waders are excellent in this situation, keeping you toasty warm much like a wet suit.

Learning more about wading will make you a better fisherman. You will be able to fish productive water that less experienced waders pass by, and you will be able to concentrate on fishing techniques rather than keeping dry.

GEORGE ANDERSON owns the Yellowstone Angler fly shop in Livingston, Mont.

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April 26th & 27th — *Clouser's Fly Shop, Middletown*

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Temperature . . .

Continued from Page 51



are high enough to cause migration. Of course, trout congregate at the mouths of cold-water tributaries and visible springs that flow into the main stream. If the water is clear, you can easily see the trout.

Springs may flow out from the bottom of the stream, and if they are in deep pools where you cannot see bottom, they can be difficult to spot.

Here is how and where I locate many springs.

You can be suspicious if the stream runs against a rock ledge and gouges out a deep pool. If you check the water temperature above the pool, then check it as it leaves the pool on the side of the ledge and find the temperature cooler (one degree or more), you can be sure you have located a spring hole.

On several occasions I have found spring holes where small wet-weather tributaries entered the main stream and at times below a dry hollow. Whenever you find ledges running across the stream with a pool below, you may find a spring.

I have taken many large trout from the previously mentioned situations and when I find such spring holes, I selfishly keep them to myself. You will have a "honey hole" only as long as the water runs pure and an angler who kills doesn't find it. Since this kind of knowledge can, if improperly used, lead to the over-exploitation of trout when they are most vulnerable, use your power with discretion: bring your catch in quickly, revive and release it. Keep your knowledge of "honey holes" to yourself.

Many of our once prime trout streams and lakes have become poisoned by acid rain and no longer support trout. If you are a roving angler it would be on the side of wisdom to know if acid rain has affected the stream you wish to fish. Water temperature can be perfect, but when the pH is below five the stream has a severe problem. There are many small brook trout streams I once fished that no longer support trout, and there are streams that were once excellent trout producers that the Pennsylvania Fish Commission no longer stocks. A kit to determine the pH of the water you intend to fish may be even more important than water temperature. All fishermen need to unite to have stringent regulations passed and enforced or we may have very little quality water left for the future generation of anglers. This problem is most serious in northeastern United States and southeast Canada, but is affecting water in areas all over the United States and the rest of the world.