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op 14

Pheasant PARADISE

by Rick Mooney

HERE'S WHY ONE FARMER COUNTS BIRDS PER ACRE, NOT BUSHELS.

IF YOU WERE A RINGNECK PHEASANT, DAVE KONECHNE'S farm in central South Dakota would be a place you'd want to live.

Okay, maybe not during the ten-week-long South Dakota hunting season each fall when hunters from all over the country swarm Konechne's 3,000-acre spread trying to outwit you and your fellow ringnecks. During the rest of the year, however, a place like this is definitely where you'd want to be. Here, you can find everything a pheasant could ask for in the way of creature comforts—an abundance of food and shelter; plenty of spots to roost, loaf, and nest; and little to worry about in the way of predators.

What the birds who reside at Konechne's most likely can't or don't appreciate is the fact that it isn't random chance which makes this farm a virtual pheasant paradise. Rather, it's the result of evolution in Konechne's approach to farming and pheasants.

The seeds of change were planted in Konechne's mind in 1976. He was farming traditionally at the time, intensively growing corn and wheat, mostly, and running a large beef cattle herd. "The drought was pretty bad that year," he says. "We had some hunters out here at the end of the season, and they were talking about coming back the following year.

"I told them I didn't know if we'd have many birds because I was going to have to farm every piece of ground to make a go of things. Feed was so precious, I couldn't afford to leave anything in the field. They told me that if I'd leave some cover, they'd pay for it."

Then it dawned on him: Why not put traditional farming practices on the back burner and focus instead on maximizing bird populations for hunters willing to pay for access rights?

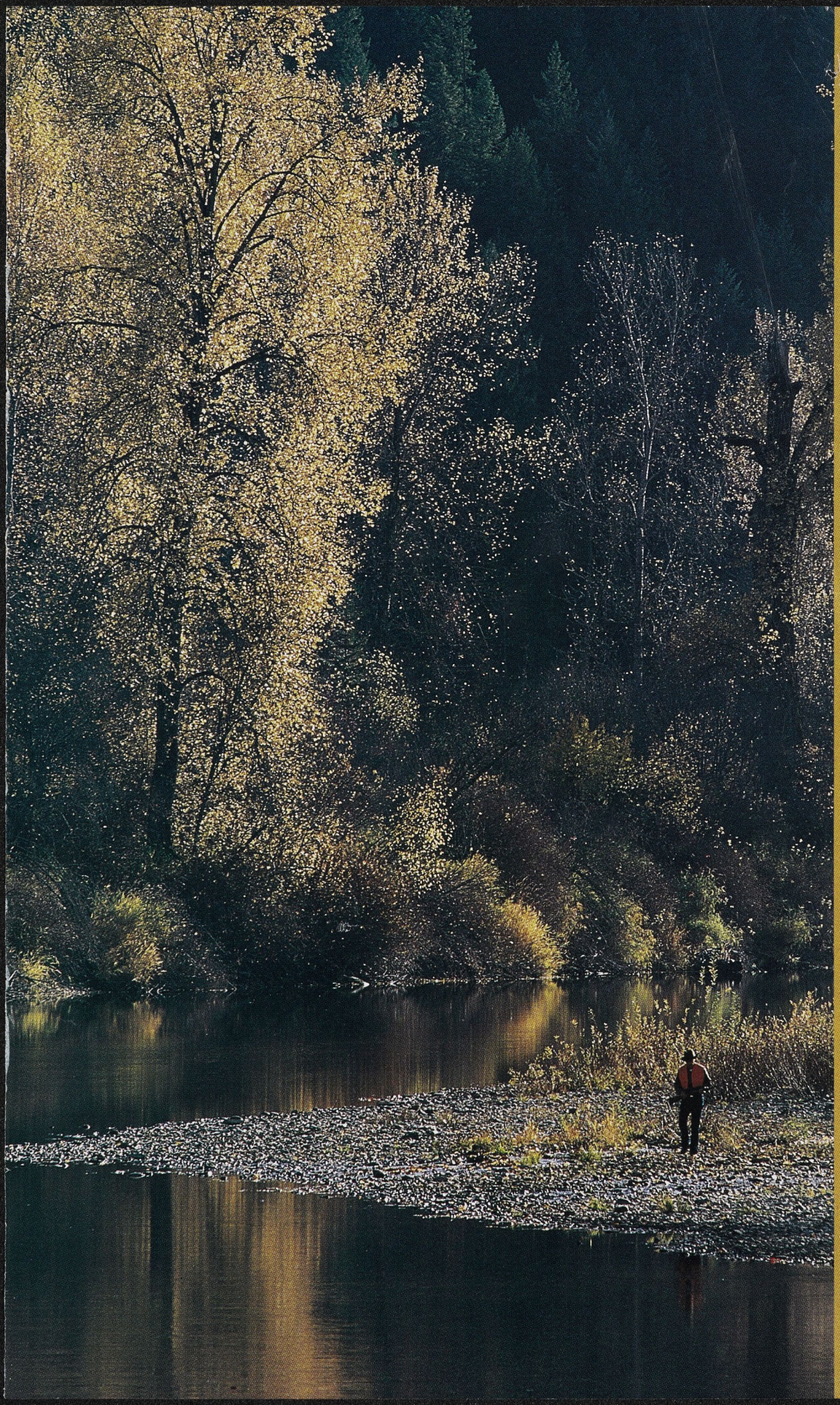
Over the next two decades, Konechne fine-tuned his farming methods to accommodate more pheasants. One key, he says, was learning to think in terms of birds per acre, rather than bushels per acre. "Now as I'm planning, I always try to put myself in the position of the pheasant," he notes. "I ask myself questions like 'If I didn't have food, where would I go? If I couldn't find shelter, what would I do?' "

With that philosophy in mind, Konechne has made several changes:

- **Scaling down field size.** While other farmers in this part of the country routinely talk about single fields of a half-section (320 acres) or larger, Konechne notes that his biggest field is just 46 acres. The average is about 15 acres. From a conventional farming standpoint, that makes for pretty poor efficiency. "You make a couple of rounds and you're done," he explains. "Then you have to move on to the next field with all your equipment." From a pheasant rearing standpoint, though, the smaller fields translate into more border or edge areas, i.e., spots where pheasants thrive.
- **Postponing grain harvest.** In a typical year, Konechne may leave half or more of his corn crop standing in the field over the winter. That can mean sacrificing lots of dollars when it's time to market the crop at the local elevator. But it also means a better pheasant crop because there's a reliable food supply in place for the birds throughout the months of harsh weather.
- **Delaying hay harvest.** The optimum time for making hay in Konechne's area—usually mid-June—coincides with the peak of the pheasant hatch. He routinely puts off harvest for several weeks until the birds are off the nest. "Every day you can wait [on harvest] is beneficial to the birds," he says. "If you're trying to maximize the pheasant population, you've got to sacrifice quality on the hay."
- **Planting shelter belts and restoring wetlands.** In the last decade or so, Konechne has undertaken projects to restore nearly two dozen small wetlands on his property. He has also planted 2 or 3 acres of trees each year. These areas take potential cropland out of production, but the tradeoff is more cover for the birds.
- **Returning cropland to grass.** Converting some of his once-plowed cropland back into grassland allows light grazing of Konechne's cattle herd—a practice that's beneficial not just to pheasants, but also to grouse, deer, ducks, and other wildlife as well. "Light grazing keeps the desirable grasses in place so that you still have good erosion control," Konechne says. He's seeding as much of his grasslands as possible with prairie grasses like switchgrass and big bluestem. "They stand real well in the winter and provide a lot of cover," he says.

LOOKING OUT OVER THE LANDSCAPE AT KONECHNE'S, someone well-schooled in traditional farming practices might not be able to discern a pattern in his management, but there's definitely one in place. The overriding goal, he explains, is to try to create a landscape that puts all of the key components of pheasant habitat—food and shelter, plus areas for roosting, loafing, and nesting—in close proximity. "Pheasants don't *(Continued on page 93)*

ILLUSTRATION BY CHRIS MAGADINI



Looking to have prime deer hunting territory all to yourself? Take to the water.

PHEASANT PARADISE

(Continued from page 60)

like to move very far," he says. "If they're undisturbed, they don't want to leave home. If you can get all those necessities within ¼ mile of each other, the birds have got it made."

The payoff to Konechne for this effort is that birds thrive on his land in sufficient numbers to attract scores of hunters there every fall. During the early part of the season, when demand for hunting access is at a peak in South Dakota, these hunters pay upwards of $170 per day for access, a guided hunt, and meals.

Fees are scaled back in increments each week as the season progresses and demand for access drops off. But even toward the close of the season in late December, it's not uncommon for Konechne to gross $1,500 per day or more from the pheasant-hunting enterprise. "You'd have to run a combine an awful long time to make that kind of money," says Konechne. "And you wouldn't have near as much fun."

FOR MORE INFORMATION, CONTACT Dave Konechne at Dept. FS, RR 2, Box 102, Kimball, SD 57355, telephone (605) 778-6332.

ADDENDA

Hunters pay their way

THE ACCESS FEES HUNTERS PAY landowners like Dave Konechne make up just a small fraction of the total dollars that South Dakota's two-month-long pheasant hunting season generates for the state's economy. By some estimates, money spent by pheasant hunters (the state sold 144,000 pheasant hunting licenses in 1994, nearly half to nonresidents) amounts to a cool $70 million, maybe more. Included in the tally are receipts from things like license sales, hotel stays, sporting goods purchases, food bills, car rentals, and even jet fuel purchases.

"On the day before the season opener, we'll have sixty to seventy-five planes coming in between 2 in the afternoon and 10 at night," says Dwayne Gebel, who, along with brother, Roger, operates Wright Brothers Aviation at the tiny municipal airport in Mitchell, South Dakota. "It's really something to see. A large corporate jet pulls up, the door opens, and out come six or eight people followed by five or six dogs. It's all fun, smiles, and excitement, kind of like the Super Bowl of the Prairie."

The clientele differs but the charged-up atmosphere is similar at the Crossroads Hotel and Convention Center in Huron, South Dakota. "It's more of a family, fun type of hunting here," says manager Steve Oetken. "Instead of a dozen corporate executives, we might have the accountant from Minneapolis getting together with a brother-in-law from Brainerd [Minnesota] and a cousin from Indiana. It might be the only time of the year they get together. It's one big party, like a homecoming weekend."

Small towns scattered throughout the state are among the biggest beneficiaries of the hunting season, says Steve Riley, a pheasant biologist with the Department of Game, Fish and Parks. "These are towns that don't really have any kind of tourist industry," says Riley. "Ordinarily, they wouldn't have many people coming in at this time of the year, but because of the hunting season, small mom-and-pop hotels will have every room filled. A downtown café where you'd expect to find a half-dozen people milling about will have a line going out the door and halfway down the block."

City officials in Winner, South Dakota, one of a half-dozen towns claiming to be the pheasant hunting capital of the state, figure the pheasant season is worth over $1 million to local businesses. "It's a make-it-or-break-it time for a lot of small farming towns all over the state," says Rick Kucera, who took two months off his regular job as an electrician last fall to set up a pheasant processing business in Winner (population 3,300). In his first year of operation, Kucera cleaned more than 4,000 birds (at $2.50 each) harvested from the farm fields near Winner and surrounding communities. "The money that comes in during the hunting season helps businesses get through the slow times during other parts of the year."

—RICK MOONEY

JIGS FOR TROUT

(Continued from page 57)

dominate the mix, but any fly fisherman would recognize the others—Hare's Ears, Pheasant Tails, Red Fox Squirrel Nymphs, Royal Coachmen, Muddler Minnows, Partridge and Orange Soft-Hackles, even a lead-headed San Juan Worm.

"Almost every pattern I try seems to work," he says. "If it's an effective fish-catcher as a fly, it seems to be even more effective as a jig."

Hayne matches the weight of each head to the most effective size for each fly. Large patterns such as Woolly Buggers get heads ranging from ⅛ to 1/32 ounce. Hare's Ears or Zug Bugs tend to be smaller, from 1/16 to 1/64 ounce. For soft-hackled patterns, Hayne sometimes uses heads as light as 1/80 or 1/100 ounce.

"The little stuff is awfully hard to cast, though," he says. "I do most of my fishing with jigs that weigh between ⅛ and 1/64 ounce."

To effectively cast such minuscule offerings the distances sometimes required, Hayne employs some fairly sophisticated ultralight tackle. His custom-built Fleaflicker rods feature broomstraw-thin, super-sensitive tips of solid graphite. With those delicate wands, Hayne can easily toss a 1/32-ounce jig the length of most trout-stream pools.

Most of the time, Hayne loads his fast-retrieve (5:1 or better) reels with 4-pound-test monofilament. When he's fishing lighter jigs, or wants to get a deeper drift, he switches to 2-pound line.

In the last ten years, Hayne has caught eleven trout that measured more than 20 inches. He says that without his specialized gear, he would probably never have hooked the largest, a 26½-inch 7-pound rainbow.

FIELD & STREAM (ISSN 8755-8599) is published monthly (Incorporating LIVING OUTDOORS) by Times Mirror Magazines Inc. Editorial, advertising, and subscription offices, 2 Park Ave., New York, NY 10016. **SUBSCRIPTIONS**: One year subscription rate for U.S. and possessions, $15.94. For Canada, add $7 per year (includes GST). For foreign add $8 per year. FIELD & STREAM entered as second class postage paid New York, NY and additional mailing offices. Canada Post Canadian Publications Mail Product Agreement No. 46280 GST registration Number R-122988066 and for payment of postage in cash. Second-class postage paid at New York, NY 10001, and at additional mailing offices. Printed in the USA. Send requests for single issues to FIELD & STREAM, 2 Park Ave., New York, NY 10016. Send requests for article reprints only to Reprint Management Services, Inc., 147 West Airport Rd., Lancaster, PA 17606-5363, telephone (717) 560-2001. **POSTMASTER**: Send change of address notices to FIELD & STREAM, P.O. Box 55652, Boulder, CO 80322-5652. **SUBSCRIPTION SERVICE**: Please send address change (enclosing latest address label) eight weeks in advance to FIELD & STREAM, P.O. Box 55652, Boulder, CO 80322-5652. If you have a subscription problem, write to the above address.

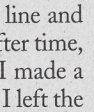
"I spotted that fish lying in the tail of a pool, 8 or 9 feet deep," he says. "It was holding just off the bottom. I made about a dozen casts, but the wind kept catching my line and preventing the jig from getting deep enough. Time after time, I watched that jig drift over the fish's head. Finally, I made a much longer cast and, even after the jig hit the water, I left the bail open and let more line run out. On the third or fourth drift, I saw the fish dart to one side and return to its original position. I set the hook and sure enough, the fish was there."

Like most dyed-in-the-feathers fly fishermen, Hayne dead-drifts most of his nymph-patterned jigs. He imparts a little life to Woolly Buggers, Muddlers, and other streamer patterns with rhythmic twitches of his rod tip.

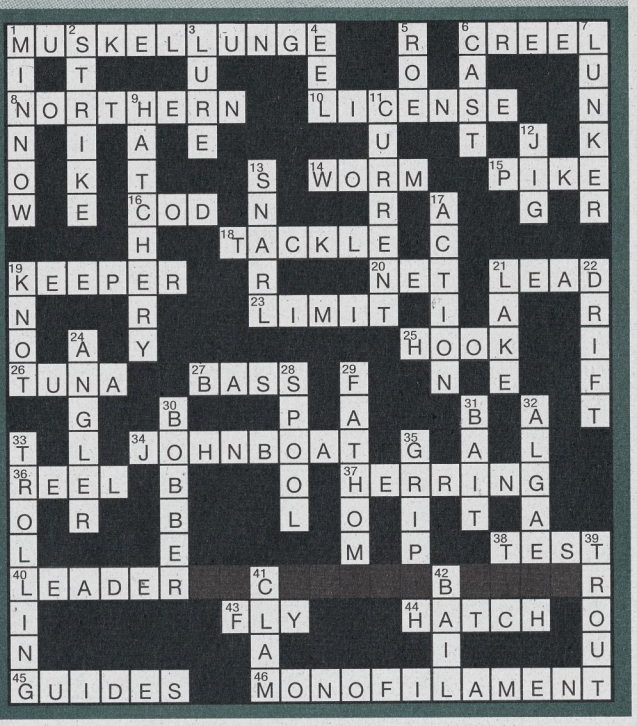
"In streams with lots of large boulders, you can even vertical-jig by standing on the boulders and dropping the lure over the side," he says. "In lakes, you can vertical-jig off a slip bobber. Really, I don't believe I've even begun to examine all the techniques this approach makes possible.

"I know one thing, though. By varying my casting location and retrieve style, I can keep my lure in the same plane as the fish longer and more effectively with ultralight spinning gear than I can with any kind of fly gear. There's no doubt that I catch more and bigger fish with jigs than I do with nymphs, though I'd hesitate to say just how many more. But it wouldn't surprise me if the ratio was two-to-one."

That rumble you hear is ol' Pinwheel Sawyer. Instead of spinning in his grave, though, he's searching his coffin for a spinning rod.



Answers to Angler's Crossword puzzle on page 35:



Creatures of the Deep Find Their Way to the Table

By WILLIAM J. BROAD

Dwelling in darkness, little known or understood, the animals of the deep sea are traditionally thought of as mysterious or monstrous. But that is changing. Increasingly, commercial fishermen are scouring the global deep to catch them by the ton. Creatures of the abyss, frequently grotesque by human standards, are being carefully prepared and marketed to hide their murky origins when sold in stores and restaurants.

Rattail delight chefs, but not ecologists.

Scientists worry that the rush for deep-sea food is beginning to upset the delicate ecology of some of the sunless regions that cover more than half the planet, threatening to tip the evolutionary balance. But chefs and fishermen are eager to probe the new frontier. Deep harvesting, they say, can be prudent and the results quite tasty.

"They're an incredible hit," Michael Stafford, the chef at the Captain Daniel Packer Inn in Mystic, Conn., said of the giant deep-sea shrimp he has started to serve. They are known as Stonington Reds and Royal Scarlets and are sometimes as large as lobsters. "They're tender and sweet, and they cook really quickly," he said. "They sell themselves."

Other deep creatures now being harvested or targeted as seafood include rattails, skates, squid, red crabs, orange roughy, black oreos, smooth oreos, hoki, blue ling, southern blue whiting, sablefish, black scabbard fish and spiny dogfish.

The search for palatable fare in the sea's depths is partly fueled by fishing wars and the collapse of such shallow fisheries as the Grand Banks off Newfoundland, where the search for wholesome food and short-term profit has driven such popular species as cod and haddock to the verge of commercial extinction. Worldwide, after centuries of steady growth, the total catch of wild fish peaked in 1989 and has subsequently declined.

Foraging deeper is often a survival strategy for fishermen forced out of traditional grounds by government regulators and pressed by creditors to make payments on expensive boats. In the United States, the investigation of deep fisheries is encouraged by the National Marine Fisheries Service of the National Oceanic and Atmospheric Administration, a Federal agency that aids such exploratory work with millions of dollars in grants. The exact amount of the catch from the deep seas is not known.

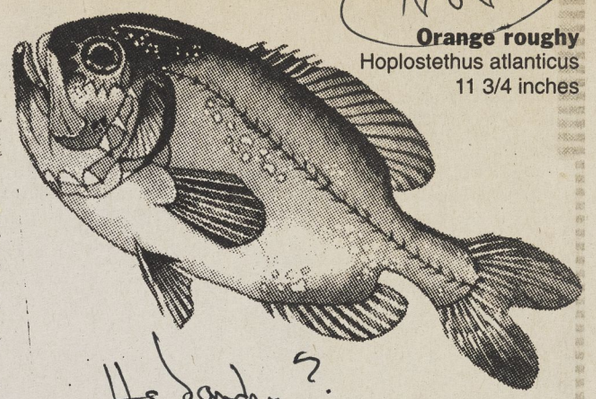
But scientists and environmental groups warn that so little is known about deep-sea creatures that some face ruin. Animals that inhabit the icy depths, experts say, often grow and reproduce very slowly, making their populations particularly vulnerable to disruption. Scientists recently discovered that the orange roughy, which dwells up to a mile deep off New Zealand and has been heavily exported to the United States for a decade, reaches sexual maturity in its 30's and lives to an age of 150 years or more.

"Deep fisheries can provide a pulse of good fishing but they're often not sustainable," said Dr. Jack Sobel, a senior scientist at the Center for Marine Conservation, a private group in Washington.

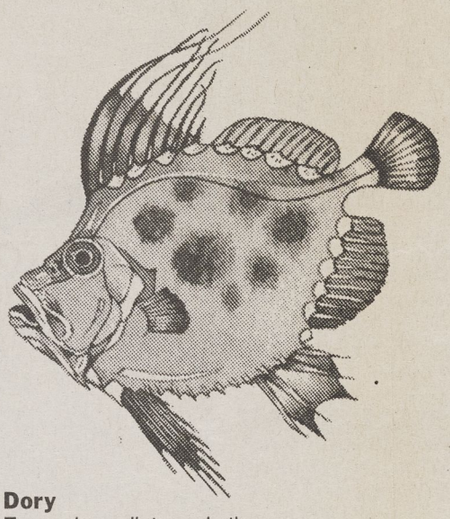
The problem is illustrated by orange roughy, whose principal stocks around New Zealand recently collapsed. "They never should have been exploited at all," said Mike Hagler, a fisheries expert in Auckland, New Zealand, for Greenpeace International. "People wouldn't eat rhinoceros or any other land creature that they knew was threatened by extinction. But they're eating fish like orange roughy without a clue to what's happening."

Peter J. Auster, science director of the National Undersea Research Center at the University of Connecticut in Avery Point, said knowledge and moderation

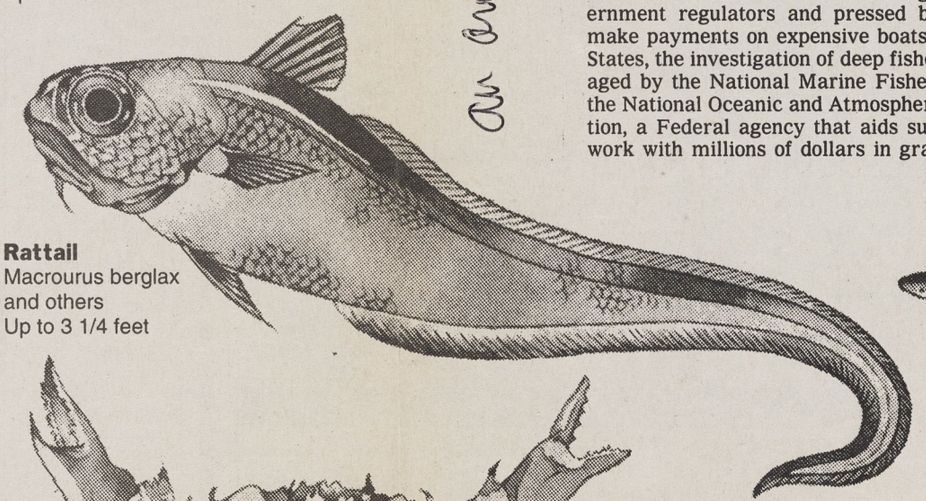
Continued on Page B6



Orange roughy
Hoplostethus atlanticus
11 3/4 inches

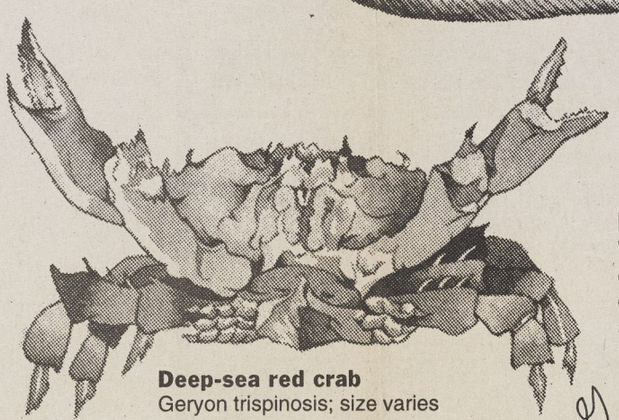


Dory
Zenopsis ocellata and others
Up to 2 feet



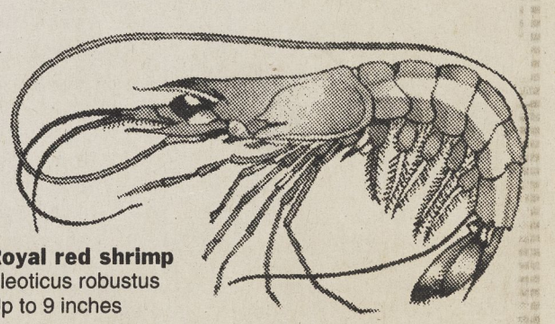
Rattail
Macrourus berglax
and others
Up to 3 1/4 feet

Spiny dogfish
Squalus acanthias
Up to 4 feet



Deep-sea red crab
Geryon trispinosis; size varies

Eat It First, Study It Later?
With many newly popular table fish coming from great depths, there is concern about depletion, especially of species now known to grow and reproduce slowly.



Royal red shrimp
Pleoticus robustus
Up to 9 inches

The New York Times; Illustrations by Alexis Seabrook

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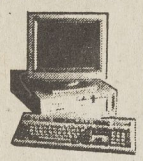

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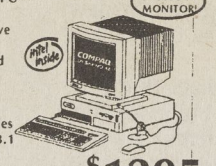

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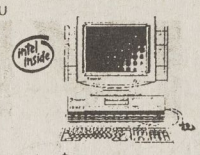

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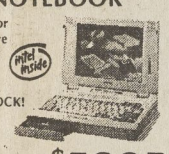

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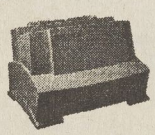

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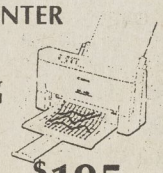

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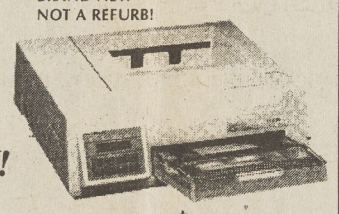

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Home

Phrases + Thinking

Formulas for hunting, then are inadequate, for Raven. They think. They find your routine + beat it. (Cite the research showing learning [:] in ravens.)

Last time the bird in the corridor. I saw tracks, but no bird. And walked down w/ the pup + saw rabbit run across the road far ahead, into a place we can't hunt — then s- here flying across.

Undo Phil

Vignette: The Dog

hen pheasant in sage,
eye bright and beautiful.
Trying ~~to avoid my gaze~~? wt
to know that I knew she
was there.

~~Cologeri called again~~
~~& will call again~~
~~at about 6:30~~

~~I think we~~ Eyes met,
for a second. (We ~~talked~~
communicated across the gap.)

Concentration makes the dog. Saw a long-tailed rooster in the morning, bright against trees, + took markers which I left it patch of fresh it enters. Went there in late afternoon. Both dogs got the smell, but the first one long gone. Then gave up. Hawk hit every patch of brush around, slowly. And in one it flew a hundred yards away, I heard the point again.

(Pheasant) N/w? Eyl?

Plucking ~~begin~~ save you from greed. The usage of hunting is feathers, + pheasant feathers are the tastiest I do.

But the sound is sublime. as far as you can get from Pheas. in Cannes? mushroom soup - the standard can. recipe.

Cooking - 1 Nov

Rooster (probably) comes from
Anc Eng th rooster, to roast.

(See roster entry in A&D)

and that's the way to cook him,
if he's an adult with long
spurs.

Sept - Dec.
Nov?

We eat well here most
days, but at all the meals -
of fish, game, or whatever -
the best are the Gallinaceous
birds, and of them the
top are pheasant, ruffed grouse,
grouse, & young partridge.)
Game birds:

Rooster = roaster,
in dutch.
See dictionary

Plucking birds: Tara took pity on me.
I think one ought to make the most of a
gamebird, as does Tara. She spun the
time between chopping your own Thanksgiving head
off + plate-wrapped, Hormel-fed, battery
raised, ~~fair~~ unreasonable facsimiles of a bird w/
a few savory bits further. Bred to be
easy to pluck automatically.
Tara believes in plucking by hand, saving the
neck + feet + giblets.
Plucked Thousands for Cecil, who had a
real hunting horse, took it where most
men fear to walk, + brought back 15-20
grouse at a time. (Heart problem?)

South Dakota Outdoor News

Media Service Center
South Dakota Department of Tourism
711 E. Wells Ave.
Pierre, SD 57501-3369
Ph. 605-773-3301/1-800-952-3625
Mark Kayser, Outdoor Promotions Manager

WINTER WILDLIFE SURVIVAL TACTICS

For Immediate Release

Before man's arrival on the Northern Plains, wildlife survival during a severe winter depended on an animal's instinct to seek out sheltered areas and even migrate out of the snow belt. Herds of bison and antelope drifted south with the storm, sharp-tailed grouse migrated to sheltered river bottoms, and of course, the ever-present prairie dog slept out the weather.

Today, man has altered the landscape and species living there. Bison no longer roam free, and barbed wire prevents antelope from drifting easily out of severe weather areas. Species have changed, too. In states like South Dakota, the ring-necked pheasant has become the predominant game bird, and pheasants require more winter habitat than the native species. So, what is good winter habitat in the Northern Plains?

"Anywhere there is permanent cover," says Steve Riley, a biologist with the South Dakota Department of Game, Fish and Parks. "When you can provide wide shelterbelts, unaltered wetlands, food plots and sizable patches of dense nesting cover, you give wildlife a chance to survive difficult conditions."

This type of habitat not only assists pheasants in survival, but deer, antelope, predators and small game utilize the resource. Plus, permanent cover can assist a farmer or rancher by providing a living snow fence and sheltering livestock.

This was especially evident during the severe winter of 1996-97 when some regions received snowfalls not seen for nearly 30 years. In areas that had permanent protection like wide shelterbelts or habitat sheltered by south-facing slopes, wildlife survived. Landowners making plans for future development of wildlife habitat need to recall how and if wildlife utilized habitat in severe winters. If they didn't use it, ask yourself why they did not use the habitat and then improve your plans.

For information on outdoor opportunities in South Dakota, contact the South Dakota Department of Tourism, 711 E. Wells Ave., Pierre, SD 57501-3369, or call 1-800-S-DAKOTA (1-800-732-5682).

-30-

Pheasants (2)

I will get to ~~to~~ watching pheasants w/o passion a little before I die but am in no hurry. My interest then will be informed by a few thousand miles of chasing them in sweat + rain + snow + thaw. I will remember the pungent smell of their large intestine as remove it carefully by streamside. (No bird I smells as bad or tastes as good as a pheasant, though wild turkeys + sage hens are in the race.)

The special gift of pheasants is that they make farmland exciting. Farms aren't pretty, most of the year, but they're pretty wherever there's a cock pheasant. He keeps fall ~~was~~ alive thru white winter + gray spring + burnt summers. In the open autumn you don't see a pheasant much except when you flush him, but his presence (imagined or real) puts life in every brushy hedgerow + willow bottom + field of uncut alfalfa or tall grass. You look + yearn.

Everyone in MT prizes pheasants. (Same in PA). The boy of downwind in the gas service station knows all about pheasants but isn't sure what a partridge is. There are prob. 10 times more pa than ph in MT

Pheasants (3)

Old ~~dog~~ pointer men often explain pheasants. Pointers can't handle 'em, they say. But pointers handle 'em better than anything else in the three-legged cover pheasants love. When you push them into cottails + cattle bottoms, springers + retrievers do better, but they're not as good in the field.

But they ruin your dog, say the old boys. Show me a pointer that can handle pheasants. More truth to this. Takes brains + experience to handle the tough 3 - ph, pa, grouse. (We don't often breed for brains anymore.

Utah has all three. Prefer pheasants, backed up by pa + grouse. (?)

Take the 3 - flush cock in fairweather, 11/88, as a starter.

Pheasants

All very well for jaded / old hunters to say that the ones that get away are best. True for the rare sometimes. But when you have just 3 or 4 Saturdays to hunt all year, a pheasant that get away ~~is plain~~ hurts. Memory doesn't ease off for years. You really want a bird for Thanksgiving.

Taste. False analogy to chicken, or at least to turkey. No more meat than a scrawny chicken, but enough flavor to make 2, 3 splendid meals for 2's, if you squeeze all the taste out. ~~Sour~~ wild rice, chestnut stuff — all flavored by some of pheasant taste.

To watch, instead of to shoot, is a higher level of consciousness, but I don't want to get there soon. To get that far above my primitive self is to get half way to that place in the sky where everyone sits around ~~sitting~~ swaying ~~their~~ harps in white gowns. The harps hide the girls bodies there & you don't even want to lift up the sheet for a peak. You're above that. You don't eat anymore (there isn't enough land to feed all those souls), & you don't chase anything. You have what you want, which is to sit around thinking lofty things. I like this better.

LEGISLATIVE UPDATE

Pheasants Forever is proud of the introduction of a bill in the U.S. Senate to extend the Conservation Reserve Program for 10 years, and urged farmers and conservationists nationwide to ask their senators to support it.

The bill, S.2437, was introduced by Sen. Kent Conrad (D-N.D.) and Sen. Tom Daschle (D-S.D.) to serve as a rallying point for senators who support re-authorization of CRP in the 1995 farm bill.

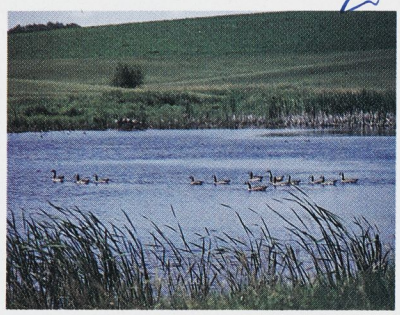
"We salute Senators Conrad and Daschle for leading the fight for CRP in the U.S. Senate," said Pheasants Forever Executive Director Jeffrey Finden. "Clearly, they understand how important CRP is to promoting conservation, increasing farm income and keeping down the cost of farm programs. We encourage other senators to co-sponsor the legislation and support continuation of CRP in the 1995 Farm Bill."

Since 1985, nearly 36.5 million acres have been retired in the Conservation Reserve Program. Unless the program is renewed in the 1995 farm bill, millions of acres will be returned to crop production. According to many studies, eliminating CRP would reduce farm income, lower grain prices, increase government subsidies and eliminate billions of dollars in soil, water, and wildlife conservation benefits.

Conrad and Daschle are members of the CRP Working Group, an informal caucus of U.S. senators and representatives who favor strong conservation provisions in the 1995 farm bill.

Next to my whistle and bell, the most important item in my vest when it comes to my dogs is a water bottle. Whether it's the hot weather of the early season or after freeze up, the need for fresh water during a hunt is constant for my hunting dogs. Since many of my hunts take me out for two or more hours, I find a portable water bottle of some type a must. I've found nothing beats a syrup bottle with a pop-up top for this use. — Pheasants Forever Special Projects Director Jay Johnson.

PROFILES IN CONSERVATION



US West donations have benefited wildlife habitat — and wildlife.

US West Communications has been a major sponsor of the Washington Game Bird chapter of Pheasants Forever over the past four years. US West's contributions of $20,000 have helped the chapter develop 4,657 acres of habitat. A large portion of that habitat (3,266 acres) has been wetlands, which provide benefits to various game and non-game species. US West has also helped the chapter develop a professional quality video that highlights the chapter's habitat projects for the preceding year. The video is shown at the chapter's annual banquet, as well as at a huge sportsman's show in the Seattle Kingdome. Beyond the annual $5,000 cash contribution, US West donates miscellaneous products, including — what else? — a cellular phone for banquet use.

PHEASANT FACTS

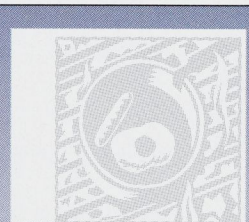
IN NOVEMBER, pheasants move toward thicker cover. If shelterbelts, wetlands, idle grass areas and crop fields are properly located, the pheasant need not move far. Ideally, these covers should be located within 0.2 miles of each other. The average cock moves 0.4, the hen 0.6, and young birds 1.6 miles. Food consumption is 33 percent higher in November than in October. Fewer weed seeds and insects are eaten. November blizzards have the least effect on birds since they have ample fat. A February blizzard can be fatal. December hens continue the weight gain they started last September. Young hens weigh 13 percent more than the adult. Even when food is not a winter problem, amount of daylight is. September birds had 12 daylight hours to dine, December provides nine. This means consuming 20 percent more food in 25 percent less time.

Ken Solomon
PF Regional Representative

STUFFED PHEASANT FILLETS

4 pheasant breast fillets, tenderloin attached
6 cups fresh French bread, cubed
1/4 cup chopped onion
1/4 cup chopped celery
2 cups chicken or pheasant stock
1/4 to 1/3 pound sausage (chorizo, Italian or Cajun)
2 tablespoons butter

Place fillets with silverskin side up. With a sharp knife, make a series of shallow cross-hatch cuts through the silverskin so it won't shrink when cooked. Flip the fillets over, silverskin side down. Make a sideways cut through the highest part of the fillets, starting about the middle of the fillet but not going all the way through. You are opening a flap in the thick part of the fillet. Prepare the stuffing by cubing the bread or chopping it in a food processor. Saute the sausage. (If the sausage has a skin casing, cut it open, chop up the meat and then saute it.) Place the chopped up bread, cooked sausage, vegetables and stock in a bowl and mix well. Tinker with the ingredients until you have a mix the consistency of stiff cookie dough. Preheat the oven to 325 degrees. Lift the flap and fill the pocket in each breast fillet with as much mix as it can accept. To close the flap, bring up the tenderloin from the opposite side of the fillet and pin it with toothpicks to the flap you cut earlier. You now have a filling mix surrounded by pheasant. Saute the stuffed fillets briefly in butter in a saucepan, then remove the fillets to an uncovered baking dish. Bake to an internal temperature of 180 degrees F, about 1 to 1-1/2 hours. Serve with gravy or any sauce you like.



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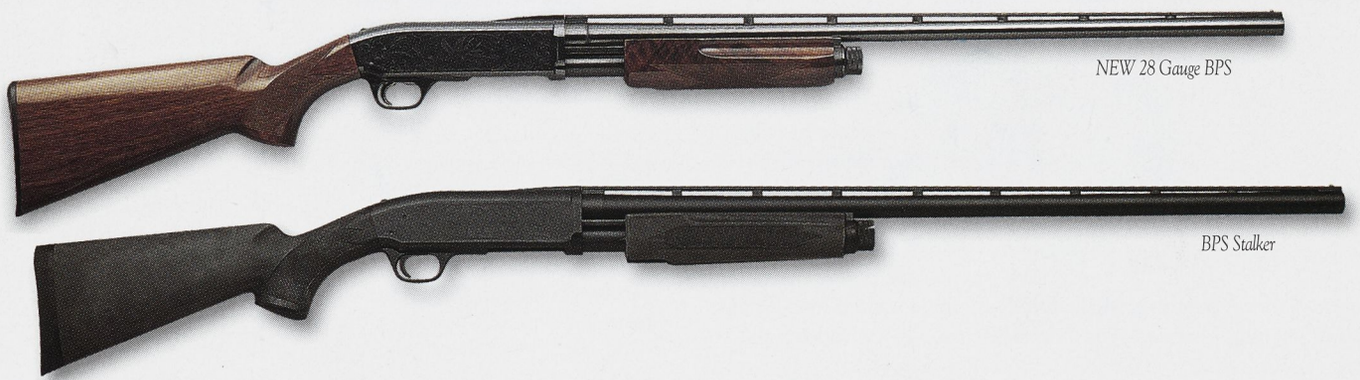

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The pump's simple but reliable design makes it the "workhorse" of shotguns — but that's no excuse for shoddy construction or a second-rate appearance. In fact, it's all the more reason you need the hard working features *and* rugged good looks *and* superior craftsmanship of the BPS.

Quality you'd expect in an over and under. Most firearm manufacturers don't consider pump shotguns worthy of the extra workmanship of their more expensive guns. As a result, the quality of the materials and craftsmanship is usually compromised. Not the BPS! The stock and forearm are made from beautiful, cut checkered select walnut. Weather-resistant Stalker models are constructed from the most durable composite materials available; graphite and fiberglass. Wood-to-metal and metal-to-metal fits are tight. The receiver is handsomely engraved with game scenes. A high gloss finish provides extra richness and durability.

Built better for better performance. A solid steel receiver stands up to the rigors of a duck blind, boat bottom and rugged use. The action of the BPS is sound and reliable. Double action slide bars are machined from heat-treated steel to eliminate twisting and binding and ensure smooth operation.

Advantages only on the BPS. The BPS is the only pump shotgun with bottom ejection and a top tang safety. Bottom ejection throws empty shells at your feet, not all over the landscape. The top tang, thumb safety is easily operated. For consistently uniform patterns and less felt recoil, 12 and 20 gauge models have back-bored barrels. The new 28 gauge BPS has the versatility of the Invector choke tube system.

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A pair of common ravens roost in a conifer.
James Brandenburg; Minden Pictures

Pheasant is another super-species, circumpolar.

A Birdbrain Nevermore

When put to the test, ravens display insight

by Bernd Heinrich

The ancient Vikings revered ravens as messengers of the gods, and Native Americans of the Pacific Northwest gave the raven the role of benefactor in their mythology. Even today, in Ireland, a wise person is said to have "raven's knowledge." How has the raven acquired this reputation? Is the bird truly intelligent? Just what do we mean by animal intelligence, and how can we measure it or distinguish it from instinct or from learned behavior? My many years of experience with ravens, both wild and tame, have given me great respect for these birds and led me to devise ways in which to test behaviors that have struck many generations of observers as downright clever.

The underlying assumption of intelligent behavior is not performance but consciousness, something nearly impossible to test directly. Nevertheless, animal consciousness has increasingly become an object of scientific inquiry. Donald R. Griffin, a professor of zoology formerly at Rockefeller University in New York, defined consciousness in terms of intentions. "An intention involves mental images of future events in which the intender pictures himself as a participant and makes a choice as to which image he will try to bring to reality.... The presence of mental images, and their use by an animal to regulate its behavior, provide a pragmatic, working definition of consciousness."

Few people would quibble with the idea that an animal that can visualize a problem and its solution demonstrates intelligence, or a capacity for insight. Insight is not a function of complexity of response or of seeming purpose, or "goal-directedness," in behavior. If it were, then insects might be considered some of the most intelligent animals on earth. But most of the complex behaviors of insects are encoded at birth on the animals' nervous system, part of their evolutionary inheritance, their "instinct." (At the other extreme, humans have intelligence, yet an impartial observer might point to all sorts of irrational human behavior that could demonstrate lack of insight.)

One of the first scientists to attempt to show that animals other than humans have insight was Wolfgang Köhler, who in 1917 reported on some then extraordinary observations of chimpanzees. Köhler had placed a banana out of reach of six hungry chimps in a room that contained a wooden crate. Most of the chimps eagerly jumped up, trying to grab the banana. One of them, however, held back, then pushed the crate under the banana, climbed on top, and grasped the fruit. Was this a lucky coincidence, instinct, learning, or a demonstration of insight? In 1984, researchers at Harvard University gave pigeons a variation of the banana test. Like the chimpanzees, the birds could push a perch to reach food, but they first had to be taught to move the perch and also to hop onto it. No pigeon spontaneously "got the idea" without prior learning.

Insight in birds had been posited at least fifty years earlier by a number of researchers who described caged birds such as finches and tits pulling on strings to draw food toward them. Although some researchers thought that this behavior showed insight, others pointed out that it could have developed gradually by learning instead. The few critical studies of this behavior showed slow learning but no sudden leap of performance, as might be supposed if the bird had a sudden mental flash of the problem and its solution.

What I'm leading up to, of course, is ravens. Many people would like to believe that such magnificent birds are intelligent, and I thus here state my bias. I love ravens and their relatives the crows. But my appreciation of them is not altered one whit whether their behavior is guided by insight, by intricate learning, by evolutionary programming, or by some combination of all of these. Whatever its origin, their behavior is remarkable. That said, I will also venture to comment that published proof of the raven's intelligence is nonexistent. The raven's braininess is, so far, not a matter of fact, any more than are its fabled cunning, divining powers, mischievousness, and sense of humor, although all these were accepted as truths for centuries. What has passed for raven intelligence can conceivably be explained by other hypotheses.

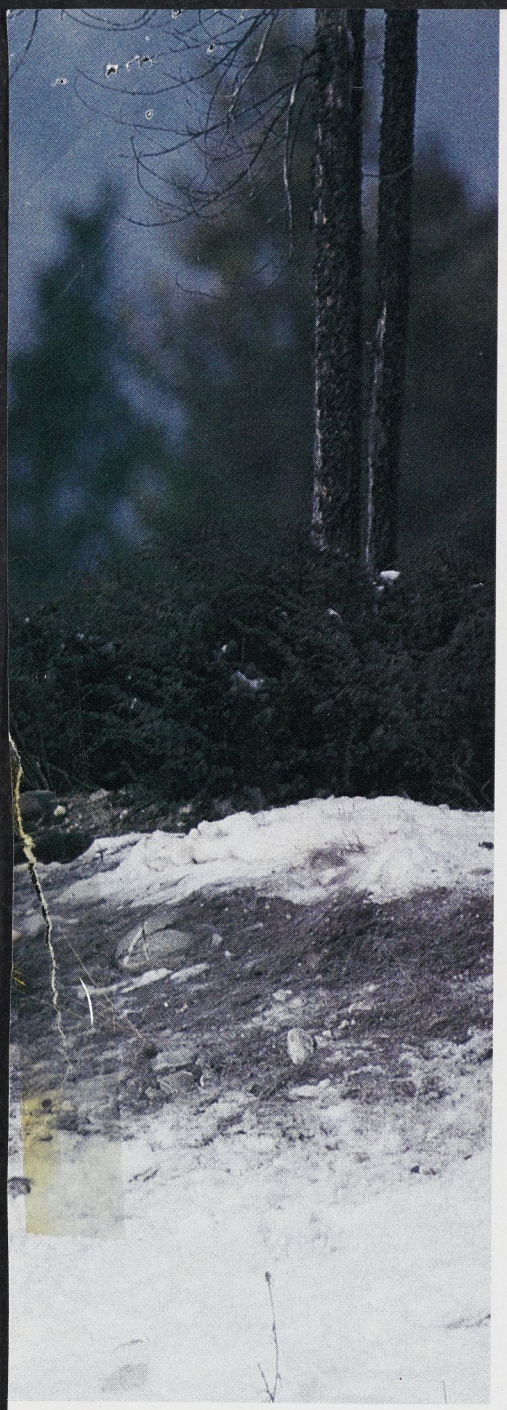
I have applied this conservative approach to numerous reports of raven intelligence. A note in a recent ornithological journal, for example, describes a pair of ravens throwing rocks at two researchers who had climbed to the ravens' nest on a desert cliff. The distraught raven parents remained directly above the interlopers, dislodging stones that dropped onto them. So far so good. But was this a *calculated* response to a threat? It may have been, but I believe a simpler explanation exists. Whenever I have climbed up to ravens' nests in Maine and Vermont, one or both of the parents usually stayed and displayed their anger by landing close to me, all the while violently hacking at anything near them. Since these were tree nests, the birds, unlike the cliffside ravens, had a number of perches available to them. They perched on trees near but not directly above me, and the twigs they tore at fell to the ground instead of on me. Thus, the ac-

tion of the rock-throwing ravens could have been basically the same as that of the frantic tree-nesting ravens. Context could make the raven behavior on the cliff appear to be intelligent and that in the forest irrational.

A second published report describes a raven jumping up and down on a lawn where voles had tunneled beneath the snow. The author concluded that the jumping was a deliberate attempt to flush out the voles. Yet I have observed hundreds of ravens in New England perform such jumping-jacks whenever they are nervous near potential food. They do it off snow as well as on, and next to a dead raccoon as well as next to any strange object, and sometimes merely if they are skittish.

Another class of often reported "evidence" for raven intelligence involves birds working in teams to achieve a common, rational goal. In the usual scenario, a predator (such as a wolf, fox, or eagle) holds food that a pair of ravens want. One raven will perhaps sneak up behind the feeding predator and bite it on the tail, and when the predator turns around to face its assailant, the second raven rushes in to grab the food. This can indeed happen, and it often has been cited as an example of foresight and intelligence. But ravens (and crows) will also harass dogs and other predators in the same way when no food is in sight. My pet crow has amused me many times by its habit of biting the tail of my neighbor's dog. And my tame ravens similarly approach and nip strange and potentially threatening objects or animals. If several ravens discover an eagle eating a fish, they will loiter nearby, waiting for an opening. One of the birds might tweak the predator's tail for any of a number of reasons. Another bird then seizes the opportunity to grab a meal. No conscious foresight needs to be presumed to account for the superb cooperation. Insight is certainly not excluded, but it is not demonstrated in a scientific sense.

Some behaviors, however, defy easy explanations. When feeding on suet, ravens, crows, blue jays, woodpeckers, chickadees, and nuthatches usually hack or tear off bite-sized portions in a feed-as-you-peck strategy. Near my home in Vermont, a pair of ravens often came to feed at suet, but remained nervous in the presence of humans and tried to minimize the



Avid scavengers, ravens gather at carcasses. At left, an aggressive raven distracts a wolf at the remains of a bighorn sheep. The birds often fly at and nip predators and in the process gain access to a windfall of meat. With the wolf in abeyance, a flock, below, divides the spoils.

Both photographs by Michael H. Francis

amount of time spent near the house. One day I inadvertently flushed one of the members of the pair from a large, frozen chunk of suet. Instead of pecking at the lump and extricating bits of the fat, this bird had chiseled a groove three inches long and more than a half inch wide. Scraps of fat were adhering to the groove, so that if the bird's objective had been to eat, it could have done so easily, then and there. Yet by gouging out a sizable portion, the raven (had I not flushed it) could have removed and carried off a much larger piece of suet than it could have eaten piecemeal in the same amount of time. It appeared to have sacrificed immediate gratification, and expended a considerable effort at the time, for a greater reward later. Its suet carving appears to be a vivid inscription of a raven's mental plan.

I devised an experiment to test for the role that consciousness might play in behavior. I needed to present the animals with a simple task that required many separate steps. In addition, no reward could be given for partial completion of a task, so that learning one step at a time would be eliminated. (Such an approach contrasts strongly with the usual learning paradigm, in which a researcher or trainer conditions an animal to complete a task by gradually shaping its behavior through rewards.)

My subjects were my tame American crows and common ravens, which I had kept for more than seven years. The first birds I investigated in detail were housed in an outdoor aviary abutting a picture window of my house. In addition to a long, horizontal pole for perching, the cage contained small trees. The ground was covered with leaves in fall, snow in winter, and greenery in summer. Thus, it was not a cramped, confining space with a single perch, where bored animals are apt to pull or yank on anything. In this enclosure, the birds had a choice of many behaviors.

I gave these hand-reared birds a simple mechanical problem that involved pulling a string to manipulate a piece of meat from a distance. The birds had never seen or used string. I suspended the meat from their horizontal perch by a string some twenty-five inches long. Humans can easily visualize a solution: to obtain the meat a bird would have to land on the perch above it, reach down with its bill, pull up a loop of string, step onto the string to an-

To reach a chunk of meat suspended from a twenty-five-inch string, a tame raven, wing-marked for identification, reaches down, tugs the string, anchors it with its foot, and then repeats the process several times in a precise sequence.

Photographs by Bernd Heinrich

chor it, release the bill, reach down again to pull up another loop, and so on, in a repeating cycle of more than twenty steps until the meat was raised to the perch. All of the steps have to be executed in a precise sequence. Because each of the mechanical steps is extraordinarily simple, the task itself is simple—if a creature has insight. The problem is more complicated for a bird that has no concept of string or what it can do. I doubted that a bird could solve the problem without a lengthy, tedious learning process.

When I left the dangling meat, both of my crows (which I had not fed in a day so they would be suitably hungry) immediately showed an avid interest in the food. They examined the hunk of meat, flew at it, then pecked and pulled at the string where it was attached to the perch. But being inaccessible, the meat was ignored within fifteen minutes. After the first day, I fed the crows without satiating them and continued to watch at the picture window to be absolutely sure I didn't miss anything. I finally stopped watching but left the meat hanging, changing it on subsequent days and offering all sorts of delectables on strings. Thirty days later the bait was still hanging. The crows had failed to figure out how to gain access to the meat, and although I suspect I could have taught them, I did not. I was interested in what they "knew," not in what they might learn.

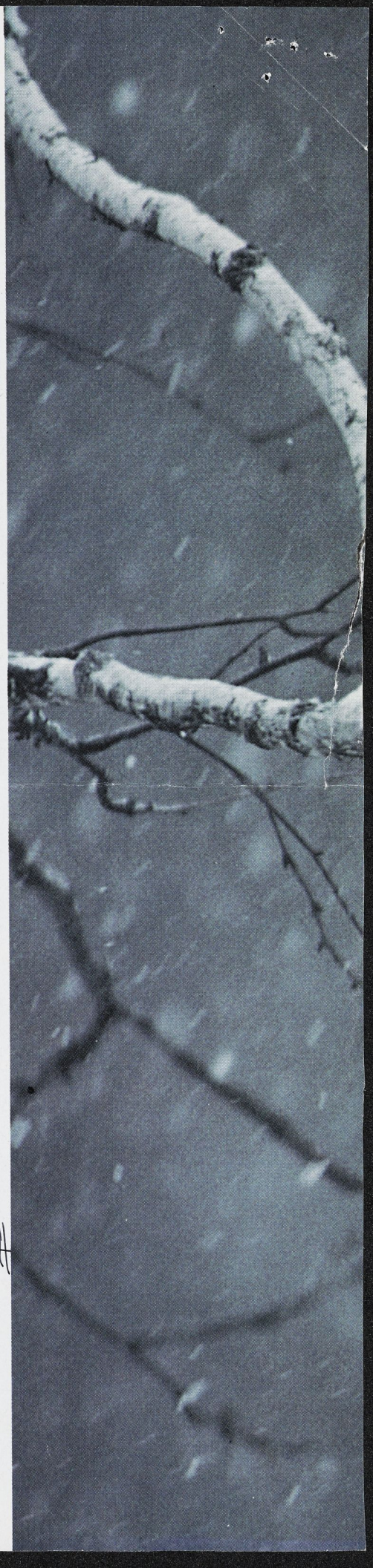
The crows were interested in the meat because when I lifted it up and placed it on the perch, they invariably grabbed it and tried to fly off with it. Each time they did so, the meat was yanked out of their bills before they had flown two feet. They did not comprehend that it was attached to something. However, after five and nine such trials, respectively, the two birds refused to fly off, and instead ate the meat in place on top of the perch. If they were induced to take flight, they then always dropped the meat first. This showed that they could quickly learn to avoid having the food wrenched away, but they still did not draw the conclusion that they could pull the meat up by using the string. These results were precisely what I had, with my cautious biases, expected.

Then, in the same aviary, I gave the

same test to five tame ravens. The ravens also immediately closely examined the dangling meat, but I had the impression that they retained an interest in it even though they were not instantly able to reach it. Unlike the crows, they kept glancing at it, as though studying the situation. After about six hours, one raven landed again on the perch, reached down to pull up a loop of string, stepped on it, reached down again, and proceeded to complete the whole sequence of pull-step-release-pull to reach the meat. I was amazed; I knew that the bird had not "practiced" at all, because I had been watching the ravens without pause for six hours. This bird had performed the sequence flawlessly on its very first attempt. I now chased the bird away from the perch before it had a chance to feed. When it took wing, it spontaneously dropped the meat. Within seconds it was back, eagerly pulling the meat up with the string. Now it could not be kept away. Every time I chased it, it dropped the meat before lifting off. The behavior had not been a fluke. The bird "knew" how to get the meat. Furthermore, it knew enough to drop the meat without any trials or practice.

Three more of the five tame ravens (all marked with conspicuous numbered tags on the wings) followed suit, showing sudden proficiency in the string-pulling task. While these birds could have learned from the first raven, I doubt that this was the case. Several days had passed since the first raven's performance, and two of the other ravens used a "side-step" rather than a direct "pull-up" technique to hold the string. Learning through observation would not preclude insight on the part of these birds, yet the critical maneuver—pressing and holding the string to the perch—would have been difficult for them to see at all. Like the first raven, none of these ever attempted to fly off with meat they had pulled up. These results are very simple to explain if the ravens had a mental picture of what they were doing. If they did not, then the outcome is puzzling. I wanted to test the simplest hypothesis, that they "knew," even further. To do that, I first needed to try to trick them.

Did the ravens now automatically asso-



With four-foot wingspans, common ravens are the largest of perching birds. They live year-round in the colder mountainous and forested regions of North America, Europe, and Asia.
James Brandenburg; Minden Pictures

ciate string with food, and would they pull up any string without examining whether or not meat was actually attached? I hung two strings, close together, from the perch. One held a piece of meat and the other a stone of equal weight. I expected both to be pulled up with nearly equal frequency. But in over one hundred trials, the ravens never once pulled up the rock. In their haste, however, the ravens often contacted the wrong string by pecking it or giving it a brief tug. These mistakes were precisely the ones I now found useful in delving into the basis of the birds' behavior. One tug was generally enough to let a raven decide whether or not to continue the entire sequence of steps, and I had the distinct impression that the ravens looked down as if to watch the meat. If they saw the meat move, they knew they had the right string. If the rock moved, they jumped back immediately to correct their mistake.

Eventually they learned to look even before they tugged, and I was able to test more specifically what they looked for. I crossed the two strings, fixing them in place with fine thread. Two of the ravens consistently first tugged on the wrong string (but still only pulled up the right one). Their consistency of choice amazed me. They made the same mistake twenty trials in a row, as if not only unable to learn but also unable to try the other string. Their behavior was not random. They were dead wrong, but they were apparently convinced they were right. The other two birds made no mistakes on the crossed-string experiment right from the beginning. Thus, the same overt behavior was based on two internal rules. One said "Pull string over food." The other said "Pull string connected to food."

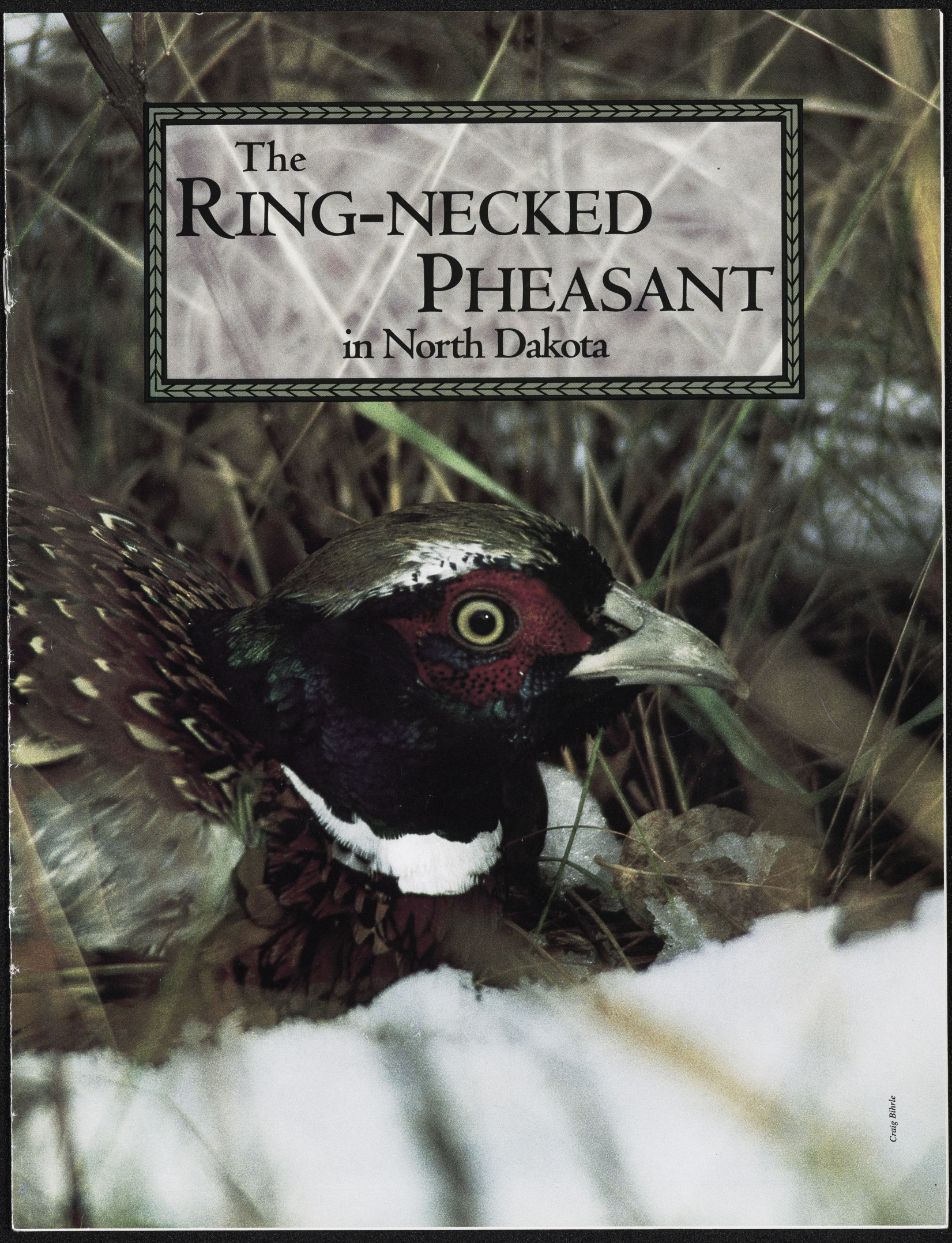
The ravens, so far, had experience only with sisal twine. However, the way to access meat was not to pull on sisal twine, but to pull on whatever happened to be connecting meat to the perch. Had the ravens gotten this essential point or had they merely made an association between sisal twine and food? When I presented them with a choice of green woven string holding meat, and sisal twine attached to a stone, they pulled only the woven string, which they had never seen before. They knew the essential point without ever having learned by trial and error.

I then hung up a sheep's head on which the ravens had been feasting and near it a small piece of meat on another string. I knew that they would be unable to hoist the heavy sheep's head, much less hold the string in place with one foot or even both feet. But would the ravens know this without learning by trial and error? Was their previous success due to a series of mere mechanical steps that miraculously resulted in the appearance of food? As before, the ravens surprised me. They never even once tried to pull up the sheep's head. They acted as if they knew what they were doing.

My five sets of observations and experiments make highly plausible the idea that some ravens can form a mental image of at least one problem and its solution. None of the observations can be explained easily by shoehorning it into the notion that learning occurred in the absence of insight. While insight can follow learning (at least, most of us who teach dearly hope so), the results with ravens show that it can also precede learning.

I later gave the same test to two groups of wild-caught ravens, of fourteen and thirteen individuals, respectively, in a huge outdoor aviary in Maine. After just fourteen minutes, one bird deftly pulled up the meat. But finally, only three birds in one group and four in the other "knew" how to attain the prize. This gap in performance argues against this behavior being instinctual and also perhaps against observational learning. It does support the idea that consciousness is not innate but individualized. As reflected in the perception of problems from pulling up meat to pondering the universe, consciousness covers a great range. (The gradations of consciousness somewhat redeem the two crows and the less brainy ravens that I tested.) Ravens may not be the cunning, clairvoyant creatures of folklore, but the ability of some ravens to see and solve a problem attests to their intelligence. □

The RING-NECKED PHEASANT in North Dakota



Craig Bihrle

PHEASANTS: THE PAST AND THE FUTURE

Among the most successful of introduced game species, ring-necked pheasants are a North Dakota favorite.

Past

No game species introduced to this continent has been as successful as the ring-necked pheasant. One of more than 40 species originating in Asia and Asia Minor, these birds from the genus *Phasianus* are perhaps better known than any of the other 15 groups of pheasants in the world. All are related to the partridges, quails, grouse and guinea-fowls which make up the order *Galliformes* or chicken-like birds.

Archeological evidence suggests that large pheasants lived in southern France in the Miocene period, some 13 million years ago. The Greeks knew the bird in the 10th Century B.C. and we have adopted their name for the species, *Phasianus ornis* (phasian bird), derived from the Phasis River (now Rion) near the Caucasus Mountains. The Chinese knew the pheasant some 3,000 years ago, but the Romans are considered responsible for the spread of pheasants in western Europe. When Julius Caesar invaded England in the first century B.C., the pheasant followed.

It wasn't until 1733 that the pheasant appeared in North America, when several pairs of the black-necked strain were introduced in New York. Other pheasant varieties were released in New Hampshire and New Jersey later in the 18th century.

Not until 1881, when Judge O.N. Denny released some 100 pairs of Chinese ring-necks in the Willamette Valley of Oregon, did the pheasant really gain a foothold in the United States. Since then, pheasants have been propagated and released by government agencies, clubs and individuals, and for all practical purposes are established everywhere on the continent that suitable habitat exists.

North Dakota Game and Fish Department files show the earliest stockings in North Dakota were 75 birds in 1910. These birds were housed at the old St. John Hatchery and some birds were raised from eggs produced by these adult hens. There were no important introductions again until 1915 when pheasant stocking operations were carried on by the Bottineau and Grafton state game farms.

In 1911, 40 pairs of pheasants were purchased at Grafton at $4.75 per pair. These were apparently some of the birds originating from a dozen eggs purchased from Oregon by W. H. Williams of Grafton in 1904. In 1917 a well-publicized release of 28 pheasants was made on the Kendal farm near Oakes in Dickey County.

Undoubtedly the biggest stocking undertaken in those early years by farmers, sportsmen, and the Game and Fish Department was in the spring of 1932 when 15,460 wild birds were trapped in Dickey, Sargent, and Richland counties and released in 45 counties across the state. The estimated cost was $.50 per bird, and they were captured by the use of spotlights at night.

Stocking of pheasants in North Dakota has continued since then. From 1910 through 1987, 226,667 pen-reared pheasants have been released and 50,191 wild birds have been trapped and transplanted to other areas in the state. Which stockings were the most important in North Dakota is unknown. As early as 1930 it was apparent that the first areas to experience rapid population increases were located in the south, especially in Dickey, Sargent and Richland counties. It was in this area that the first open season on pheasants in North Dakota was held in 1931.

Although stockings since the 1930s have introduced new genetic variation to the pheasant population in the state, they have

Ed Bry

Pheasant stocking in North Dakota began in 1910.

This was inserted in N. D. Outdoors, Feb. '92.

done little, if anything, to increase total pheasant numbers, which are largely dependent upon habitat availability.

Once viable populations are established, land-use patterns are the most important factor in pheasant survival. Although the pheasant is highly adaptable, it, like any other organism, has requisites of food and cover.

The state's highest pheasant populations occur in areas devoted to row-crop agriculture where 20 to 45 percent of the land is in small grains and wild hay, and less than 40 percent is in corn and alfalfa. Where cultivated lands and permanent vegetation are interspersed, pheasants thrive.

As might be expected, pheasant populations in an area without much cropland are not stable, and greatest numbers are found near marshes, shelterbelts, streams or small cultivated areas. In contrast to prime pheasant range, wild sunflowers, grasses and ragweed become very important to pheasants in areas that are not cultivated, and like the prairie grouse, the adaptable ringneck in those areas also eats a variety of berries, particularly in winter.

During the relatively short history of pheasants in North Dakota it has become apparent that even a small amount of cover means much to pheasants. Land set-aside booms have come and gone, and the pheasant has fluctuated with these increases and decreases in cover. Where intensive farming has removed fence rows, drained and leveled wetlands, and narrowed roadsides, pheasant numbers have dropped.

From a game manager's perspective, every unit of land has a given carrying capacity. Where nesting habitat, winter cover or winter foods are lacking, carrying capacity is diminished.

Interspersion or diversity of cover types also determines the productive capability of pheasant range. A solid 640 acres of corn or grass might provide abundant food or nesting cover, but it lacks other habitat types essential to a pheasant's life.

Thus, like any other organism, the pheasant is completely dependent on suitable habitat. Unfortunately, habitat that produces high wildlife numbers is often incompatible with agricultural or urban land-use patterns. Nevertheless, many methods of habitat management and restoration can be wholly compatible with farm improvement practices and urban land development. Implementation of these practices by private landowners could greatly improve the outlook for the ring-necked pheasant in North Dakota.

Craig Bihrle

The addition of thousands of Conservation Reserve Program acres to the habitat base in North Dakota has brightened the prospects for pheasants in the near future.

SPRING: COURTSHIP AND NESTING

Early March 1992

The annual turnover rate in a pheasant population is about 70 percent. Thus the nesting season, when new birds hatch, is a critical time of year for the ring-necked pheasant in North Dakota.

As spring approaches, distinctive changes occur in the ring-necked pheasant. In response to lengthening days, the pituitary gland in the brain becomes active, triggering the production of hormones which stimulate courtship behavior. The courtship dance marks the beginning of the reproductive cycle; spring is a natural point at which to begin a description of the pheasant life cycle.

In order to cope with the rigors of mating, nesting and brood rearing, hens attain their peak weights in spring; they must gather reserves of energy to support egg-laying and to produce the heat necessary for incubation.

Usually beginning in late March, and peaking in May, roosters claim territories. Within these areas, which may range in size from a few acres to a half section or more, the roosters strut and crow, tolerating no intrusion by other males. A rooster's raucous crowing, followed by a rapid beating of wings, proclaims that this is his territory; his aggressive behavior apparently demonstrates to prospective mates that his is desirable genetic material, and that his offspring are likely to be hardy.

The second and most dramatic phase of courtship occurs after the hen is attracted to a rooster's territory. He approaches the hen, tilts his body toward her, spreads his tail feathers, and extends one wing downward. His head is held low with ear tufts erect and neck feathers flared. The lores (or wattles) on the sides of his head turn a vivid shade of red and swell until they nearly touch on top of the head. His yellow eyes appear vacant, and he seems to be completely ruled by the biological instinct to reproduce.

Early in the season, hens show little if any interest in the rooster's displays. They may watch briefly, then continue feeding. As the nesting season approaches, hens become more attentive, and finally they select roosters with which they will breed.

Pheasants are polygamous, and a rooster will gather as many hens as possible into a "harem." In North Dakota the average harem is three or four hens, but it is not unusual to see as many as eight.

The gender ratio in the spring breeding population usually averages about 2 1/2 hens per rooster. Since harems average three or four hens per rooster, there are always roosters which do not mate. "Bachelor" birds tend to be a disturbing influence in the breeding population, roaming about as they try to gather their own harems, picking fights and assaulting hens.

All of these bachelor roosters and even many of those which did acquire mates, are surplus to the reproductive needs of the species. A spring sex ratio of six to 10 hens per rooster would be sufficient to ensure species reproductive success.

After fertilization takes place, courtship ends. The hen chooses a nest site, lays and incubates the eggs, and broods the chicks with no help from the male, whose reproductive role ends with mating.

Ed Bry

Left: As the nesting season approaches hens become attentive and select roosters with which they will breed.

Above: A nesting hen lays eggs at a rate of about one per day until her clutch is completed. She may lay up to 20 eggs, but frequently lays less. The average in North Dakota is 11 eggs.

Early in the nesting season, hens may seem rather careless about egg laying. Eggs may be dropped at random and left unconcealed.

Later, a hen may initiate a nest, lay a few eggs in it, and then abandon it. Frequently, several hens lay eggs in a single nest, termed a "dump nest" by biologists. It is not uncommon for a dump nest to contain 20 to 30 eggs. As spring progresses, random egg laying ceases.

Pheasants are ground nesters, whose nests consist of small depressions lined with grass, leaves and other plant material. Down, feathers and additional vegetation are added as egg laying and incubation progresses.

Nests are established in a variety of vegetation types, and studies suggest that local availability dictates the hen's choice. In some states, pheasants rely heavily upon small grains for nesting. In North Dakota most of our small grains are planted too late in spring to be able to provide quality nesting cover. The small grain harvest normally begins during July, well after the peak of the pheasant hatch. Hens that lose early nests and choose small grain fields as renesting sites may also be successful, even if fields are harvested prior to hatching, since stubble is normally left high enough to provide sufficient cover and many hens return to complete incubation after harvest.

Predation of nests is lower in small grain than in any other cover type because nests are spread over a large area and nest predators, such as striped skunks, are more likely to hunt in strip cover such as fencerows and roadsides.

Alfalfa is attractive nesting cover in North Dakota. However, a high percentage of nests in alfalfa are destroyed by mowing, which occurs just prior to the peak of hatch. Often these nests become death traps for incubating hens. Chicks that do hatch before mowing are usually too young to escape the swather and hens are often killed with their broods as they try to protect them.

A nesting hen lays eggs at a rate of about one per day. She remains at the nest only to deposit eggs, which may number from one to 20 when the clutch is completed; the average in North Dakota is 11 eggs.

When the clutch is complete, incubation begins. Just prior to egg laying, hens shed breast feathers, exposing a bare patch of skin. This "brood patch" is well supplied with surface blood vessels, and keeps the eggs at the proper temperature for hatching. During egg laying, the hen seems only a casual visitor to the nest, staying just long enough to deposit each egg. During incubation, however, she leaves the nest only for a brief period each day.

Pheasant eggs require approximately 23 days of incubation. During this period, the hen turns the eggs frequently. Although eggs are laid individually over a two-week period, incubation of all eggs begins at the same time and all hatch within a few hours of each other.

When development is complete, the chick uses its egg tooth, a projection on top of the beak, to cut the cap off the large end of the egg. Although pheasant chicks hatch from May through August, studies indicate that from 30 to 60 percent of all chicks hatch during the last two weeks of June. The chicks emerge as wet balls of fluff supported on spindly legs. Pheasant chicks are precocious, capable of leaving the nest soon after hatching, and the hen will lead the brood away from the nest as soon as they are dry.

The majority of nesting failures can be attributed to three factors - farming operations, predation, and nest abandonment. All have varying effects from area to area and from year to year, but generally when abandonment rates rise, nest failures from predation and farming operations fall, and vice versa. Generally speaking, high nesting success occurs in years when spring weather is warm and dry.

Habitat, as a factor affecting nest success, is a much discussed topic, but its true importance - providing secure nesting cover - is seldom fully recognized. Moreover, habitat quality is the one factor in nesting success over which man can exert a degree of control, and thus modify the impact of weather, predation, farming losses and abandonment.

Fertility is not a problem in North Dakota's pheasant population. Examination of hundreds of eggs indicates that fertility consistently averages over 90 percent.

North Dakota pheasants are persistent nesters. Hens do everything in their power to nest successfully, and will make multiple nesting attempts.

Pheasants are not noted for their longevity; average life span of a North Dakota pheasant is less than one year, and few birds live to see two successive hunting seasons. The annual turnover rate in the population approaches 70 percent.

In any year's population, nearly 80 percent of the birds are young-of-the-year. Thus the nesting season, when these replacement birds are produced, is the most important time of the year for North Dakota's pheasants.

A territorial ringneck proclaiming his domain.

Ed Bry

SUMMER: RAISING THE YOUNG

Once chicks hatch, the hen attends them almost constantly until the brood is 8 - 12 weeks old.

Summer marks the brooding stage in the pheasant reproductive cycle. Once chicks hatch, the hen attends them almost constantly; they are highly susceptible to cold, wet weather and cannot survive repeated or severe exposure. Normally the hen remains with her brood until the young are 8 - 12 weeks old.

If a brood is lost, few hens will renest. If a nest is destroyed or abandoned before the eggs hatch, a hen will renest time and again, until she is successful or simply runs out of time, but a second brood is rare. The common misconception of a "second hatch" arises from the hen pheasant's persistence in trying to successfully hatch one brood, and most young pheasants observed in late summer or early fall are the result of renesting, not of a second hatch.

The time required to lay a clutch of eggs, incubate them, and rear the young makes producing two broods in one summer next to impossible. It takes the average hen 13 to 14 days to lay her eggs, 23 days to incubate them, and another 8 - 12 weeks rearing the young, a total of three to four months from start to finish. If a hen were to start a clutch in early May, it would be August before she could begin again. There is just not enough time for her to repeat the process.

However, radio-telemetry studies in which hens were fitted with small radio transmitters and their activities closely monitored, have shown that a few hens that have lost their chicks within a few days of hatching will adopt an existing clutch of eggs and hatch them. Even in these cases two broods are not successfully raised by one hen.

Summer is also an important season for pheasant management. Among the most difficult studies of pheasant populations is the accurate counting of broods. The summer census provides information about the success of the nesting season, of juvenile mortality, and contributes to setting hunting season regulations.

North Dakota Game and Fish Department personnel conduct late summer roadside counts by traveling the same routes each year. This system provides quantitative pheasant information by area, that can be compared from year to year.

Data from these surveys provide game managers with estimates of birds per hundred miles and young-per-adult-hen ratio. These figures are used as post-breeding population indices suggesting population trends from area to area and from year to year. Regulations for the hunting season are based on these trends.

Summer brings many threats to young pheasants, and approximately 35 percent of the chicks die in the first six to 10 weeks following hatching. Causes for this mortality are extremely difficult to document. Dr. Allen Stokes of Utah State University aptly described the scope of

Craig Bihrle

Pheasant broods often appear along roadsides during early morning and evening hours.

this problem when he wrote, "The disappearance of so many thousands of chicks in the short space of a summer, almost beneath one's eyes, and yet not noticed is a baffling experience and an enigma still to be solved." Predation and weather certainly play a major role; automobiles, agricultural chemicals and other hazards also take a toll.

Hens will adopt strays or chicks who have lost their own mothers, and a hen with young of two or more age groups is not uncommon in North Dakota. Broods accompanied by more than one hen are also commonly observed in the summer. This may represent a mixing of two or more broods, or it may be that a broodless hen has attached herself to another hen and her brood. Studies have shown that a hen pheasant may abandon her nest if she sees or hears other hens with chicks.

A newly-hatched pheasant chick weighs slightly less than one ounce. Chicks begin feeding immediately after leaving the nest, and insects make up the major portion of their diet for several weeks. Chicks respond quickly to this protein-rich diet, rapidly increasing in size and strength, reaching a little over half a pound at five weeks, and about 1.5 - 2 pounds at 13 or 14 weeks. Thereafter growth is more gradual.

As they grow, pheasant chicks' plumage changes. Within a few days of hatching, natal down is replaced by drab juvenile plumage similar in both sexes. The primaries, or flight feathers, are the first real feathers to develop, and by the end of its first week, a chick is capable of short flights.

Chicks undergo a virtually continuous molt during the first summer, and begin to replace their juvenile plumage with adult or post-juvenile plumage at about four weeks. Young roosters begin to show colored feathers on their breasts and necks at eight weeks. This molt continues until the chicks are about five months old, and it is almost impossible to tell a 21-week-old bird from an adult by its plumage alone.

Adult hens also molt during this period. They are at their lowest weight of the year after egg laying and incubation, and must use any reserve energy to grow new feathers. There is some evidence that many hens die from this stress. In fact, there are indications that summer hen mortality may exceed winter mortality.

Adult roosters molt in late July and early August and become quite secretive. Until their new feathers have grown, they are seldom seen.

As in the nesting season, suitable habitat remains a primary need throughout the summer. A series of days in the life of a hypothetical pheasant brood can illustrate the variety of cover types they use.

Imagine a brood of nine chicks hatching on June 16 in a nest established in a roadside. Two chicks chill and die in a sudden thunderstorm shortly after hatching.

A little before sunrise on July 5, the seven remaining chicks move around the roost site in a patch of western wheatgrass along the margin of a marsh. They could just as well have spent the night in a roadside or an ungrazed pasture. As the sun appears, the brood moves into a pasture to feed on insects. On another morning, they might be found eating ground beetles, ants and other insects in an alfalfa field.

Later, the brood moves to a nearby roadside. There they spend the hottest part of the day in the shade of a wild prairie rose bush. Other broods loaf in a brushy fencerow or at the edge of a marsh. The roadside is rich with insect life and the brood spends the late afternoon feeding period there.

As sundown nears, the hen collects her young and moves them to a patch of western wheatgrass for the night.

Soon the small grain is harvested, and for several weeks the brood roosts in the stubble. By early August only five chicks remain; two died when they contested the right-of-way with a pickup truck. Their diet now includes plant material as well as insects. The roosting field contains abundant grain seeds left by the combine, so they are in no hurry to get to the neighboring corn field where they will spend the rest of the morning. They seldom visit the pasture where they fed a month ago, because that area has been heavily grazed and cover is sparse. A weedy fencerow nearby seems a good place to spend midday; other broods might choose a marsh or a roadside.

In the evening, the birds move into an uncut alfalfa field with abundant insects and greens. They won't come here to feed in the morning because there is usually a heavy dew; they avoid getting their feathers wet. As darkness approaches they return to the small grain stubble for the night.

By late August, color is apparent on the breasts of the young roosters. Maturing row crops provide excellent cover now, so the brood spends entire days in the shade and shelter of a corn or sunflower field, feeding, loafing, and dusting.

The brood ends the day, as it has ended so many others in the last month, in the small grain stubble; the wheatgrass where they roosted in June has been hayed. As fall approaches, pheasants disband as family groups, and young pheasants begin to assert their independence.

In late summer and early fall, pheasants are often found in areas where they are likely to find a good source of insects and greens.

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FALL: THE HUNTING SEASON

Fall brings the hunting season, and the wary ringneck becomes the quarry of a an average 41,000 hunters each year. In the last decade, the bag has averaged 130,000 birds per year; improved habitat could increase numbers.

August and its hints of fall — ripening grain, and a change in the plumage of young roosters — means the pheasant season is approaching. In mid-July, biologists' recommendations for season regulations, based on summer brood surveys and field observations, go to the Game and Fish Director, and many eyes and ears await the official announcement of the North Dakota pheasant season dates and limits.

Season setting, however, is no simple matter. Many weeks of data gathering precede the final tabulation of data, and season recommendations are formulated to permit the hunting of surplus birds, and also to ensure a sustained resource for future years. In nearly 60 years of season-setting, however, one premise has been affirmed time and again: It is virtually impossible to overharvest rooster pheasants.

Experience in North Dakota and elsewhere demonstrates beyond argument that when pheasant numbers are reduced below a certain level, hunters will no longer pursue them. After a certain minimum density has been reached, their scarcity combined with the birds' wiliness make it almost impossible for hunters to shoot enough of them to adversely affect the population. Even at these low numbers, rooster populations remain high enough to breed with all available hens, and recovery of the population depends primarily on habitat availability, not on the number of roosters.

But biological management is only one aspect of pheasant management. The sociological aspects of pheasant hunting also require consideration. From a biological point of view, the pheasant season could run from October through March if only roosters were legal. While this may be true, public tolerance of such a season length would be limited. In setting the season, consideration of all interests is important, to ensure that a portion of the surplus roosters can be hunted, that recreational benefits can be enjoyed, and that private and public lands will not be subjected to undue pressure.

During all this decision-making, young pheasants have been maturing. By hunting season in mid-October, all but a few late-hatched roosters will have acquired their colorful, adult plumage and have learned the survival strategies which make them such a respected game bird. An understanding of some of these capabilities can assist any would-be pheasant hunter to be more successful and to gain a greater appreciation for his quarry.

Often overlooked is the ringneck's acute hearing. The slam of a car door or even the metallic click of a closing shotgun chamber may be enough to send most pheasants scurrying for cover. Pheasants are reported to have responded to cannon fire some 320 miles away during World War I - explosions inaudible to the human ear. Human voices also will alert birds, particularly on dry, calm days. The first maxim of successful pheasant hunting could well be "make no more noise than necessary."

The ringneck also has extremely good eyesight, and the appearance of unfamiliar objects in his accustomed territory may well make him flee. Pheasants are wary, and take to wing or legs at any intrusion, so any use the hunter can make of natural cover is an asset to successful pheasant hunting.

For a bird with a small wing area relative to body size, pheasants fly well, and make up with rapid wing beats what they lack in wing area. In full flight a pheasant may reach 35 to 45 miles per hour. They are not long distance flyers, several hundred yards is about average. The pheasant's leg muscles are well adapted for running, and this is the bird's primary method for evading danger.

Ringnecks are hardy, and each year many instances of healed legs and wings come to biologists' attention. In addition to their tremendous capacity to heal breaks and wounds, pheasants can often survive after losing feet, toes, or an eye. One study on the Valentine National Wildlife Refuge in Nebraska found three percent of the roosters with complete or partial loss of toes on both feet. Five roosters were blind in one eye, probably from fighting. Nevertheless, all were within normal weight ranges. In agricultural areas the rate of injury is undoubtedly higher. Thus, hunters who risk long shots which only put a pellet or two into these robust birds are unlikely to take many home.

Because the pheasant's primary defenses are hiding and running, hunters profit from working cover slowly and methodically. A zig-zag style of hunting is not only effective on birds hiding in heavy cover, but helps to interrupt the run-ahead, circle, and run-back tactics used by other pheasants.

Quick, accurate marking of downed game also helps hunters find birds. Hunting partners who assume responsibility for marking each other's downed birds increase their chances of finding them by "homing in" along two lines of sight. Solo hunters can mark the spot where a bird drops, then work around it in ever-increasing circles, pausing frequently; often a brief pause is enough to make a

wounded bird break cover.

In row crops, a wounded pheasant may run straight down a row without the usual zig-zagging, and carefully approaching the field's end often produces the bird.

Many hunters vary their techniques as the season progresses and weather changes. Often overlooked but highly effective is early morning hunting in small grain stubble, a favorite cover type of roosting pheasants. Early in the season especially, careful and quiet movement into this cover at first morning light can provide excellent hunting. Overcast or drizzly days are especially good; in these conditions birds remain longer in the secure, comfortable cover. Late in the season, grain stubble can be productive on overcast evenings or just before a storm breaks. Birds seem to respond to a falling barometer and move into roosting cover early.

As the season progresses, pheasants still retain their early morning and late afternoon feeding habits, but spend more midday loafing time in heavier weedy pockets and fencerows. Fireweed, ragweed and wild sunflowers are among the preferred vegetation. Sunny, weedy fencerows bordering sunflowers and corn are choice areas, particularly as autumn days shorten.

Under blizzard or heavy snow conditions, tracking pheasants often produces game. Pheasants will burrow into cover but, especially with snow on the ground, unconcealed tail feathers can give away a rooster's hiding place.

Regardless of hunting techniques used, pheasant hunters are often surprised to learn that North Dakotans have only been hunting ring-necked pheasants since 1931. That first, 1 1/2-day season in Dickey, Sargent and Richland counties had a three rooster limit.

By 1940 the big harvest had commenced and for the first time exceeded 500,000 birds. The following year the number of upland game hunters passed the 50,000 mark for the first time. The "Golden Forties" had begun for pheasant hunters. The harvest was estimated in the millions from 1940 to 1946, climaxed by 1944 and 1945 when nearly 2.5 million were taken each year. This harvest took place in spite of the fact that a war was on, shotgun shells were scarce, gasoline was rationed, and many of the best hunters were in the armed forces.

Seasons were liberal. In 1945 hunters were allowed four hens in possession and could hunt for 136 days. Hunting was so easy it was said by some to be merely killing. The average hunter took over 34 pheasants per season during the four year period 1942-45.

Gunners shot pheasants practically everywhere during these years of high populations. They could easily be shot from the road and walking was unnecessary. The birds "boiled out" of sweet-clover patches for those who did get out and walk. The ground where birds concentrated often had the appearance of being tramped down by cattle and was littered with droppings and feathers. There were literally millions of pheasants, with hundreds on one section or in one sweet-clover patch. Nearly everyone enjoyed pheasants at the dinner table and servicemen traveling the railroads received free pheasant sandwiches served by the USO and other organizations in places like Mandan, where troop trains stopped. Hunters followed the birds: in the banner year of 1945, 62,000 residents and 4,800 nonresidents bought licenses to hunt in North Dakota. Still, numbers of hunters were small compared with numbers of pheasants that were in the field.

The boom years were coming to an end by 1946, and suddenly there was a clamor for control in a different direction. The

The ring-necked pheasant is arguably the favorite game bird of North Dakota hunters.

Craig Bihrle

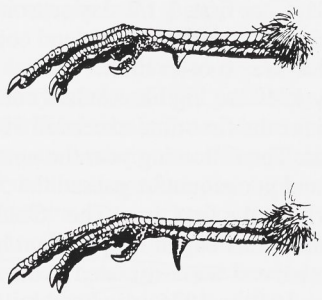
pheasant harvest fell off considerably in 1946. Instead of damage complaints from farmers and ranchers, the Department received demands from hunters for predator control, for control of mechanical combines, the weather, even the genes affecting the pheasants - anything to restore the bird to bountiful numbers.

Since 1946 there have been two periods of strong pheasant harvests, though none of the magnitude of the early '40s. Those days are unlikely to ever come again. From a harvest of 60,000 in 1950, the number of pheasants taken slowly climbed until 1963, when 490,000 were harvested. The good years — relatively good, that is — between 1956 and 1963 are generally associated with changes in land use brought about by the Soil Bank. When Soil Bank contracts began to run out in the mid-sixties, pheasant harvests dropped markedly. Land which had been idled in Soil Bank was being brought back into agricultural production. In addition, the winter of 1964-65 was very hard, with a bad blizzard in December and deep snowcover for a long period of time. The breeding stock of pheasants was significantly reduced by the double effect of weather and poor habitat conditions. The pheasant season was closed in 1966, and again in 1969.

The 1970s were years of generally poor pheasant harvests. The decade was a period of massive intensification of agriculture and increased demands on natural resources. In spite of changes in the way upland gunners hunted — an increased use of dogs, for example — hunter success was poor. In the mid-sixties the harvest of sharptails exceeded that of pheasants, and in the 1970s the pheasant harvest fell to third place, behind both sharptails and Huns.

The 1980s were better years for pheasant harvests. How much this rebound can be attributed to a poor farm economy is difficult to say. It is expected that the Conservation Reserve Program (CRP), in addition to keeping highly erodible land out of agricultural production, will provide good upland game habitat and give impetus to a rise in pheasant populations. Total acres idled through CRP is similar to that idled by Soil Bank. Based on lessons of the past, a significant rise in pheasant populations is likely. Nothing has happened in the last 40 or 50 years to modify Ira Gabrielson's words in 1946- that "destruction of habitat [and] poor breeding conditions" caused the decline in pheasant populations. It is expected that increased habitat and good breeding conditions will reverse it.

AGEING PHEASANTS

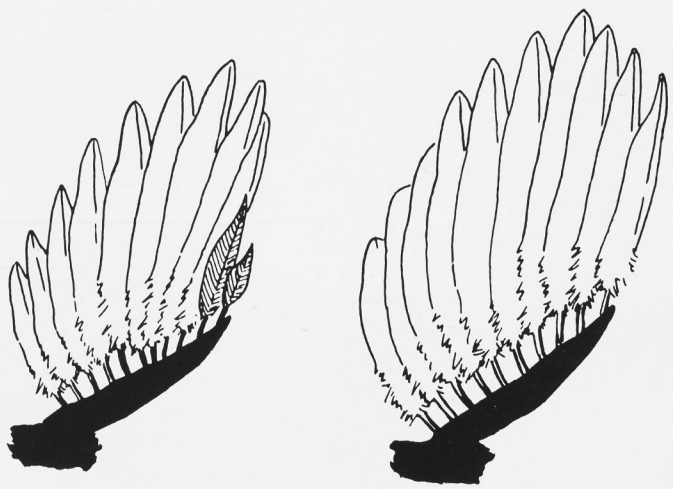


Spur Length

Spurs of young roosters are dull-colored, blunt, and usually less than 3/4-inch long. Adult spurs usually are long, shiny-black and sharply pointed.

Bursa Depth

The "bursa of Fabricus" is a blind pouch off the upper wall of the cloaca (the cavity into which intestinal, genital and urinary tracts open). Bursa depth in young-of-the-year birds is usually 1/3-inch or more, but as birds get older, bursa size usually decreases.



Molt of Wing Primaries

Primary feathers of wing molt in sequence from innermost to outermost. Outer two in left illustration are new, suggesting age of 16-17 weeks. Adult wing, right, is fully feathered.

WINTER: THE TIME OF TRIAL

Winter weather can severely test ringnecks, but except in extremely harsh conditions, or where habitat is lacking, they can survive the cold season with very little difficulty.

Inevitably, fall yields to winter. The sun warms the earth for a shorter period each day and autumn's bright colors turn to gray as icy winds sweep the plains. Winter rules supreme and locks the state in a frigid grasp.

Pheasants have been preparing for the new season's hardships all through the fall months, gaining weight which will enable them to withstand the rigors of winter. Their fat reserves build up and will be used during periods of extremely low temperatures and heavy snow cover. They move from summer habitat to winter cover with the first hint of a change in the weather.

In winter, pheasants almost always segregate by sex. Hens are more tolerant of crowding than are roosters, and generally gather in larger groups. Roosters are inclined to roost in small groups or alone, apart from hens. Thus, the frequent assumption that "with all these hens there has to be a rooster close by" has led many a winter hunter on a useless chase.

During winter, North Dakota pheasants utilize marshes, plum thickets, brushy cover with a weedy understory, shelterbelts, woody ditches, bushy fencerows, and unmowed railroad rights-of-way. High-quality cover is essential for their survival during cold months, but where such cover exists, pheasants can easily survive almost anything winter can offer.

Well adapted to North Dakota winters, ring-necked pheasants seldom succumb to starvation or cold in ordinary winter conditions. They are adept at locating food sources even in extreme conditions, and if necessary, pheasants can go without food for long periods, living off their stored energy reserves.

They burrow effectively into heavy cover, and deep snow causes them little difficulty. They are able to dig themselves out from under drifts several feet deep, and will form complex tunnel systems through cover that is buried beneath a layer of snow.

In regions of the state where corn and sunflowers are abundant, these grains become staples in the pheasant diet. Using their feet and wings, they can dig through a foot or more of snow to find grain. If grain is unavailable, pheasants can subsist on a diet of weed seeds, fleshy fruits, and other plant material. If these food sources fail, it is not uncommon for them to move into a farmyard and feed with domestic stock, or to follow a manure spreader and glean waste grain.

Blowing snow and extremely cold temperatures are greater threats. Without adequate shelter, pheasants find it difficult to survive blizzards. Caught away from good cover when a blizzard strikes, pheasants often die from freezing or suffocation. Caught in the open during blizzard conditions, they will ordinarily face into the wind to keep snow from penetrating their feathers. Their nasal openings may then freeze over, forcing them to hold their beaks open in order to breathe. Ice balls may then form, block the mouth, and the birds will suffocate.

Wind can force snow under their feathers, where it is melted by body heat. If their feathers get wet, the insulating value of the pheasants plumage greatly decreases, and the moist feathers quickly radiate body heat. This moisture may refreeze, forming ice beneath the birds' feathers. In these circumstances birds will rapidly lose critical body heat and die. Ice storms can also pose a threat.

Nevertheless, in most winters the critical factor for pheasant survival is habitat, and given adequate food, the ringneck in North Dakota is almost impervious to the elements.

Ed Bry

High quality cover is essential to pheasant survival during North Dakota's cold winter months.

MANAGING THE RINGNECK

Management

Of all the strategies proposed for increasing pheasant populations, only one really works: increasing the amount of available habitat.

The complete story of the ring-necked pheasant in North Dakota cannot be told by just describing its life cycle. Non-native birds, they were introduced to this continent by humans, and they do not exist as remote, isolated populations, independent of humans and human manipulation; their lives continue to be affected by our actions.

From the point of view of a wildlife agency such as the North Dakota Game and Fish Department, pheasants are a renewable resource. They can be harvested in large numbers, yet maintain constant population levels. Pheasant populations have a high turnover rate whether hunted or not. Their numbers are unaffected by controlled hunting of roosters, and "surplus" roosters — those not needed for breeding — cannot be stored for future use like grain in a bin.

Pheasants that cannot be supported by the available habitat will die, whether taken by hunters, predators, starvation, disease, exposure, or any other threats that challenge them. Providing birds for hunting might, from one point of view, be considered the goal of a management program, but from another perspective, hunters are actually participating in the efficient management of pheasant populations.

Pheasants are a polygamous species, and the removal of 90 percent or more of the roosters has no effect on reproduction. North Dakota hunters have never approached that level of harvest. On an annual basis, North Dakota pheasant hunters could increase their harvest by 35 percent and still not harm the population.

Hunting mortality is the most visible form of wildlife mortality, and many people expect that it will affect the following year's population. Scientific experiments have conclusively shown that reasonable sport hunting does not cause game populations to decrease. A nine-year study in northern Iowa and southern Minnesota matched pheasant population trends in a 19-county area in each state. The pheasant density in the Iowa counties remained higher than that in the adjoining Minnesota counties, and the trend in the pheasant population in the two states remained parallel in spite of the fact that the Iowa pheasant seasons were twice as long as the Minnesota seasons.

The mortality rate of pheasants is similar for both hunted and adjacent non-hunted areas. The yearly mortality rates usually exceed 70 percent, and the high rate for unhunted populations negates the effect of hunting on the following year's population.

In general, the size of an animal correlates with its metabolic rate and thus with its life expectancy and reproductive rate. Small animals have high metabolic and reproductive rates, and short life expectancy. Conversely, larger animals have a longer life expectancy, lower reproductive rate, and hunting mortality has a greater effect on the number alive the following reproductive season.

The effect of hunting on small animals with high mortality rates is well demonstrated by songbirds. We do not hunt songbirds, yet the number does not increase yearly. To close or shorten the pheasant season would substantially reduce hunting recreation with no positive effect on subsequent bird populations.

Many hunters fear that long seasons will result in an overharvest of roosters and too few roosters to assure egg fertility. Such fears are unfounded. North Dakota hunters take only about 60 percent of the available roosters, and egg fertility remains consistently over 90 percent.

Under certain circumstances even hunting hen pheasants would not reduce populations. If the number of hens in a spring population is higher than the number required to produce the maximum number of young that can be raised in an area, the excess hens could have been removed during the preceding hunting season.

The hunting of hen pheasants is a topic guaranteed to stir up heated debate even among pheasant biologists. Some maintain that a huntable surplus exists. They point out that in other game species, such as grouse and partridge, both sexes are taken without apparent damage to the population.

Others contend that shooting hens is like killing the goose that lays the golden egg. They maintain that even though there are surplus hens, future conditions may become more favorable for reproduction and we should have a maximum number of hens to take advantage of any increase in the carrying capacity of the land. The dissenters also doubt the possibility of regulating the season to ensure that only surplus hens and no more are taken.

North Dakota has allowed a hen in the bag in past years. Because hunting surveys indicated that hunting pressure on hens was light and that the regulation was unpopular, the shooting of hens was terminated following the 1945 hunting season.

In many respects, pheasant hunting is self-regulating and governed by the "law" of diminishing returns. Usually, more than 75 percent of the pheasants killed each season are shot during the first nine days of the season, and most of them are taken on the opening weekend. Rooster

pheasants learn fast, and the harder they are hunted the more difficult they are to find. As the population declines, more hours of effort are required to bag each bird. Soon a point is reached at which hunters simply will not expend further effort in pursuit of their quarry. Thus, lengthening the season adds few birds to the total number killed, but it does offer more recreational opportunities to hunters.

Any discussion of pheasant management inevitably includes the issues of stocking, winter feeding, and predator control. These have been described as three of the sharpest thorns in the pheasant manager's side. They consume a great deal of money and manpower, but provide few tangible results.

Nevertheless, these programs are often popular with hunters who do not differentiate between introductory stocking and annual maintenance stocking. The purpose of introductory stocking is to establish a new species in an area that provides suitable habitat. Maintenance stocking is a means of trying to maintain populations at levels higher than the habitat will support by releasing game-farm birds. Maintenance stocking ignores natural controls which govern population levels in an established population.

Maintenance stocking, or stocking where a population is well established, is virtually useless. A given unit of land has a carrying capacity: a maximum number of pheasants that it will support. This carrying capacity is determined by environmental factors and may change from season to season and year to year. Pheasants produce more young each year than the land will support, and these extra birds are doomed. The addition of game-farm birds simply adds to the surplus.

Maintenance stocking is expensive and produces a very low return. Long-term documentation of annual stocking attempts by the North Dakota Game and Fish Department, wildlife clubs and other organized groups as well as private individuals shows that less than five percent of released cock pheasants are bagged by hunters. Rising costs of raising birds coupled with low survival rates indicate that maintenance stocking would require the entire license fees of several hunters to pay for each of the few additional birds bagged during hunting seasons.

Stocking increases the risk of introducing disease or inferior genetic strains into a population and on this basis alone, is difficult to justify.

North Dakota is characterized by extremes in climate, and during harsh winters, some people feel the need to feed pheasants. Like stocking, winter feeding is a stopgap measure, expensive in time and money, and provides few benefits for the pheasant population.

Pheasants can survive long fasts, can dig through deep snow drifts for grain, and will move into farmyards for a free meal. Winter feeding programs are based on a human emotional need to do something for the birds, rather than on the birds' physical need for supplemental food.

In spite of the good intentions of their supporters, most winter feeding programs fail. Grain is generally distributed where humans have easiest access: along open roads and highways or near farmsteads. These are not generally the areas of greatest need and feeding there can be detrimental. Many birds drawn to roads by feeding are subsequently killed by passing vehicles.

A statewide feeding program is extremely expensive, costing thousands of dollars per day for grain alone to provide the 3 1/2 ounces of foodstuffs that pheasants consume daily during the winter. Transportation and labor costs to distribute grain to areas where it is needed could easily double the cost.

Predator-control programs are sometimes proposed to decrease the number of birds killed by predators. Unfortunately, predator-prey relationships are not a sim-

Sometimes surplus pheasants are trapped and moved from one area of good habitat to another area of good habitat. These wild-trapped birds have a better chance of survival than do pen-reared birds.

Ed Bry

ple matter of mathematics whereby the subtraction of a predator equals the addition of pheasants for the hunter.

Predators are opportunists, and prey on any species readily available. A fox or coyote will take a pheasant if it can, but opportunity varies with pheasant numbers and habitat quality. Predators tend to pursue the most abundant prey species, and in North Dakota pheasants seldom make up a major portion of any predator's diet. Their primary prey includes mice, ground squirrels and rabbits, species characterized by reproductive rates exceeding those of the pheasant.

Diminishing returns control the actions of four-legged or flying predators much as they do those of human hunters. When prey populations decrease to the level of the carrying capacity of the land, continued efforts result in decreased returns. At that point, a prey species such as the pheasant becomes relatively safe from predation.

Researchers in southern Minnesota annually trapped and removed 15 to 20 predators from each square mile of a study area. The rate of pheasant nest destruction was reduced by at least half, and the reproductive rate doubled. Nevertheless, pheasant numbers continued to decline, and researchers concluded that predator control did not compensate for habitat losses.

In addition, this Minnesota study showed that predator control is prohibitively expensive. It cost approximately $21 per predator removed, or $4.50 for each additional chick hatched. With normal survival rates of about 50 percent, the cost for each additional bird reaching maturity was about $9. Since only half of these birds could be expected to be roosters, the cost reached $18 for each bird that might be shot in the fall.

The only certain method of increasing pheasant populations is to improve their living conditions. To do that, the major factor limiting the population must be identified. In most parts of North Dakota, good quality undisturbed nesting habitat is the primary problem, and secure habitat can modify the effects of secondary limiting factors such as weather and predation.

Given these conditions, what kind of management programs will affect enough acres of land to materially increase pheasant populations?

Since some 92 percent of the land in North Dakota is privately owned, most pheasants are also produced and hunted on private land. Thus, any program to significantly increase pheasant numbers on a statewide basis depends on increasing pheasant habitat on private land. Federal farm programs offer the only economically feasible potential for attaining this goal.

The Soil Bank program of the late 1950s and early 1960s converted some 2.72 million acres of cropland to year-round cover in North Dakota, and the pheasant population increased significantly. Early vegetative stages (weeds) characteristic of cropland retirement provide a safe haven for nesting as well as a refuge from predators and winter weather. When the Soil Bank program ended, and land went back into crop production, pheasant numbers declined accordingly.

Habitat management is the key to abundance of pheasants, or of any wildlife species, and only through sound programs can populations thrive. The Habitat Stamp Program is one of the Game and Fish Departments responses to the continuing loss of habitat. In its first nine years (1981-1990) the program generated over $2 million for habitat preservation, creation and enhancement.

The Department's Interest Money Program also offers funds to provide habitat. During the five-year period, 1983-1988, approximately $600,000 has been furnished by this program. Combined, these two programs are annually helping

The high cost of raising birds, low survival rates of pen-reared birds in the wild and other factors make stocking programs difficult to justify.

Ed Bry

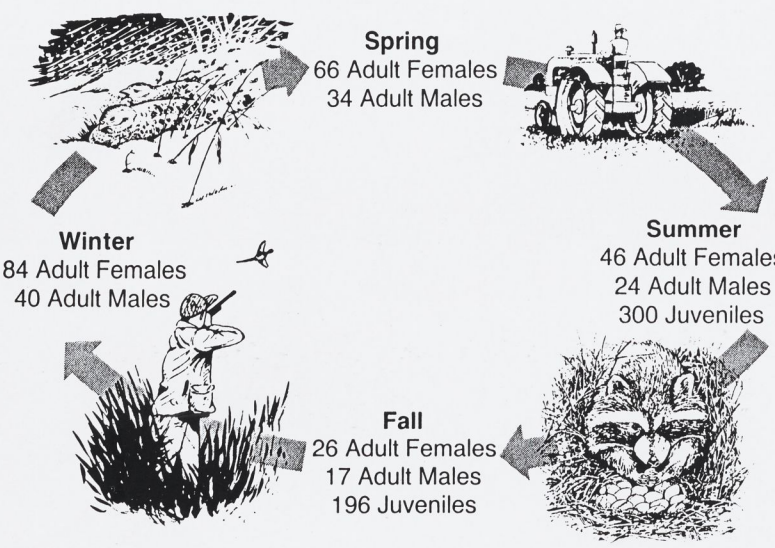
maintain about 15,000 acres of wildlife habitat.

The immediate future for pheasants in North Dakota looks bright because of the Conservation Reserve Program created by the U.S. Department of Agriculture farm bill of 1985. It is similar to the Soil Bank program, and by September 1991, North Dakota farmers had enrolled more than 2.88 million acres of cropland in 10-year permanent-cover contracts. This is about 10.2 percent of the state's cropland, and is larger than the peak acreage enrolled in the Soil Bank program. In effect, CRP has multiplied by approximately 192 times the acreage in the Game and Fish Department private land management programs.

Based on the pheasant response to the Soil Bank program, it is realistic to expect a notable increase in the state's pheasant population during the life of CRP. Overall loss of habitat during the last 30 years will prevent the population from equaling that of the late 1950s. Cropping of forage from CRP land such as that authorized in response to the droughts of 1988 and 1989 will reduce the contribution of such land to pheasant recovery.

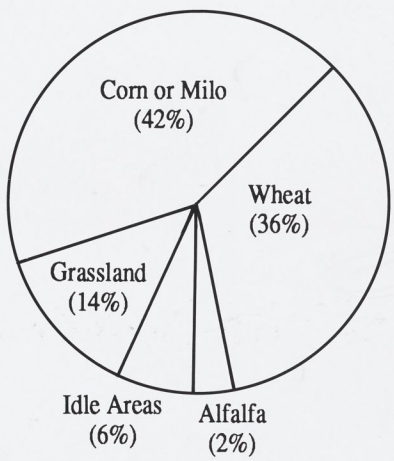
The ring-necked pheasant is a relative newcomer to North Dakota, yet has become so much a part of the state's heritage that many people are unaware that it is not a native bird. But, if pheasants are to prosper in the state, and continue to provide pleasure to hunters and others who simply enjoy seeing them, they must have sufficient habitat. While federal programs will do the most to improve statewide populations, Game and Fish Department programs can help improve habitat on both public and private land. The fact that pheasants may live their entire lives on a single quarter section of land means that individual landowners can materially affect the number of pheasants on their property. Interested landowners may contact the Game and Fish Department for further information.

POPULATION DYNAMICS



The annual cycle begins in spring with a hypothetical population of 100 adult birds. By nesting season end, 30 are lost to natural causes and farming operations such as mowing. Half the hens produce broods, totalling 300 young. By autumn, the population of 370 is reduced by predation, road losses, and natural mortality to 239. Hunting and natural mortality takes 115 birds. Winter stress reduces population to the original 100 adults.

OPTIMUM LAND USE FOR PHEASANTS



An ideal ratio of land-use for pheasant production includes a high proportion of grain crops which provide a stable food source. Wheat also provides nesting cover, and alfalfa offers brood cover. Pastures and grasslands make good nesting cover, and idle acres are important areas for nesting, roosting, loafing, and winter cover. Ideally, each cover type would occur in small units and in close proximity to other types.

Published in February 1992 by the North Dakota Game and Fish Department with funding made available by the Federal Aid in Wildlife Restoration Act, Project W-67-R. Copies are available from the North Dakota Game and Fish Department, 100 N. Bismarck Expressway, Bismarck, North Dakota, 58501-5095. North Dakota gratefully acknowledges the contribution of the Nebraska Game and Parks Commission. Much of the text for this publication was originally published in "The Ring-necked Pheasant in Nebraska" by the Nebraska Game and Parks Commission under funding by Federal Aid in Wildlife Restoration Act, Project W-15-R. Lowell Tripp, Oakes, North Dakota Game and Fish Department upland game biologist, contributed heavily to this document by adapting appropriate North Dakota information.

Harold Unger

About 1860 words

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(Game & Fish Management)

A PLACE OF OUR OWN

There's a lot to do on 60 acres.

Wildlife uses all of our farm, fanning out from a marshy core that has survived without much change, over the years since Lewis and Clark passed through, simply because it is too wet to plow and too brushy for cattle. You can sit in the shade of a cottonwood and take in most of the show -- trout rising in the spring branches, baby teal skittering after midges, and sora rails practicing their ventriloquist act. But there is one species that won't come close to you.

The pheasants have no silly season. They do not dance like sandhill cranes, sunbathe like muskrats, or frisk like fox cubs. When young pheasants start to explore, I see only their heads, high and wary. They dip their beaks in the creek and then look up instantly. They remind me of the soldiers Gideon picked for his toughest battle -- those who were always alert, even while sipping water. But how do the pheasants know me? Who taught them to see into my shadows?

About ???? words

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You control the things that do too well.
Lean, weed.

Managing

KNOWING PHEASANTS

The Far Side
Spring-Creek Experiment
Bozeman Tea Party
The Bird that Thinks

There is no stupid season for the pheasants on spring-creek farm. They are not innocent in June, like the white-tailed [] fawns; not stiff-necked in November, like the rutting bucks; and not frisky in February [] like the foxes. True, you can drive along the gravel road and watch roosters gleaning barley from the stubble, but they have learned that they are safe from cars. Walk along that same road and the pheasants will be gone before you see them.

Wildlife uses the whole farm and those surrounding it, but the core habitat is a place that has survived without much change, over the years since Lewis and Clark passed through, simply because it is too wet to plow and too dry for anything bigger than a trout. Mallards nest between the spring ~~feeders~~ branches, snipe winnow overhead, and yellow [] warblers nest in the buffaloberry brush. You can sit on a cottonwood log and watch all the wildlife -- except for one species. You you would not guess

that there are pheasants around you until a cock crows.

When the young pheasants start to explore in midsummer, the part you notice is their heads, high and wary. They dip their beaks in the creek and then look up again instantly. They remind you of the soldiers that King [] David picked for his toughest [] battles [] -- not the men who flopped down on their bellies to drink but those who knelt and sipped from their hands, on the lookout for enemies. []

I know why the young birds fear raccoons, great horned owls, and red-tailed hawks. Mother hen teaches her brood about such predators. She abandons her young before they meet me, however -- and still they hide from me. Deer walk up to my house and peer in the window, wondering which chapter I'm working on, but the pheasants disappear when I reach for my binoculars. How do they know? Who taught them to see into my shadows?

I could trick the pheasants, probably. I could seduce them with false blandishments and corn, but they are better as they are, wildest of the wild. I am a predator and they are right not to trust me.

The Spring-Creek Experiment

On opening day, the young pheasants do not know how to cope with me and my dog. The mother hen taught them about great horned owls, foxes, and other non-human predators, but left her young birds on their own before hunting season started. I might be able to take out all the cocks in the brood on that first day of hunting in mid-October, but I stop with one and leave immediately.

By my second hunt, a week later, an odd thing has happened. The innocent young pheasants have become sophisticated. It is as if they had held a seminar, right after my departure, in which they discussed the new predator and what to do about him. They seem to process information in the same way as my puppy, who got lost twice on her first day's hunt, when she was three months old, but woke up the next day knowing exactly what she did wrong and how to avoid frightening mistakes from then on.

The pheasants, on the contrary, want to lose me and stay lost. Their main method is to flee to a place where I cannot follow -- the far side of the road. In today's hunting, there is almost always a far side. What is surprising about pheasants is that they take the hint so quickly and reckon so closely the boundaries of safety.

They also have a sense of timing. After two days, there may be no birds on the place at all, or just the ocasional slow-learner. After a week, however, a fair part of the brood has trickled back -- perhaps because they were hunted on the

surrounding land, or perhaps because they remember the barley.

[I can then hunt the covert for the rest of the season, once a week, with some chance of getting a cock each time, if I do it right.]

For the second week's hunt, I have learned to hike up the gravel road as quietly as possible, dogs at heel, and enter the cover where one of the miniature spring creeks flows onto the farm through a culvert. This is the pheasants' main route of escape -- a safe, brushy corridor. In this way, dogs and I can hunt without the help of other human blockers.

The trick, then, is to find the resident rooster before he figures out Plan B. I can't move that fast. The pup can't think that fast. The old dog can, so he takes over. He is not visible in pheasant cover, most of the time, so I follow the sound of his beeper. It it switches to a point signal, I try to loop in from well in front of him so that the bird will be between us.

He may be bright, for a bird, but he has only one escape route clearly in mind.

with good cover that is interrupted for just a few feet by a gravel roadled [] lane. My tactic [] is to walk up lane with my dog and enter the covert at this pheasant corridor, blocking it. When I try entering the covert from some other direction, the dog is likely to find fresh scent but no birds.

[Most gamebirds [] can be pushed out of their core area.

They have patterns of evasion, but beyond that they learn things that one would not expect, of a bird. [Not as far-fetched as it used to be to suggest that a bird thinks. Ravens. A genetic ability to learn]

Outflanking a Rooster

[not traditional blocking. It's cutting off the exits and then hunting inside.]

A creature of such beauty needs to be conscious of human passions and the places where we exercise them.

"Lots of pheasants around," said Joe, and we believed him. He had been watching wheat and hay and birds cycle up and down on his farm since he was a little boy, and if he said that this year was a good one, he knew what he was talking about. Some hens who nested too near the creek might have had their nests washed away, he said, but those who chose well-drained sites brought off big broods despite the heavy rains. During the harvest, Joe had seen well-grown young birds everywhere.

Charley and I stood around talking to our host casually, just as if we were in no hurry to start hunting on three hundred acres aflutter with pheasants. Joe told us that had let another party hunt day-before-yesterday, but they'd had no dogs and no luck. Joe was sure that we would find the birds the otheer guys had missed.

We started at the gravel lane north of the farm and worked upwind, pushing toward the stream-bottom and the sedgy fields around the swamp where birds would hold well for our dogs. We had been planning such campaigns for years, Charley and I. We would not have rushed in without a strategy session.

The first pheasant was a hen. The second was a cock that ran out and flushed behind me when I looped in too close to my old

dog's point. The third was a hen flushed by his five-month-old daughter. I praised her profusely, making her sire jealous, and he decided to show me how a real dog finds pheasants. I found him twenty minutes later in the darkest part of the woods, pointing a tangle of fallen willow limbs. The bird that flushed had a long tail but I could not see its colors well to be sure that it was a cock.

That was all. Three hundred acres, four pheasants, no shots. The hunters who had been there two days earlier must have pushed the rest of the birds off the place.

Charley and I loaded the dogs, sagged onto the seat of our truck, and drove home down a lane separating the farm where we had permission to hunt from another where nobody had permission to hunt.

Three of them wriggle onto the farm from as many directions and a fourth flows from a pond under the cottonwoods, creating a place that suits trout as much as pheasants.

A biologist would want to study an area of perhaps four square miles, because pheasants move around a lot.

Pheasants turn up on all sixty acres of the farm at one time or another, exploring outward from their nests at the confluence of four spring creeks.

It is a kind of catch-and-release hunting, and it keeps both of us lean and hungry.

Four spring creeks come together

Boundaries

From mid-October through mid-December, my shotgun comes along and we no longer take random strolls through the cover. I tried the casual approach during my first season on the place and found that any cock would disappear, usually before I got a shot.

For a time I wondered if we were leaving enough for breeding, but the population does better when fewer cocks around to compete with the hens over the winter and fight over them in spring. A wild rooster -- like the tame one in a pen -- can fertilize the eggs of a dozen hens, and probably far more. Sometimes it seems as if we have shot every cock in the valley by December, but when they start to crow in spring, there are so many that some never get to breed.

fight over the hens in the spring

[Management -- a crop]

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Five cock pheasants were on the far [] side of the lane, necks proud, tails arched, long legs prancing, feathers like sun through autumn leaves. We stopped and accused the birds of showing off, though they may have been thinking of nothing more elevated than roadside grit.

(A mile of water is core habitat for trout + ducks — + pheasant too. They need water for hab. tat + drinking.)

Of one thing we were sure: those five roosters had figured out that they were safer on the far side of the road.

Fair Game

For my first hunt on the spring-creek farm, eight autumns ago, the only thing I got right was the intelligence collection. Half an hour before sunrise, I tooted my old crow call and was answered by a cock pheasant. I headed for him -- the direct approach. Saw his tracks in fresh snow. Followed them upstream through the brush along one of the spring feeders. He flushed wild, flew across the gravel road, and kept going. I saw the tracks of more pheasants crossing the road right above the culvert through which the miniature spring creek flowed. For birds, the cattails and willows along the creek formed a safe emergency exit.

Lesson 1: Humans like the the shortest distance between two points. Pheasants choose the route with the best cover.

I learned to walk up the gravel road as quietly as possible and enter the cover right where the pheasants wanted to leave it, at the spring-creek corridor. It was an awkward place to start, requiring a climb over a barbed-wire fence defended by brush, and the whole operation had to be done quietly, with no aubible commands to the dog. Not that we caught birds by surprise, even then. The object was just to avoid frightening them so badly that they would flush wild. I would be ashamed to report how many tries it took before I got this right.

The Pheasants' Calender

I had an excuse. The pheasants were not back in the cover

the next time I visited it -- which happened to be the next day. They were not there when I came back two days after that, either. It took three seasons for me to understand that they had a calendar for trickling back into the spring-creek cover.

I still do not know just how the mechanism works, but I suspect the cock pheasants of using the hens as scouts -- not that either would think in such terms. The sexes eat the same food, and it may be that the hens just sneak back in order to avoid competition from the much bigger, bolder cocks.

I saw one cock chase off a fox. (Please take this for what it is -- an experience that may not make sense, but happened.) I saw a small goshawk who ignored cocks in a field while hunting hens in the brush, and catching them. It is not surprising, then, that hens like to stay near impenetrable cover -- such as the snowberry bushes along the feeder springs and the willows whose dead lower branches have fallen to the ground in ancient tangles.

In any case, I have learned that I can hunt the banks of the feeder springs once a week with a chance at one cock pheasant. If we slip up, he gets away and will be even more difficult when we hunt him again a week later. On the other hand, if we get the bird, another will replace him. So it pays to do everything right.

2. Pheasants.

Many readers have experience with pheasants (unlike Gambel's quail), so the story has to look at them from new angles. I'd like to draw on what I've learned by watching pheasants on the same farm over eight years, in and out of season. My dogs and I hunt for eight months a year -- ~~six~~ 4 of them without a gun.

This is not an essay but a series of very short stories/episodes, with subtitles. Sounds like a biology text but won't read like one.

Do pheasants think? It is no longer ridiculous (even for scientists) to wonder about the consciousness of some birds, and pheasants seem to be among the brightest. They are born wary of humans and learn from experience.

Boundaries. Pheasants learn about human property lines -- quickly and precisely.

Timing. How soon will pheasants move back to good food and cover if you leave them alone? (About a week, in my experience.)

Tactics. How can a single hunter cope with pheasants that have planned their escape routes?

Management. Ways to increase populations.

coyotes helped by getting rid of foxes.

(pointer.

The Long Hunt

My dogs and I follow the pheasants for eight months of the year -- all but the nesting season, and the puppy would do no damage even then. She is interested in everything and therefore catches nothing. Her sire, however, can find nesting hens if I let him. He makes me wonder how they manage to incubate eggs for three weeks. [] Could it be that wild predators have weaker noses than pointing dogs? More likely the skunks and mink [] just have easier things to hunt, whereas my big dog is single-minded.

For two months in autumn, I shoot at the cock pheasants big dog finds. He points them in heavy cover, frequently, and cannot see them tumbling down through November sun, so his daughter may beat him to the retrieve. She figured that part out when she was four months old and all legs. With luck, the taste of feathers will make her a dog like her daddy.

I never gave big dog much formal training but he perceived his mission in life when I shot birds for him. Fortunately, it did not take many lessons. State biologists wanted a census after the season so I pulled out my diary and turned pheasants into numbers, half ashamed, and then calculated that I had walked four and one-half miles for every bird in the game bag. Big dog covered at least ten miles to my one. That would be some forty-five miles of hard going for a pheasant in the mouth.

It was enough. Big dog follows weak scent of pheasant while pup dithers on voles and muskrats. The difference is not energy, not nose, not anything physical. It's commitment. I'm not sure

whether pup has inherited her daddy's brains, either.

Off-season, the dogs are my research assistants, hunting for six months without a shot. Big dog stays with birds and I try to keep up. He points. I flush the pheasant and swing my trigger finger through its flight. He chases for a few yards and comes back with tongue lolling, eyes emitting [] sparks. Pup wishes she could do it.

[Pup does not have the sparks under control. She has not become a hunter. You have to hunt your prey and taste it before you know how to hunt and not eat. You have to learn like Henry David Thoreau.

When I first read Thoreau, I wondered how he could live among brook trout and ruffed grouse without hunting them more often. Here and there in his works, however, his feelings came out. "As I came home through the woods with my string of fish," he wrote, "trailing my pole, it being now quite dark, I caught a glimpse of a woodchuck stealing across my path, and felt a strange thrill of savage delight, and was strongly tempted to seize and devour him raw; not that I was hungry then, except for that wildness which he represented.... I found myself ranging the woods, like a half-starved hound,... seeking some kind of venison which I might devour, and no morsel could have been too savage for me."

Thoreau the hunter had the vision of Thoreau the shaman. He saw nature with an intensity and honesty that no one else has ever quite matched, but he dined on beans. [] He cut down on meat

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I don't know whether pheasants are that clever, but they do have some things in common with ravens. Both species have managed to make a living throughout the northern hemisphere, surviving in different habitats and on very different foods. Both are tough and adaptable.

Perhaps pheasants learn gradually to shape their behavior, which does not require intelligence. Sometimes, however, the learning process seems anything but gradual. The birds had moved off Joe's farm without much hunting pressure, for example, and

settled down in new habitat. They had used distance for cover, which is not a common trait in upland birds.

What impressed me most, however, was the pheasants' ability to understand a property line -- and stand on the far side tempting Charley and me. Human boundaries must be hard to grasp, for a wild bird, especially when the lane between safe and risky territory matters for only a few weeks in the fall.

PHEASANT HABITAT IN THE GALLATIN VALLEY

Datus Proper
(406) 388-3345

The Gallatin Valley, where I live, has in the past produced pheasants in large numbers. It is evidently capable of doing so today, because I have seen excellent populations while hunting on properties that happen to have the right conditions.

I have tried to improve habitat on my own small place, with limited success. I don't claim to know what works, but I am becoming an expert in things that do not work. This paper ends with a plea for research that would help other Montanans avoid mistakes like mine.

Three of my neighbors are managing larger areas for wildlife, and they might be interested in my experiments -- if I produce better results.

Inventory

1. Existing Habitat

My property is small (60 acres), but it is decent pheasant habitat. Characteristics:

a. 1 large and 3 small spring creeks -- perhaps a mile in total -- plus some ponds. Open water in winter

b. Lots of buffaloberry bushes that the pheasants use for shelter, plus some willows old enough to create tangles of fallen trunks. (The birds have not shown much interest in young willows.)

c. Dense stands of snowberries and wild roses.

d. About 25 acres of barley that is left in stubble all winter. It adjoins the heavier cover.

— Alfalfa

e. Some good grass for nesting cover. (One hen last year raised a brood of 11 chicks to full size.)

f. Adjoining properties have additional habitat, including stands of cattail. Mine is not a patch of isolated cover.

g. The East Gallatin River winds around my house, separated in one place by a single field. It is a sort of pheasant corridor for this part of the valley, with thick brush on the banks.

The worst habitat on my place is some 10 acres of bluegrass. I would replace it if I were confident of achieving a lasting improvement.

2. Leading Problems

Hen survival is generally poor. In December we had 4 or 5 hens, but most did not survive the (mild) winter. There seem to be more cocks than hens, even though the cocks were hunted.

The hen that raised 11 chicks was exceptional. Some years I get only small, late-hatching broods, suggesting that the first nesting attempts failed.

3.Experiments

a. There has been no grazing for several years. Pheasant numbers improved markedly when the cows left. Conclusion: success.

b. 4 years ago, I put in 1½ acres of rough barley for winter feed. The deer ate every head in the fall. I don't think that they spilled a grain of barley. Pheasants never used the plot.

Conclusion: flop.

c. Today we are harvesting all 25 acres of barley, in the process spilling some grains for the pheasants and ducks. The barley appears to rot by late season, and I am concerned about pesticides used in its production. Conclusion: better than nothing.

d. Five years ago, I put in about 3/4 acre of what was intended to be nesting cover. The mixture was suggested by the SCS: tall wheatgrass, alfalfa, and yellow blossom sweetclover. I now have a fine stand (mainly tall wheatgrass). The pheasants, however, go out of their way to avoid it. The problem may be that the grass is too dense at ground level. Conclusion: failure.

In contrast, I have hunted several times on a CRP field elsewhere in the valley that was planted in shorter grasses -- mainly crested wheatgrass, I think. This grass is not supposed to be suitable for pheasants but it has always contained lots of them, at all seasons. (maybe not winter — and it declined)

It seems clear that we need research on the grasses (and food crops) that pheasants really prefer in this climate. I am reluctant to try any more experiments on my own.

4. Limiting Factors

The following factors, in order of priority, may be limiting pheasant numbers on my place.

a. **Predation:** Predators get more pheasants (and ducks) than the population can afford, despite respectable cover. I realize that this conclusion is not politically correct, but I have made

enough observations to be fairly sure of it. My dog finds the carcasses. I can pretty well track the pheasants around my area by seeing which trees the great horned owls are sitting in: They know. Goshawks have started to show up in the same trees. Red-tailed hawks are around. Foxes are thriving. Of nest predators, there are many skunks and magpies, plus some raccoons.

All this is a big change from the situation when I was growing up. At that time too, biologists believed, or hoped, that predation would have little impact on birds in good habitat. The latest research on that subject is not encouraging.[1] Predation needs to be identified and discussed as an issue, if only because it affects decisions on types of habitat.

b. **Winter food:** My barley stubble adjoins good cover, so the pheasants do not have to commute far for food. In late winter, however, a pheasant that is even a few yards from cover is likely to be a target of predation. The rotted barley may also be low in nutrition. The bottom line is that I do not see much use of the stubble during the time when birds are most in need of food. I might be able to put in a plot of better food near the holding cover -- if I knew of something that would not attract the deer.

c. **Deer:** There are so many whitetails that even the young buffaloberry bushes get eaten back. I have considered planting one or more shelter belts, but the deer demolish unprotected trees. This again is a big change from the situation when I was

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1.See especially Stephen Trapper, Malcom Brockless, and Dick Potts, "The Salisbury Plain Predation Experiment: The Conclusion." In The Game Conservancy Review of 1990, pp.89-91. (British publication.)

growing up in Montana.

d. **Nesting cover:** There is an alfalfa field next to my property, but any nest in it is going to be destroyed by mowing. (Is there any nesting cover good enough to keep hens out of the alfalfa?)

e. **Winter cover:** No problem for the last two seasons. Has been a problem during winters of extreme cold and heavy snow. At such times spilled barley is inaccessible, the buffaloberries are gone, and the pheasants have to travel long distances between shelter and food.

Long-Term Changes

If I have assessed the limiting factors correctly, an interesting conclusion leaps out: the leading factors are new.

- A generation ago, we had no raccoons and few raptors of the species skilled at catching pheasants (great horned owls, goshawks, and red-tailed hawks). Foxes and skunks may or may not have been better controlled by trapping.
- Whitetails were unknown in the valley or just arriving.

The existence of new factors again points to the need for research.

Answers Needed

I have been talking to biologists recommended by Pheasants Forever in other states, and reading as many papers on the subject as I could find. Unfortunately, research done even in the Dakotas may not apply here. Our climate may be too cold for

switchgrass. Our deer might eat sorghum and buckwheat (though these crops seem to survive deer attacks elsewhere). I don't know how to plant a shelter belt that would survive current deer populations.

The Department of Fish, Wildlife, and Parks has been doing great work on a tight budget, but research will take funding. I am willing to speak out for an upland bird stamp, if that would help to finance research. I have been buying sportsmen's licenses, which means that I am not even identified as a bird-hunters in official files. I would welcome a chance to contribute to small-game research.

September 12, 1992

About ???? words

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KNOWING PHEASANTS

The Far Side
Spring-Creek Experiment
Bozeman Tea Party
The Bird that Thinks

There is no stupid season for the pheasants on spring-creek farm. They are not innocent in June, like the white-tailed [] fawns; not stiff-necked in November, like the rutting bucks; and not frisky in February [] like the foxes. True, you can drive along the gravel road and watch roosters gleaning barley from the stubble, but they have learned that they are safe from cars. Walk along that same road and the pheasants will be gone before you see them.

Wildlife uses the whole farm and those surrounding it, but the core habitat is a place that has survived without much change, over the years since Lewis and Clark passed through, simply because it is too wet to plow and too dry for anything bigger than a trout. Mallards nest between the spring feeeders, snipe winnow overhead, and yellow [] warblers nest in the buffaloberry brush. You can sit on a cottonwood log and watch all the wildlife -- except for one species. You you would not guess

that there are pheasants around you until a cock crows.

When the young pheasants start to explore in midsummer, the part you notice is their heads, high and wary. They dip their beaks in the creek and then look up again instantly. They remind you of the soldiers that King [] David picked for his toughest [] battles [] -- not the men who flopped down on their bellies to drink but those who knelt and sipped from their hands, on the lookout for enemies. []

I know why the young birds fear raccoons, great horned owls, and red-tailed hawks. Mother hen teaches her brood about such predators. She abandons her young before they meet me, however -- and still they hide from me. Deer walk up to my house and peer in the window, wondering which chapter I'm working on, but the pheasants disappear when I reach for my binoculars. How do they know? Who taught them to see into my shadows?

I could trick the pheasants, probably. I could seduce them with false blandishments and corn, but they are better as they are, wildest of the wild. I am a predator and they are right not to trust me.

The Long Hunt

My dogs and I follow the pheasants for eight months of the year -- all but the nesting season, and the puppy would do no damage even then. She is interested in everything and therefore catches nothing. Her sire, however, can find nesting hens if I let him. He makes me wonder how they manage to incubate eggs for

three weeks. [] Could it be that wild predators have weaker noses than pointing dogs? More likely the skunks and mink [] just have easier things to hunt, whereas my big dog is single-minded.

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settled down in new habitat. They had used distance for cover, which is not a common trait in upland birds.

What impressed me most, however, was the pheasants' ability to understand a property line -- and stand on the far side tempting Charley and me. Human boundaries must be hard to grasp, for a wild bird, especially when the lane between safe and risky territory matters for only a few weeks in the fall.

The Spring-Creek Experiment

On opening day, the young pheasants do not know how to cope with me and my dog. The mother hen taught them about great horned owls, foxes, and other non-human predators, but left her young birds on their own before hunting season started. I might be able to take out all the cocks in the brood on that first day of hunting in mid-October, but I stop with one and leave immediately.

By my second hunt, a week later, an odd thing has happened. The innocent young pheasants have become sophisticated. It is as if they had held a seminar, right after my departure, in which they discussed the new predator and what to do about him. They seem to process information in the same way as my puppy, who got lost twice on her first day's hunt, when she was three months old, but woke up the next day knowing exactly what she did wrong and how to avoid frightening mistakes from then on.

The pheasants, on the contrary, want to lose me and stay lost. Their main method is to flee to a place where I cannot

follow -- the far side of the road. In today's hunting, there is almost always a far side. What is surprising about pheasants is that they take the hint so quickly and reckon so closely the boundaries of safety.

They also have a sense of timing. After two days, there may be no birds on the place at all, or just the ocasional slow-learner. After a week, however, a fair part of the brood has trickled back -- perhaps because they were hunted on the surrounding land, or perhaps because they remember the barley.

[I can then hunt the covert for the rest of the season, once a week, with some chance of getting a cock each time, if I do it right.]

For the second week's hunt, I have learned to hike up the gravel road as quietly as possible, dogs at heel, and enter the cover where one of the miniature spring creeks flows onto the farm through a culvert. This is the pheasants' main route of escape -- a safe, brushy corridor. In this way, dogs and I can hunt without the help of other human blockers.

The trick, then, is to find the resident rooster before he figures out Plan B. I can't move that fast. The pup can't think that fast. The old dog can, so he takes over. He is not visible in pheasant cover, most of the time, so I follow the sound of his beeper. It it switches to a point signal, I try to loop in from well in front of him so that the bird will be between us.

He may be bright, for a bird, but he has only one escape

route clearly in mind.

with good cover that is interrupted for just a few feet by a gravel roadled [] lane. My tactic [] is to walk up lane with my dog and enter the covert at this pheasant corridor, blocking it. When I try entering the covert from some other direction, the dog is likely to find fresh scent but no birds.

[Most gamebirds [] can be pushed out of their core area. They have patterns of evasion, but beyond that they learn things that one would not expect, of a bird. [Not as far-fetched as it used to be to suggest that a bird thinks. Ravens. A genetic ability to learn]

Outflanking a Rooster

[not traditional blocking. It's cutting off the exits and then hunting inside.]

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Four spring creeks come together

Fair Game (pheasants)

The pheasants have no silly season. They do not dance like sandhill cranes, sunbathe like muskrats, or frisk like fox cubs. When young pheasants start to explore, I see only their heads, high and wary. They dip their beaks in the creek and then look up instantly. They remind me of the soldiers Gideon picked for his toughest battle -- those who were always alert, even while sipping water. But how do the pheasants know me? Who taught them to see into my shadows?

I could trick the pheasants, probably. I could seduce them with false blandishments and corn, but they are better as they are, wildest of the wild. I am a predator and they are right not to trust me.

From mid-October through mid-December, my shotgun comes along and we no longer take random strolls through the cover. I tried the casual approach during my first season on the place and found that any cock would disappear, usually before I got a shot.

For a time I wondered if we were leaving enough for breeding, but the population does better when fewer cocks around to compete with the hens over the winter and fight over them in spring. A wild rooster -- like the tame one in a pen -- can fertilize the eggs of a dozen hens, and probably far more. Sometimes it seems as if we have shot every cock in the valley by December, but when they start to crow in spring, there are so many that some never get to breed.

The pheasants come under just as much pressure.

fight over the hens in the spring

eleemosynary

Pheasants would be hard to find, but for one thing: a great horned owl, sometimes joined by a goshawk, is perching a few yards above them. Fortunately, the cover is a twisted, prickly shrub that provides excellent shelter and some high-quality food. As brush goes, this species is an unsung hero. Thanks, buffaloberry.

Thanks also for sexual dimorphism -- the difference in appearance which lets me hunt cocks only. They, like drake mallards, are less vulnerable to predation than the hens. I try to even the scales, goodness knows, but somehow by spring there are still more males than females out there in the stubble.

Often in winter a great horned owl, sometimes joined by a goshawk, perches right on the patch of cover where the pheasants are hiding, waiting for them to come out for food.

Pheasants - N

~~Ravens~~ NOV

Consciousness?

Once upon a time, only hunters and other primitives believed that non-human animals had a kind of consciousness. We had to believe. Our basic myth instructs us to take life in order to feed our families, and then to apologize to our prey and beg it to return in another season to feed us again. For those of us who grew up in the old way, it explains life and death, rain in spring and bright falling leaves -- the cycle of nature that gives us nourishment.

Scientists need clearer proofs of animal consciousness and did not have them, till recently. The evidence is starting to come in from a few extra-clever species such as the raven. Scientist Bernd Heinrich, writing in Natural History magazine, showed that some individual ravens had consciousness, defined as an ability to form [] "mental images of future events in which the intended pictures himself as a participant and makes a choice as to which image he will try to bring to reality...." like one year ~~I don't know whether~~ pheasants are Not that clever, but they do have some things in common with ravens. Both species have managed to make a living throughout the northern hemisphere, surviving in different habitats and on very different foods. Both are tough and adaptable.

60

Perhaps pheasants learn gradually to shape their behavior, which does not require intelligence. Sometimes, however, the learning process seems anything but gradual. The birds had moved off Joe's farm without much hunting pressure, for example, and

settled down in new habitat. They had used distance for cover, which is not a common trait in upland birds.

What impressed me most, however, was the pheasants' ability to understand a property line -- and stand on the far side tempting Charley and me. Human boundaries must be hard to grasp, for a wild bird, especially when the lane between safe and risky territory matters for only a few weeks in the fall.

Oct ?

About ???? words

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KNOWING PHEASANTS

The Far Side
Spring-Creek Experiment
Bozeman Tea Party
The Bird that Thinks

There is no stupid season for the pheasants on spring-creek farm. They are not innocent in June, like the white-tailed [] fawns; not stiff-necked in November, like the rutting bucks; and not frisky in February [] like the foxes. True, you can drive along the gravel road and watch roosters gleaning barley from the stubble, but they have learned that they are safe from cars. Walk along that same road and the pheasants will be gone before you see them.

Wildlife uses the whole farm and those surrounding it, but the core habitat is a place that has survived without much change, over the years since Lewis and Clark passed through, simply because it is too wet to plow and too dry for anything bigger than a trout. Mallards nest between the spring feeeders, snipe winnow overhead, and yellow [] warblers nest in the buffaloberry brush. You can sit on a cottonwood log and watch all the wildlife -- except for one species. You you would not guess

that there are pheasants around you until a cock crows.

When the young pheasants start to explore in midsummer, the part you notice is their heads, high and wary. They dip their beaks in the creek and then look up again instantly. They remind you of the soldiers that King [] David picked for his toughest [] battles [] -- not the men who flopped down on their bellies to drink but those who knelt and sipped from their hands, on the lookout for enemies. []

I know why the young birds fear raccoons, great horned owls, and red-tailed hawks. Mother hen teaches her brood about such predators. She abandons her young before they meet me, however -- and still they hide from me. Deer walk up to my house and peer in the window, wondering which chapter I'm working on, but the pheasants disappear when I reach for my binoculars. How do they know? Who taught them to see into my shadows?

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Fair Game

For my first hunt on the spring-creek farm, eight autumns ago, the only thing I got right was the intelligence collection. Half an hour before sunrise, I tooted my old crow call and was answered by a cock pheasant. I headed for him -- the direct approach. Saw his tracks in fresh snow. Followed them upstream through the brush along one of the spring feeders. He flushed wild, flew across the gravel road, and kept going. I saw the tracks of more pheasants crossing the road right above the culvert through which the miniature spring creek flowed. For birds, the cattails and willows along the creek formed a safe emergency exit.

Lesson 1: Humans like the the shortest distance between two points. Pheasants choose the route with the best cover.

I learned to walk up the gravel road as quietly as possible and enter the cover right where the pheasants wanted to leave it, at the spring-creek corridor. It was an awkward place to start, requiring a climb over a barbed-wire fence defended by brush, and the whole operation had to be done quietly, with no aubible commands to the dog. Not that we caught birds by surprise, even then. The object was just to avoid frightening them so badly that they would flush wild. I would be ashamed to report how many tries it took before I got this right.

The Pheasants' Calender

I had an excuse. The pheasants were not back in the cover

the next time I visited it -- which happened to be the next day. They were not there when I came back two days after that, either. It took three seasons for me to understand that they had a calendar for trickling back into the spring-creek cover.

I still do not know just how the mechanism works, but I suspect the cock pheasants of using the hens as scouts -- not that either would think in such terms. The sexes eat the same food, and it may be that the hens just sneak back in order to avoid competition from the much bigger, bolder cocks.

I saw one cock chase off a fox. (Please take this for what it is -- an experience that may not make sense, but happened.) I saw a small goshawk who ignored cocks in a field while hunting hens in the brush, and catching them. It is not surprising, then, that hens like to stay near impenetrable cover -- such as the snowberry bushes along the feeder springs and the willows whose dead lower branches have fallen to the ground in ancient tangles.

In any case, I have learned that I can hunt the banks of the feeder springs once a week with a chance at one cock pheasant. If we slip up, he gets away and will be even more difficult when we hunt him again a week later. On the other hand, if we get the bird, another will replace him. So it pays to do everything right.

Quickness to learn may be more important than
cunning itself. The Iowa preserve pheasants

The Spring-Creek Experiment

On opening day, the young pheasants do not know how to cope with me and my dog. The mother hen taught them about great horned owls, foxes, and other non-human predators, but left her young birds on their own before hunting season started. I might be able to take out all the cocks in the brood on that first day of hunting in mid-October, but I stop with one and leave immediately.

By my second hunt, a week later, an odd thing has happened. The innocent young pheasants have become sophisticated. It is as if they had held a seminar, right after my departure, in which they discussed the new predator and what to do about him. They seem to process information in the same way as my puppy, who got lost twice on her first day's hunt, when she was three months old, but woke up the next day knowing exactly what she did wrong and how to avoid frightening mistakes from then on.

The pheasants, on the contrary, want to lose me and stay lost. Their main method is to flee to a place where I cannot follow -- the far side of the road. In today's hunting, there is almost always a far side. What is surprising about pheasants is that they take the hint so quickly and reckon so closely the boundaries of safety.

They also have a sense of timing. After two days, there may be no birds on the place at all, or just the ocasional slow-learner. After a week, however, a fair part of the brood has trickled back -- perhaps because they were hunted on the

surrounding land, or perhaps because they remember the barley.

[I can then hunt the covert for the rest of the season, once a week, with some chance of getting a cock each time, if I do it right.]

For the second week's hunt, I have learned to hike up the gravel road as quietly as possible, dogs at heel, and enter the cover where one of the miniature spring creeks flows onto the farm through a culvert. This is the pheasants' main route of escape -- a safe, brushy corridor. In this way, dogs and I can hunt without the help of other human blockers.

The trick, then, is to find the resident rooster before he figures out Plan B. I can't move that fast. The pup can't think that fast. The old dog can, so he takes over. He is not visible in pheasant cover, most of the time, so I follow the sound of his beeper. It it switches to a point signal, I try to loop in from well in front of him so that the bird will be between us.

He may be bright, for a bird, but he has only one escape route clearly in mind.

with good cover that is interrupted for just a few feet by a gravel roadled [] lane. My tactic [] is to walk up lane with my dog and enter the covert at this pheasant corridor, blocking it. When I try entering the covert from some other direction, the dog is likely to find fresh scent but no birds.

[Most gamebirds [] can be pushed out of their core area.

They have patterns of evasion, but beyond that they learn things that one would not expect, of a bird. [Not as far-fetched as it used to be to suggest that a bird thinks. Ravens. A genetic ability to learn]

Boundaries

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fight over the hens in the spring

[Management -- a crop]

[Protecting the Hens]

The spring-creek farm is just sixty acres in size, of which perhaps fifteen is core habitat with everything pheasants need -- good brush, fair grass, and barley stubble for feed. In an average year, one brood of pheasants grows up on the place.

Five cock pheasants were on the far [] side of the lane, necks proud, tails arched, long legs prancing, feathers like sun through autumn leaves. We stopped and accused the birds of showing off, though they may have been thinking of nothing more elevated than roadside grit.

Of one thing we were sure: those five roosters had figured out that they were safer on the far side of the road.

The Long Hunt

My dogs and I follow the pheasants for eight months of the year -- all but the nesting season, and the puppy would do no damage even then. She is interested in everything and therefore catches nothing. Her sire, however, can find nesting hens if I let him. He makes me wonder how they manage to incubate eggs for three weeks. [] Could it be that wild predators have weaker noses than pointing dogs? More likely the skunks and mink [] just have easier things to hunt, whereas my big dog is single-minded.

For two months in autumn, I shoot at the cock pheasants big dog finds. He points them in heavy cover, frequently, and cannot see them tumbling down through November sun, so his daughter may beat him to the retrieve. She figured that part out when she was four months old and all legs. With luck, the taste of feathers will make her a dog like her daddy.

I never gave big dog much formal training but he perceived his mission in life when I shot birds for him. Fortunately, it did not take many lessons. State biologists wanted a census after the season so I pulled out my diary and turned pheasants into numbers, half ashamed, and then calculated that I had walked four and one-half miles for every bird in the game bag. Big dog covered at least ten miles to my one. That would be some forty-five miles of hard going for a pheasant in the mouth.

It was enough. Big dog follows weak scent of pheasant while pup dithers on voles and muskrats. The difference is not energy, not nose, not anything physical. It's commitment. I'm not sure

whether pup has inherited her daddy's brains, either.

Off-season, the dogs are my research assistants, hunting for six months without a shot. Big dog stays with birds and I try to keep up. He points. I flush the pheasant and swing my trigger finger through its flight. He chases for a few yards and comes back with tongue lolling, eyes emitting [] sparks. Pup wishes she could do it.

[Pup does not have the sparks under control. She has not become a hunter. You have to hunt your prey and taste it before you know how to hunt and not eat. You have to learn like Henry David Thoreau.

When I first read Thoreau, I wondered how he could live among brook trout and ruffed grouse without hunting them more often. Here and there in his works, however, his feelings came out. "As I came home through the woods with my string of fish," he wrote, "trailing my pole, it being now quite dark, I caught a glimpse of a woodchuck stealing across my path, and felt a strange thrill of savage delight, and was strongly tempted to seize and devour him raw; not that I was hungry then, except for that wildness which he represented.... I found myself ranging the woods, like a half-starved hound,... seeking some kind of venison which I might devour, and no morsel could have been too savage for me."

Thoreau the hunter had the vision of Thoreau the shaman. He saw nature with an intensity and honesty that no one else has ever quite matched, but he dined on beans. [] He cut down on meat

because he had more important [] tasks and not enough time. The argument would not work, coming from most people, but Thoreau did not marry the woman he wanted, either. Near the end [] of his life, he wrote in in his diary that had married a shrub oak. []

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