

KANSAS

FISH & GAME



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KANSAS FISH & GAME



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COVER PHOTOS

Front cover—Honey bee on spring blossom. Ektachrome transparency by Ken Stiebben.

Back cover—Male red-winged blackbird swaying in the wind is the essence of spring. Ektachrome transparency by Ken Stiebben.

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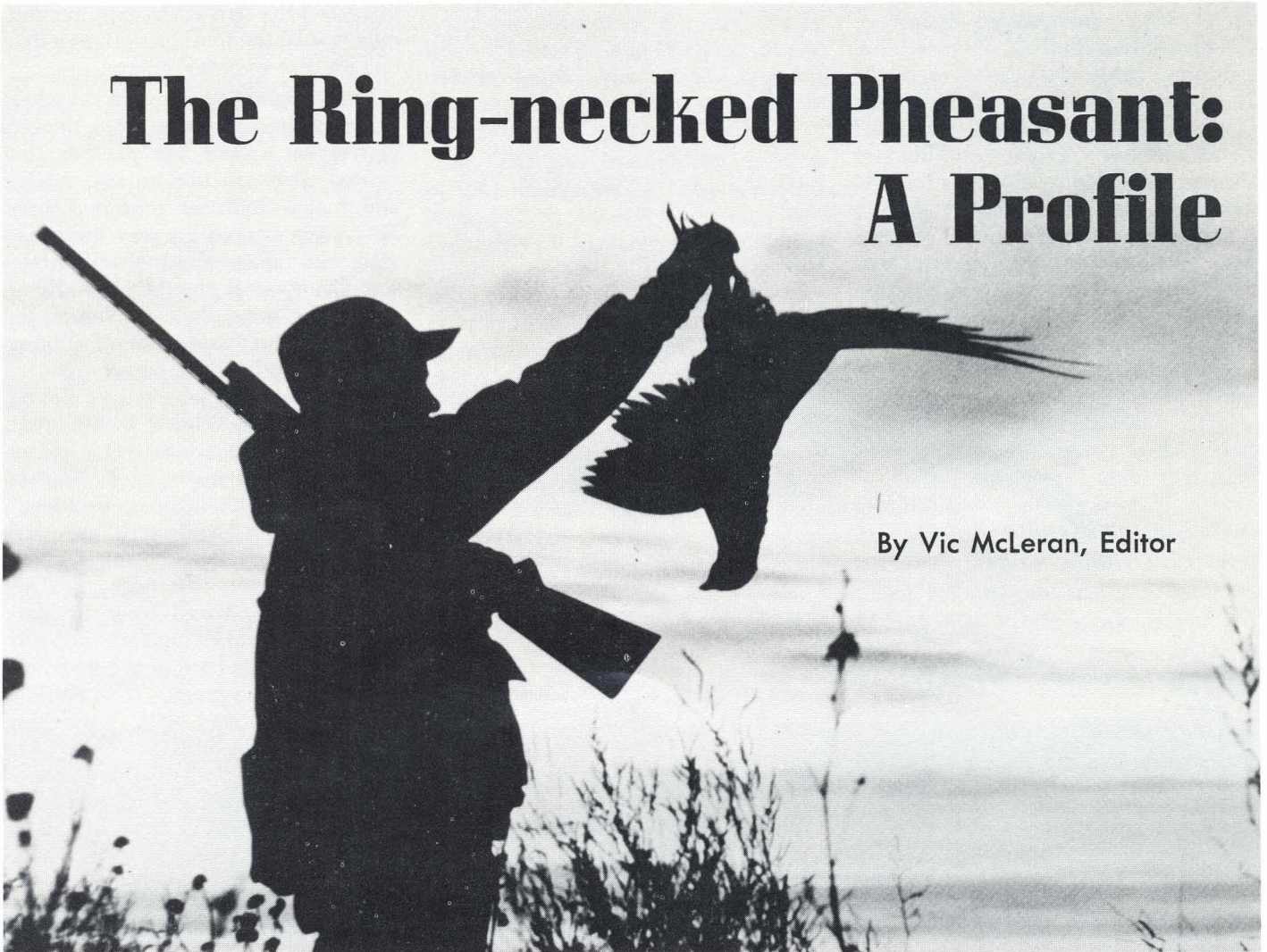
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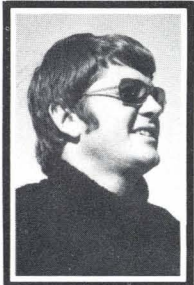
The Ring-necked Pheasant: A Profile

By Vic McLeran, Editor



Ken Stiebben

THE LITTLE liver and white Brittany plunged through frost-burnt switch grass working his way toward the plum thicket. With head down and tail stub vibrating rapidly, he suddenly crouched near the thicket's edge. About 30 yards behind the dog, a pair of brown-clad hunters waded through cover.



McLeran
Moving in behind the Britt, both men tensed as they heard birds rustling in the thicket. Eagerly the dog inched toward the cover.

"Steady," cautioned one of the men, planting his feet solidly behind the

dog. Suddenly a rooster clattered into the air, cackling and flapping. A split-second later two shorter-tailed hens burst from the sand plums. The rooster towered at about 20 feet and began to level off. The hunter swung his 12 gauge pump gun along the bird's flight path, squeezing off as his piece passed the rooster's head. The big pheasant folded in a shower of feathers. Scrambling frantically, the Britt dived into the heavy cover to retrieve the gaudy bird.

Each November, scenes like this are commonplace across much of Kansas as licensed hunters harvest around 600,000 ring-necked pheasants annually. Outside of the bobwhite quail, probably no other game bird exemplifies wingshooting in Kansas like the gaudy pheasant.

The ringneck got his start in the Sunflower State nearly 70 years ago. Jim Norman, supervisor of game research for the Commission, did some research on the history of pheasants in Kansas.

"There were three major periods of pheasant stocking in Kansas," Norman explained. "In 1905 more than 5,000 pheasants were obtained for stocking purposes." This was the state's first recorded pheasant stocking.

For the next few years there were periodic scattered releases of the birds, both by the state and private individuals and game breeders. By 1917, the birds had increased to a point where a season was opened. Running through 1920, these first four years saw a short season; about two



Powerful short, cupped wings enable the ringneck to hit top speeds of 40 miles per hour.

weeks, with a liberal bag and possession limit—there wasn't any! The season was open statewide with no restrictions on hen shooting. The season was closed in 1921 and remained closed through 1931.

The second major introduction effort occurred from 1925 through 1936. During this period, more than 10,000 birds were liberated and about 117,000 pheasant eggs were distributed to interested groups and individuals who agreed to hatch the eggs, rear the young and release them.

By 1932 pheasants were well established, particularly in the northwest section of the state. A two-day season with a two-rooster limit was opened that year and we've had an annual pheasant season ever since.

The third major period of pheasant releases ran from 1940 through 1962. A pheasant farm was constructed by

the Commission in '40 and for the next 22 years, about 20,000 pheasants were stocked annually.

In 1962, the Commission quit stocking ringnecks. A lot of people wonder why. Pheasant specialist Norman explains: "Pheasant stocking had its place when we were introducing the bird to Kansas and it may have had a little to do with helping spread the populations. But now, with all suitable range in the state occupied, stocking has no justification. It has been 10 years since we stocked pheasants and we can clearly see that we were correct in dropping the practice because populations have reacted much the same as they had been when we were stocking. Besides, it took a lot of money and effort in rearing pheasants and our releases accounted for less than one percent of the statewide harvest. And that doesn't mean we

increased the harvest by that amount, only that of the total harvest, less than one percent were pen-reared."

From original stockings in the wheat fields, shelterbelts and plum thickets of western Kansas, the pheasant has drifted eastward into sumac patches and maize fields of central Kansas. He's even worked his way northeastward into the cornfields of hilly Atchison County—on the Missouri River. About the only place in Kansas the pheasant hasn't made himself at home is in the southeastern corner.

Regardless of where he's found, hunters always consider the ring-necked pheasant a prize. One reason is probably his appearance. Garbed regally in metallic hues, the bird's head, ear tufts and neck are dark green. The back and flank feathers are light brown with dark markings while the breast and belly are dark bronze with reddish highlights. Feathers covering the base of the back and tail are bluish-green. The bill is yellow-white offset with contrasting blood-red cheek patches. The 22- or 23-inch tail is light brown with black bars. All things considered, the rooster pheasant is one of the most handsome birds on the continent. His female counterpart has a demure coloring of light brown flecked with black. Measuring as much as 36 inches in length with his tail, the rooster has a wingspan of 32 inches and weighs two or three pounds. Hens average about a pound lighter.

Although hens aren't normally hunted, many biologists feel a few could be taken without hurting the resource. "Those hens which don't successfully produce young are surplus," says Norman. "Letting hunters harvest this surplus would increase hunter success but wouldn't hurt the size of next fall's population."

The rooster's hefty size is another reason for his popularity. Because of this white-meated bulk, the bird makes a meal, not just a snack, like some of our smaller game birds. If you've ever pulled yourself up to a steaming platter of fried pheasant flanked by mounds of mashed potatoes and hot gravy, well . . . you know what I mean.

The cock pheasant's beautiful plumage reaches its finest hour during April—the mating season. Swaggering and crowing loudly, courting roosters are pugnacious, issuing and accepting challenges from other male pheasants. The brawls are rough and tumble affairs with no holds barred. Fighting cocks will approach each other with heads lowered. Suddenly, one rooster lunges forward to grab an opponent with his beak, at the same time leaping into the air and slashing out with needle-sharp spurs. Some battles are so severe that a badly mauled rooster may die.

When dust from these lusty brawls has settled, the winners have usually established their territories. This is when the noise begins. Courting roosters are pretty vocal characters—their raucous crowing can be heard over a mile away on still spring mornings. Announcing to other cock pheasants

that this land is taken, crowing roosters may call as often as every two or three minutes during the peak of the mating season. Most of this crowing occurs just after sunrise and a little before sunset.

As hens pass through the domains of individual roosters, they're treated to quite a show. Approaching a hen, the cock will bow his neck, ruffle his feathers, extend a wing downward and fan his tail, all the while strutting proudly. Early in the season hens are often unimpressed, but as the season progresses, they grow more attentive. And the final selection is invariably made by the hens, not the rooster.

The cock pheasant is a lusty harem master, capable of serving as many as 30 or 40 hens. But females usually aren't this plentiful and the average rooster settles for a coterie of six or eight wives.

Selection of the nest site and actual

construction of the nest are handled exclusively by the hen. The vast majority of nests are built on the ground. There are exceptions though, and one nest in Minnesota was found on a haystack. The most unusual was probably that found in an abandoned crow's nest 22 feet above the ground.

Early in the season, hens are pretty careless about egg-laying, dropping the first few eggs at random. No attempt is made to incubate these eggs. Hen pheasants occasionally utilize "dump nests." John Madson, Winchester-Western's assistant director of conservation, notes in his booklet, *The Ring-necked Pheasant*: "There are times—usually in the early spring—when the hen assumes that any ground nest is a dump nest. Nearly five percent of the puddle duck nests in Iowa's pothole country have been parasitized by pheasants. The nests of king rails, Virginia rails, Hungarian

Freshly-hatched ringneck chicks stumble in to the sunlight. They'll leave the nest with their mother in an hour or so.



Leonard Lee Rue

partridge, mallards, teal, woodcock, sooty grouse and domestic chickens have been usurped by hen pheasants. One mixed clutch in Michigan held six ringneck eggs and thirteen ruffed grouse eggs."

Incidentally, Madson has authored a series of these wildlife portraits for Winchester-Western. Other titles of interest for Kansans include: *The Mallard*, *The White-tailed Deer* and *The Cottontail*. Madson, one of the country's leading outdoor writers, has crammed these booklets with interesting facts in his gutsy, down-to-earth style. They're available at one dollar apiece from the Conservation Department, Winchester-Western, East Alton, Illinois 62024

At first, hens use little lining on the nest but plant material and down feathers gradually accumulate as the eggs are laid. An average of 10 or 12 olive-colored eggs are dropped during April or May. The earlier clutches seem to have more eggs than those laid later.

Incubation lasts 23 or 24 days and is normally handled solely by the hen. Weighing less than an ounce at birth, the newly-hatched pheasant chicks are clothed in down and able to run about as soon as they're dry. The youngsters are brooded constantly by the hen until they're several weeks old. Several days after hatching, the chicks begin replacing their natal down with juvenile plumage. At two months of age, the post-juvenile plumage feathers begin coming in and when the season opens in November, it's tough to identify young birds from old by plumage alone.

The hen pheasant is fairly protective of her eggs or chicks. Bull snakes occasionally develop a taste for pheasant eggs. But nesting pheasants have been known to rout snakes and in one case, a pheasant killed a bullsnake. In Ohio, a hen pheasant with chicks was seen actually charging a grown collie.

During the early weeks of a chick's life, the little fellow feeds almost entirely on insects. But as he grows older, he turns more and more to seeds and grain. Foxtail and rag-

weed seem to be a couple of favorites. Domestic grains like corn, maize, wheat, oats and barely are also heavily utilized. Wild fruits such as sand plums, elderberries and wild grapes are taken too. There have been reports of Pennsylvania ringnecks getting "high" from eating frost-fermented wild grapes. At certain times, usually in the spring, they'll also include leafy greens in their diet.

The ringneck isn't above a little meat in his diet either. Snakes, mice

before the young rooster becomes a rugged mature cock pheasant. As a mature bird, the pheasant is remarkably resistant to disease, starvation and injury. Pheasants have been trapped that had shot-broken wings perfectly healed, even though the bone ends overlapped by more than an inch. Madson cites one Nebraska study in which pheasants were pen-trapped. Five cock pheasants were captured that had lost a leg at or below the knee. Another old cock



Leonard Lee Rue

More drably marked than her male counterpart, a hen pheasant is also slightly smaller.

and even young cottontail rabbits have shown up in pheasant crops. Both living snails and empty snail shells are also eaten—probably for their calcium content. In fact, hens may feed heavily on this rich source of calcium during the laying season.

At times, pheasants can really mess up a vegetable garden. Tomatoes, cucumbers, cantaloupes and watermelons all appeal to the ringneck. Tomatoes can be particularly hard hit during drought periods when pheasants eat them to obtain water.

Given a proper diet, it's not long

pheasant was seen stumping across the fields with no feet at all, though apparently in good health.

Rugged as they are, pheasants suffer little from predation. Although there are several natural predators that take an occasional ringneck, none have much of an effect on established pheasant populations. Crippled, sick or unfit pheasants are normally the victims. Coyotes, foxes, bobcats and great horned owls probably get a few adult birds but the number is negligible. Free-ranging dogs and feral house cats also nab an occasional

pheasant. And skunks, crows, 'coons and weasels will take a few eggs during the spring nesting season. Most hawks aren't big enough to give the pheasant much of a problem. Madson mentions one instance where a marsh hawk landed near some partially-grown pheasants. The old hen that was watching the youngsters calmly walked over to the hawk and gave him an emphatic peck. At this point the hawk took wing in search of a less aggressive meal.

With the coyote population being what it is in Kansas, you'd expect coyotes to feed heavily on the pheasants. Not so. One study which collected 8,339 coyote stomachs found pheasant remains in only 11 stomachs.

Probably the most unusual incident surrounding pheasant predators involved a snapping turtle in Pennsylvania. A hen pheasant was drinking from a small pool when a snapper grabbed her by the neck. A soil conservation agent heard the struggle and raced to the hen's rescue. He pried the turtle's jaws apart but the hen died soon after.

Cars and farm machinery often take a pretty heavy toll of pheasants—especially during spring and summer. A study in Oregon revealed that, outside the farm machinery kill, motor vehicles accounted for more accidental pheasant losses than any other cause.

Deadlier than automobiles are the high speed mowers which strip alfalfa fields where the hens are nesting. In addition to broken nests and smashed eggs, a large number of tight-setting hens are killed or crippled by mower blades. In western Ohio, where 200,000 acres of hay and grainfields were studied, nearly one-third of the nesting hens in the hay fields were killed by mowers. One hen was observed returning to her nest with both legs clipped off by mower blades. Wounded as she was, the hen continued to incubate her eggs even as she bled to death.

Madson, in his comprehensive,

booklet on pheasants sums up this loss to mowing, "So long as pheasants nest in alfalfa, a grievous percentage will be butchered by early mowing."

Outside of mowing, probably the greatest single threat to ringneck populations is the recent agricultural tendency to rip out shelter belts, plum thickets, brushy draws and hedge-rows, converting these areas to pasture or croplands.

The Fish and Game Commission has recently begun a program which should benefit pheasant and other wildlife species, both game and non-game. It's called Wildlife Habitat Improvement Program; WHIP for short. Basically, it's a program in which biologists provide landowners with technical assistance in improving and developing wildlife habitat with little or no cost or sacrifice of agricultural production.

A similar program, called Acres for Wildlife, is jointly sponsored by Kansas State University Extension Service, Soil Conservation Service and

the FF&G. In the program, landowners are encouraged to set aside a plot of land for wildlife habitat. The plot may be left in its natural state of cover or it may be seeded to suitable cover for wildlife at the option of the landowner. Acres for Wildlife is aimed at saving spots like groves, ditches, fence lines, pond edges and draws—areas which are not suitable for farming operations.

Hopefully, programs like these will provide the ringneck with more of the habitat he requires. "With continued cooperation of landowners, we'll be able to raise the base population of pheasants and many other forms of wildlife," says Norman.

Let's hope so. Because if these programs don't work, future generations of Kansas hunters won't be able to experience the thrill of opening seasons on one of our most magnificent game birds—the ringnecked pheasant.

Bringing home the bacon—a big rooster pheasant makes a real meal.



Leonard Lee Rue

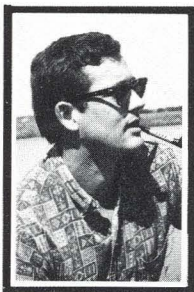


The Buffalo: Heads he lost, Tails he lost,

By Bill Scott, Staff Writer

*Photos courtesy of the
Kansas State Historical
Society*

TEN MILLION buffalo in Kansas. What hard, flat things numbers like that are! They don't speak to us because we can't relate to them. How does one communicate to a 1974



Scott

audience, when the writer did not see it himself, that prior to the white man coming through Kansas on the Santa Fe trail in 1820 there were about 10 million animals weighing 1700 to 1800 pounds apiece blanketing the plains of our state? How does one picture a rolling, seething brown tidal

wave of huge shaggy bodies inundating the earth near where such towns as Wilson, Little River, Hutchinson, Medicine Lodge, Cimarron, Dodge and Garden City now stand?

Peaceful and quiet as they were huge, very little sound issued from a herd of buffalo as they grazed and loafed and dusted in their wallows. No bawling or lowing was heard as in a herd of domestic cattle, only a far-off snorting. A herd of buafflo overwhelmed the viewer with the sheer awesomeness of its numbers and massiveness.

In *The Kansas Historical Quarterly* of autumn 1973, Kansas University journalism professor David Dary records the astonishment of several eye-

witnesses. One such traveler was Thomas J. Farnham. He was crossing Kansas on the Santa Fe trail in 1839 near where the town of Lyons now stands. He later recalled moving through one herd of buffalo for three days in that area!

"It appeared oftentimes extremely dangerous even for the immense cavalcade of the Santa Fe traders to attempt to break its way through them. (Several Kansas and Pacific and Santa Fe railway engineers were to later learn the truth of this. When they tried to bulldoze through a herd, the engines were tossed off the tracks like a toy. Train crews soon learned to stop and wait until a herd passed.)

"We traveled at the rate of fifteen

miles a day. The length of sight on either side of the trail, 15 miles; on both sides, 30 miles:—15 (miles traveled a day) \times 3 (days traveled) = 45 \times 30 (miles visibility on both sides of the trail) = 1,350 square miles of country, so thickly covered with these noble animals, that when viewed from a height, it scarcely afforded a sight of a square league of its surface," Farnham wrote.

A league is about three miles; so apparently Farnham was saying that he could not see a total of nine miles of land surface out of 1,350 square miles he viewed because of the densely packed animals.

In 1852, 13 years later, the immense herds of south central Kansas still defied description. In June, 1852, an unnamed army officer was quoted in the *New York Daily Tribune*,

"As we approached Little Cow Creek, the entire surface of prairie plain and slope appeared black with countless numbers of buffalo." The next day he wrote, "We soon came in sight of thousands of buffalo spread over the prairies to the left and right of the road."

Probably, "Little Cow Creek" was the headwaters of "Cow Creek" of today which flows through Barton and Rice counties on its way to Hutchinson.

A scant 103 years ago, in 1871, Major Richard I. Dodge, for whom Fort Dodge and later Dodge City was named, took a buggy ride he remembered years later. Driving southwestward along the Arkansas River toward Fort Larned, he was overwhelmed by what he saw.

"The whole country appeared one mass of buffalo, moving slowly northward. Only when among them could it be ascertained that the apparently solid mass was an agglomeration of enumerable (*sic*) small herds of fifty to two hundred animals. This great herd was about five days passing to a given point, and not less than fifty miles deep. From the top of Pawnee Rock I could see from six to ten miles in every direction. The whole space was covered with buffaloes, looking at a distance like one compact mass, the visual angle not permitting the ground to be seen."

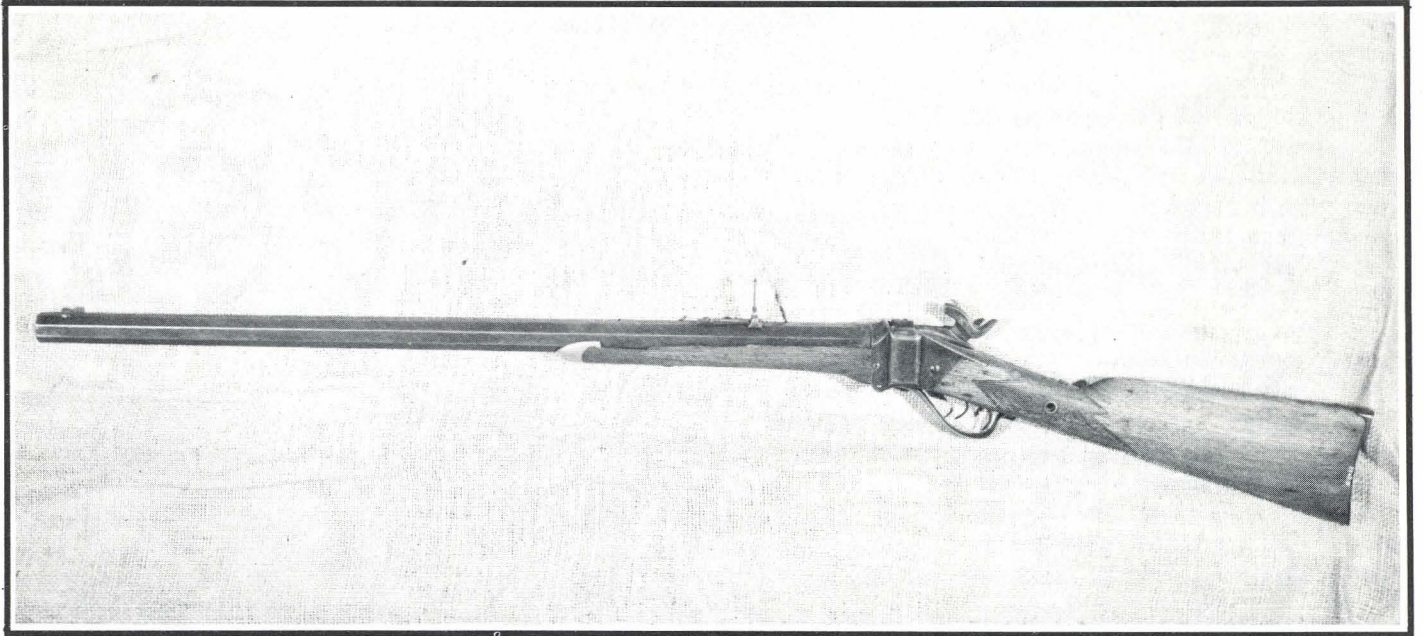
In his Osborne county farm home, old buffalo hunter Jeff Durfey recalled watching an unbelievable thing happen not once, but twice. He was camped in western Kansas, on the banks of Beaver creek. His story went, "(The stream) was six feet wide and six inches deep, with swiftly running water. A buffalo herd came to the creek above our camp and drank it dry. For hours the creek was dry until the great herd had passed on.

Durfey also claimed that in 1872, he saw another immense herd drink the Solomon river dry and the river was 25 feet wide and one foot deep before the buffalo came, writes David Dary.

Durfey wasn't alone in his claims of seeing buffalo "drink the river dry." During the parched summer of 1868, northern McPherson county settlers were startled to see a vast herd stretching for 30 miles moving in rapidly from the east. The Smoky Hill river was the appointed victim of this onslaught. "Hundreds, thousands, and even hundreds of thousands of buffalo watered at the river that hot day, and



Estimates on the number of buffalo killed in Kansas vary from one to three million. In most cases, the animals were simply stripped of their hides and left to lay.



An old Sharp's .50 caliber buffalo gun. This is the rifle which Indians said, "shoots today and kills tomorrow."

buffalo drank the river dry," gasped one McPherson county pioneer.

Then, they were gone.

To the southwest retreated the tattered remnants of the once-magnificent Kansas buffalo herd. When the white man came, it was useless for Fate to flip a coin to decide what would happen to the buffalo. That decision had already been made; for with the buffalo, heads he lost, tails he lost.

A bullet was marked for the last wild Plains bison in Kansas in 1879. Wandering lonely and forlornly west of Dodge City, his death brought an end to the 1870's, the Decade of Slaughter.

Between 1820 and 1879 is an astounding story, though, which copy limitations allow us to only scratch the surface.

Even long before the white man came, Indians killed thousands of buffalo, perhaps a million or more. In the *piskun* a popular method for killing bison for Indians living in cliff-and-canyon country the buffalo were driven over a cliff and dashed to death on the rocks below. Because of this state's terrain, this was probably used very little in Kansas.

Another method, the *impound*, was

probably used some in eastern Kansas where timber was plentiful. Here, the buffalo were driven into corrals fashioned out of logs and rocks and killed.

The *surround* was likely the most popular method of harvesting buffalo for the Plains Indian of Kansas. Here, Indians would form a cordon around a herd, circling on foot as many buffalo that the braves felt they could handle. Then, Dary writes, "running in circles around the terrified animals, yelling loudly, they would slowly close the circle, making it smaller and smaller." Then the lances and arrows would fly, and the dead animals would serve as a roadblock for the animals still alive. Buffalo were unwilling to pass the carcasses of their comrades, and Colonel Dodge wrote that a white man witnessed 300 buffaloes killed in the space of 10 minutes using this method—(and) "not a single buffalo escaped."

The Indians' killing accelerated considerably after the horse came to Kansas. Most authorities pooh-pooh the idea that the horse came to the Indian accidentally from Spanish explorers by lost or straying animals. Instead, the currently popular theory is that the horse came to Kansas through trading with Spanish settlements in

Texas and New Mexico. If true, it dispels the myth that Indians were relatively little-traveled "stay-at-homes." Our Indians wandered a great deal, apparently.

Even with the horse, the Indian wasted little. Hides for robes and teepees, liver, heart, intestine, brains as well as the meat was the Indians' staff of life; tendon for bowstrings and twine, hair for ornaments and rope, back fat for hair grease, bones for spears and tools of all kinds—like the shoulder blade, which was used for a hoe—the bladder used as a canteen for drinking water, and the buffalo chips burned for fuel on the Great Plains where timber was scarce, may give you some idea of the uses the ingenious red man found for his precious and life-sustaining buffalo.

No wonder the Indian was quickly enraged when he saw the white man come with his Sharps .50 caliber, cut out the tongue and perhaps a choice rump roast and leave the rest for the wolves. And let us face this fact right now: The buffalo hunter has too often been pictured with a halo, for if it were not for his efforts in exterminating the plains of the buffalo, the Indians' food supply, we would still be fighting them today.

Make no mistake about it: Buffalo hunters were in it for cash, not because they had caught a glimpse of some lofty vision—to make the plains safe for democracy, or anything like that. There was money in killing buffalo!

One of the most celebrated, William “Buffalo Bill” Cody, was only a young man of 23, and just a cut above average in marksmanship. He had done a good job killing buffalo for the Kansas Pacific (later to become the Union Pacific) when it was laying tracks for Kansas, but he was now out of a job and loafing in Nebraska near Fort McPherson.

E. Z. C. Judson, a writer of dime novels from New York City, would take care of that. Judson, whose famous pen name was Ned Buntline, saw just the qualities in Cody he liked. Soon the propaganda factory began to turn, and Cody was a national hero virtually overnight. This helped to draw Easterners westward, under the impression that “buffalo are just out there for the taking, and there’s money in it!” In all fairness to Cody, he was not quite the fraud that latter-day historians have made him out to be. He was skilled in his profession, but his accomplishments pale before the gun of Josiah Wright Mooar, a blue-eyed hellion from New England.

Mooar, using the Sharps .50 caliber buffalo gun the Indians said “shoots today and kills tomorrow,” set a pattern that others followed, although less successfully in a financial sense than Mooar.

Mooar would not do any of the fancy, show-off riding alongside a buffalo, shooting and whooping at the top of his lungs. Instead, Mooar went about it in a businesslike way, as befit a businessman.

The 19-year-old Mooar would spot a herd the day before. As day broke, he was on his “stand,” a high bluff or hill overlooking the herd. Each herd was broken into segments of 10 or 20 animals, and each segment was bossed not by a snorting old bull, but by an old cow! Mooar would shoot the old cow through the lungs so she would stomp and beller and mill about before she would topple over. The other

buffalo would excitedly mill around her, sniffing the blood, making no attempt to escape. Mooar would simply fire as fast as he could until he killed 20 to 30, as much as his skinners could handle for one day. About as exciting as shooting cows in a barnyard, but efficient.

Billy Dixon would kill 50 buffalo a day using this method, once killing 101 without moving out of his tracks. Zack Light killed 2,300 buffalo during one season in Kansas. Tom Nixon killed 110 head in 40 minutes on the head waters of Bluff Creek in western Kansas. Doc Carver, Nebraska dentist who later starred in Buffalo Bill’s Wild West Show, claimed he killed 30,000 buffalo in his hunting career—many of those animals coming from Kansas.

And so the white man, shooting from trains, killing the buffalo in wholesale numbers like those above, drunken soldiers on a tear, farmers who would shoot any and all buffalo they saw—managed to kill ‘em off by 1879.

Only those hard, cold figures are left to us to try to grasp the magnitude of the slaughter, and they con-

flict badly. Frank Mayer, a buffalo runner quoted in Charles B. Roth’s *The Buffalo Harvest*, believed that 3,158,730 buffalo were killed around Dodge City and its surrounding territory in the years 1872, 1873 and 1874. The animals were all shipped via the Atchison, Topeka and Santa Fe railroad, the only line serving that area.

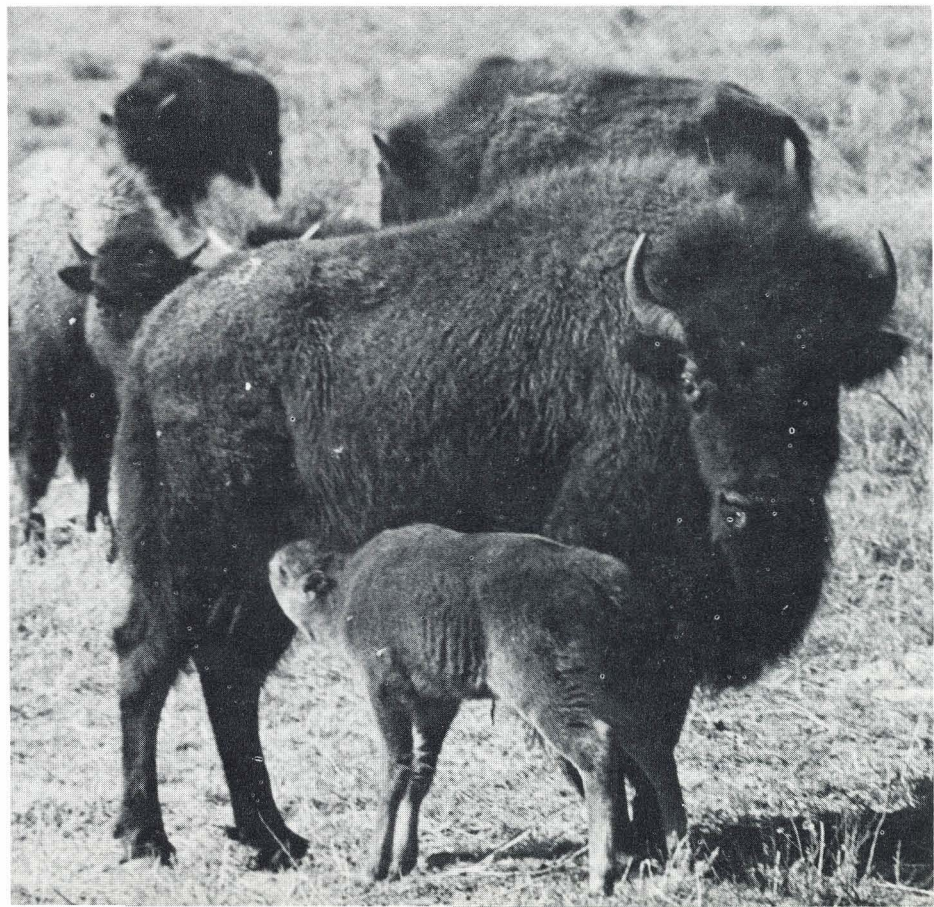
However, Col. Dodge in 1877 in his book, *The Plains of the Great West*, for those same years gave the total number of hides shipped by all railroads in the state at 1,378,359. That figure, supposedly given him by the railroads, perhaps reflects the railroads’ practice of setting estimates low to keep the competition guessing.

There can be no guessing as to who killed the buffalo, though.

They were the ones who, basically had dollar signs before their eyes.

Editor’s Note: David Dary, journalism professor at Kansas University was mentioned several times in the text. An extremely keen buffalo historian, Dary has compiled a comprehensive portfolio on the animal, entitled *The Buffalo Book*. Published by Swallow Press, 1139 S. Wabash, Chicago 60605, the book is slated for distribution in June 1974.

From buffalo herds numbering in the millions, all that remain are a few small bands on state areas.

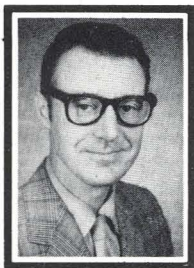


Ken Stiebben

Flavored Catfish

By Paul Bocquin, Staff Writer

NEXT TIME you catch a channel catfish from a Kansas pond or stream and it has a muddy or "fish" odor or flavor, don't blame the fish. It's the water this fish was swimming in that's really to blame.



Bocquin

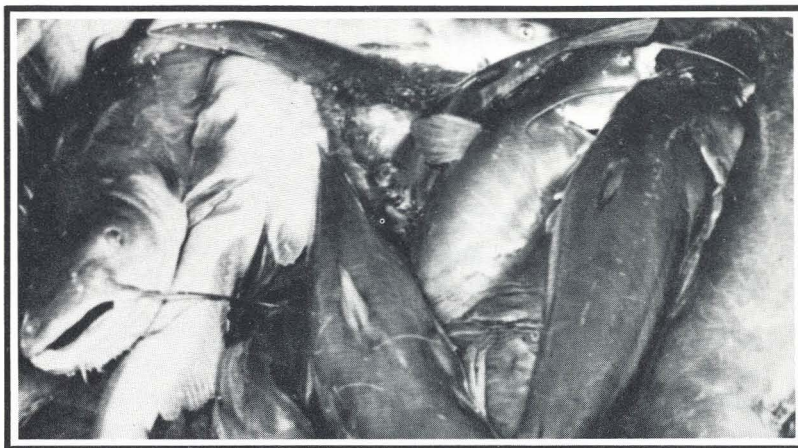
This and other data are being compiled in a research project at Kansas State University that includes a female graduate student who wades in fish ponds and a chemical laboratory employing sophisticated equipment that resembles an electrocardiogram used in measuring the human heartbeat.

The research is sponsored jointly by the Kansas Agricultural Experiment Station; Kansas Forestry, Fish and Game Commission, and the National Marine Fisheries Service.

The leading lady is Lilia L. Maligalig, who received a bachelor's degree in food technology in her native Philippines. Since enrolling at KSU in 1970, she has received a master's in foods and nutrition. Now she is writing a dissertation for a Ph. D. on catfish flavors.

Directing the K-State research are Dr. Jean F. Caul, food scientist with the Department of Foods and Nutrition and Dr. Otto Tiemeier, professor of the KSU division of biology.

Working out of three different research labs on the KSU campus, Lilia has been finding out why channel catfish taste and smell the way they do and learning what methods can be employed to improve fish quality.



She was not unfamiliar with the subject before coming to K-State. Fishing is a major industry in her country and fish is a staple item in the diet of most Filipinos.

When channel catfish were shipped into the Kansas Agricultural Experiment Station's Fisheries Research Laboratory, Lilia could often be seen wading among the 28 plastic lined ponds at the hatchery. The Tuttle Creek laboratory was started 10 years ago and is one of the oldest research facilities for channel cats in the state.

Lilia used a seine to gather fish for the aquarium lab in Bushnell Hall.

There the fish were held in 150-gallon tanks, where they underwent a fasting period to purge out muddy flavors.

Pre-flavoring takes place while the fish are still alive. This is done in a 20-gallon flavoring tank filled with dechlorinated tap water. An air hose feeds oxygen into the tank. The water is flavored with a small quantity of liquid smoke or whatever flavor is preferred—about one-fourth cup per 150 gallons. The fish swim around in this solution for 30 minutes.

"The amount of flavoring varies but the time factor remains constant," Dr. Caul explained.

First step in the catfish-flavoring process begins when Lilia Maligalig, KSU doctoral student, adds a small amount of liquid smoke to tank containing channel catfish.



Paul Bocquin

KANSAS FISH & GAME

NEWS

P.O. BOX 1028

PRATT, KANSAS 67124



EDITOR'S NOTE: The following news items have been condensed from the Kansas Forestry, Fish and Game Commission's weekly news release. Compiled by the Information-Education Division the release is mailed to news media throughout the state. In coming months, we'll select items of interest for inclusion in this news insert.

News contact: Ross Harrison

Phone— 316/672-6473

RELEASE _____

RECORD TROPHY DEER TAKEN

(released February 1)

PRATT--An all-time trophy deer record for Kansas bowhunters was set during the 1973 archery season the Kansas Forestry, Fish and Game Commission reports.

A 10-point white tail deer, taken with bow and arrow by Stan D. Christiansen, Manhattan, stacked up a trophy rack measurement of 179 7/8. The deer was killed Nov. 21 in Riley County on Sweed Creek.

Archers wishing to enter their trophies for Kansas or national records should send for applications at the Kansas Forestry, Fish and Game Commission, Box 1028, Pratt, Kansas 67124.

####

TURKEYS TRANSPLANTED TO NEW AREAS

(released February 1)

PRATT--Twenty seven Rio Grande wild turkeys have been transplanted from Barber and Harper County flocks into new areas by state game biologists to expand the turkey range in Kansas.

Game biologist Bill Hlavachick, of the Forestry, Fish and Game Commission, recently trapped the turkeys with a drop net.

They were transplanted to the following areas; seven hens and three gobblers to an unoccupied area in Stafford County; nine hens and three gobblers to an unoccupied area in Kingman County; three hens added to an existing flock of six turkeys also in Kingman County; and two gobblers to an 18-hen flock in Ness County.

Through similar trap-transplant efforts to expand the turkey range in Kansas over the last 10 years, the wild turkey has made a phenomenal comeback.

Though nonexistent since the late 1800's, the wild turkey in Kansas have built up the early 1960's enough to support a limited, gobblers only hunting season this April in southwest and southcentral Kansas.

Game biologists also are in the process of obtaining Eastern wild turkeys from Missouri for stocking in two release sites in eastern Kansas. The Rio Grande turkey requires dry habitat, such as in western Kansas, while the Eastern turkey prefers more timber and the moisture found in eastern regions of the state.

####

Crispino was selected for his outstanding promotional work for National Hunting and Fishing Day observances the past two years, resulting in a better public understanding and appreciation for the commission's work and the role of the hunter and fisherman in conservation.

He was also cited for his cooperation and diligent effort in working with various sportsmen clubs in southeast region.

Other commission law enforcement officers considered for the award were Paul Lies, Hutchinson; Clyde Ukele, Oberlin; Charles Schmidtberger, Marion; and Jim Kellenberger, Jetmore.

####

CREEL CENSUS TO IMPROVE ANGLING (released March 1)

PRATT--Kansas anglers this spring will be major participants in helping fisheries biologist improve angling in years to come.

For the first time on a statewide basis, the Forestry, Fish and Game Commission will conduct a census of fishermen.

At the 20 federal reservoirs and half of the 42 state fishing lakes, biologists and possibly some partime help later this summer, will be asking fishermen what they caught, how long they've been fishing at the site and several other questions.

Fisheries chief Roy Schoonover said the creel census will tell biologists how fish management projects are working and where these management steps should be strengthened.

Coupled with fish tagging projects, the creel census will make it easier for biologists to find how many tagged fish are caught and, therefore, the population of that fish in the water.

When biologists analyze activities and success of fishermen, they will be able to adjust fisheries management for increased harvest of game fish, according to Schoonover. He said the creel census will be run during most of the fishing season this year and for years to come.

####

SNAGGERS PAY \$112 BARRED FROM LAKE (released March 8)

PRATT-- Two Chanute men were barred from fishing in Fall River Reservoir for 60 days and paid fines and court costs totalling \$112.30 for illegal fishing there on Feb. 19, the Forestry, Fish and Game Commission reports.

Marion C. Kibler and R.O. Beaman were apprehended by state game protectors Al Halbhook and Everett Wilnerd for snagging fish below the outlet.

The subjects were taken before Greenwood County Judge Harriet Shumard in Eureka the same day and pleaded guilty to snagging two flathead catfish. Kibler was also cited for not having U.S. Coast Guard approved life preservers aboard his vessel.

####

COURTESY WATER PATROL (released March 8)
SET FOR BOATING SEASON

PRATT--After six weeks of intensive training at the National Boating Safety School in Yorktown, Va., members of the Forestry, Fish and Game Commission's new water patrol are ready for the 1974 Kansas boating season.

Completing the course were boating administrator Oliver Gasswint, Pratt; and members of the patrol team, John Lingg, Newton, Raymond M. Beisel, Concordia, and Billy E. Cox, Manhattan.

Total class enrollment at the Yorktown school was 27, including 14 from the Coast Guard and 13 state personnel - 4 from Kansas, 3 from Georgia and 6 from the District of Columbia.

The Kansas water patrol team had previously completed the six-week SASNAK Training School last summer and five weeks of basic training at the Kansas Law Enforcement Training Center in Hutchinson last fall.

A busy season awaits the three water patrolmen. At the recent Fish and Game Department Conference at Rock Springs Ranch, Gasswint said the number of power and sail craft in Kansas has increased from 30,000 in 1960 to 70,000 in 1973, or about 10 per cent annually. The rise in recreational boating has increased the number of boating accidents and property damage, although Kansas has a far better safety record than many other states.

The courtesy water patrol has been equipped with 19-foot inboard-outboard vessels that will be used primarily on federal reservoirs. Safety check lanes will be carried out similarly to auto safety checks. Informational material will be provided to boaters.

###

PADDLEFISH ARRIVE (released March 22)
AT CHETOPA DAM

PRATT--Although a little late for the scheduled March 10 opening of snagging season, paddlefish have now arrived at Chetopa Dam, according to R.W. "Bill" Fowler, Weir, fourth district commissioner for the Kansas Forestry, Fish and Game Commission.

Two male paddlefish were caught this week below the dam, weighing about 17½ pounds each. John Ray, Chanute, regional fisheries supervisor, said the water level of the Neosho River is down but still adequate for fish movement.

This is the third paddlefish snagging season along a short stretch of the Neosho directly below Chetopa Dam. Commission personnel were to post this area to indicate open season. When not posted, the season is closed.

Under certain conditions, the river will be closed to snagging if other game fish are congregating in large numbers and there is risk that anglers will snag the wrong species.

There will be no creel limits imposed during snagging season. Rough fish, such as carp, buffalo suckers and others can also be snagged. But fishermen are warned that any snagged game fish must be immediately returned to the water.

-more-

Legal hooks may consist of not more than two, single-shank hooks, or one single-treble hook not larger than No. 1.

####

BLUE CATFISH AVAILABLE (released March 22)
TO KANSAS FISHERMEN

PRATT--Blue catfish have been stocked in state fishing lakes and reservoirs at various locations throughout the state, the Kansas Forestry, Fish and Game Commission reports. Catching one can be an everyday occurrence this season, although this was not true a few seasons back.

Verl Stevens, fish hatcheries supervisor, offers some pointers on how to distinguish a blue catfish from a channel catfish.

The skin color has nothing to do with it, he points out. In general appearance, the blue catfish has a distinct hump on the back near the dorsal fin or directly behind the head. Its head is much smaller than the channel cat.

"A very definite characteristic is the anal fin on the bottom side of the fish, right in front of the tail. It is much longer on the channel catfish," he explained. "This fin has 30 to 35 bones or rays on the blue catfish, while the channel cat has only 24 to 29."

Blue catfish have been distributed by the Commission to various public fishing areas over the state, Stevens said. In 1972, there were about 14,000 "short" blue cat produced, measuring 8 to 11 inches long. They were stocked in 13 state fishing lakes as well as Marion and Norton reservoirs.

At Marion Reservoir, each fish was tagged during stocking to find out about its movements. Fishermen catching these tagged fish are asked to turn the tags into the local game protector or mail them to Commission headquarters in Pratt.

"This tagging study has indicated that some fish are leaving the reservoir and going downstream. The majority of those picked up so far are from the stream below the dam. However, this does not indicate most of the fish are leaving the reservoir as fish usually concentrate in these areas where the water is discharging," he explained.

Blue catfish were stocked in the following state fishing lakes now open: Lyon, McPherson, Neosho, Woodson, Jewell, Lane, Logan, Scott, Sherman, Barber, Kingman and Kowa.

Nemaha State Fishing Lake which opens later to fishing, was also stocked with blue cat. Stevens said most lakes received 500 to 1,000 blue catfish.

####

STATEWIDE CREEL
CENSUS UNDERWAY

PRATT--A statewide creel census is being conducted by the Kansas Forestry, Fish and Game Commission under Project SASNAK, which has as one of

its goals to increase by 50 per cent the take of game fish on public fishing waters.

Bob Hartmann, supervisor of fisheries research and management, said that while similar limited censuses have been taken in the past, this is the most comprehensive study. Work has been started at all of the federal reservoirs and about half of the state fishing lakes in Kansas.

The initial program is set up for a three-year period. Fisheries biologists will be working at these locations throughout most of the fishing season, March through October.

Already, they are gathering valuable information about the best fishing spots from anglers who are appearing on many of these lakes and reservoirs. "We have been able to pinpoint some good location," Hartmann commented.

Among the questions biologists are asking fishermen are the amount of time spent fishing and the success they have had. "Failure to catch a fish is just as important to us as success," he pointed out.

Man days of use and fisherman success are the key factors in determining effectiveness of management techniques being applied, so the creel census will indirectly improve the take of game fish as specified under Project SASNAK.

####

ILLEGAL FISHING
PROMPTS OUTLET CLOSURE

(released April 5)

TOPEKA--Outbreaks of illegal fish snagging at the outlet of Perry Reservoir have prompted the Kansas Forestry, Fish and Game Commission to close temporarily fishing at that reservoir's outlet structure.

From FF&G Commission headquarters in Pratt Thursday afternoon, Director Dick Wettersten announced the Perry Reservoir outlet will be closed to all fishing activity from 3 p.m. Friday, April 5 through 10 a.m. Tuesday, April 9. Only the outlet stilling basin will be closed, stressed Wettersten. The reservoir remains open to fishing.

Wettersten said he acted on information by regional game protector supervisor Glen Hurst that illegal fish snagging, especially for large walleye, was rampant at the outlet. About 20 illegal fishermen were issued citations last week alone, but Hurst said tough enforcement action has not slowed the snagging.

Hurst reported that illegal snaggers have gone so far as to carry photographs to identify local game protectors who sometimes survey the area in plain clothes. He said it is difficult to enforce the no snagging law because offenders cut their lines in the water if they feel an enforcement official is observing. Snaggers heavily interfere with legal fishermen by entangling their lines.

With the backing of resident Corps of Engineer official Lynn Meyers, Wettersten said the closing is meant to encourage legal and honest anglers to police their own ranks.

"The purpose is not to stop fishing," said Wettersten. "We just want to bring this illegal activity to a stop and obtain the good angler's support to keep it that way. We won't hesitate to close the Perry outlet again, or those at other reservoirs, if illegal snagging continues to be a problem.

HAMILTON PROMOTED TO
REGIONAL SUPERVISOR

(released April 5)

DODGE CITY--The Kansas Forestry, Fish and Game Commission announced the promotion of Marvin "Butch" Hamilton, Salina, to southwest regional law enforcement supervisor. The announcement came from Commission John Luft, Bison, of the third district and Commission Chairman Jack Haley of Minneapolis. Hamilton, 54, replaces John Spence, who retired recently because of ill health.

Hamilton is the son of Mrs. Anna Hamilton, Guide Rock, Nebraska. Mrs. Hamilton formerly lived in Mankato.

The new supervisor comes in with 16 years of experience in the Commission. He joined the Fish and Game in 1958 and served as reservoir superintendent at Lovewell Reservoir.

Following military leave, he returned as game protector. His most recent assignment was district game protector for Saline and Ottawa counties.

As regional supervisor with headquarters in Dodge City, Hamilton will be in charge of eight district game protectors over a 24-county area.

Counties under Hamilton's law enforcement jurisdiction are Edwards, Pawnee, Stafford, Gray, Finney, Haskell, Pratt, Kiowa, Barber, Rush, Barton, Ness, Hodgeman, Ford, Grant, Morton, Seward, Stevens, Hamilton, Kearney, Stanton, Meade, Comanche and Clark.

####

OPENING DATES SET
FOR BIRD SEASON

(released April 5)

PRATT--Opening dates for pheasant, quail and prairie chicken hunting seasons have been set to be Nov. 2 by the Forestry, Fish and Game Commission.

Commission Chairman Jack Haley, Minneapolis, explained the opening date is about a week earlier than in past years. He said the Nov. 2 opener is closer to the production period of the three game birds, so there will be fewer birds lost to natural causes before the hunting seasons begin.

Complete season regulations such as bag limits and season length will be set this summer, said Haley.

Haley also announced that in the April meeting of the FF&G Commission tentatively set for April 17, there will be formal recommendations for Kansas' first antelope season. Recommendations are expected to call for a three-day antelope season with limited permits available for hunting in portions of Wallace, Logan and Sherman Counties on the western border of the state. The 1974 deer seasons will also be set at the April meeting.

Commission Chairman Haley added that new regulations for raccoon hunting also will be recommended at the April meeting. Changes in raccoon hunting regulations were recommended by representatives of at least 10 raccoon hunting clubs who attended the March 27 meeting of the Forestry, Fish and Game Commission at Pratt.

####

Other flavors experimented with include vanilla, orange, garlic and onion but smoke flavored fish are of primary interest for commercial purposes.

The long-range goal of pre-flavoring was to recommend, from consumers' viewpoints, preferred methods for producing, processing, and handling catfish in retail markets, homes and restaurants. The immediate goal was to determine whether diets gave different flavors in catfish and whether consumers could detect the differences.

"Fish that are really fresh do not have a foreign odor or flavor, but fish will absorb anything they come in contact with," Dr. Caul explained.

"There are few companies in the catfish industry," she continued. "Individual farmers are more common. We need to find out how these fish are handled from farm to market in order to discover where is the best point for pre-flavoring. A processing plant or some central point might be best suited for this purpose."

Catfish farming is a growing industry in the United States. Excellent food qualities and insufficient production create a constant demand for catfish. Research such as that carried on at K-State is improving technology.

The KSU studies show that flavor of channel catfish depends primarily upon pond conditions. Ponds with noticeable off-odors produce muddy-flavor fish. "Purging" or purifying these fish in tanks reduces off-flavors.

Immediately after being pre-flavored, the fish are skinned and cleaned, individually wrapped in heavy-duty foil, labelled, and transported on ice to KSU's food and nutrition laboratory in Justin Hall, the home economics building. Samples are held refrigerated or frozen in a walk-in freezer (minus 15 to 5 degrees F) except in one study where they are frozen in liquid nitrogen spray. Some samples are also quick-frozen.

Lilia prepares the fish for the table by cooking it for about five minutes in a micro-wave oven. To allow the aromas and flavors to be perceptible, each fish is steamed over boiling, de-ionized water in a covered aluminum pan or glass casserole until the fish



After the pre-flavored fish is cooked, it is checked for taste by a panel of nutrition experts.

flake easily. Cooking time is determined by weight of the thawed samples. Those cooked from the frozen state are steamed 5 to 10 minutes longer.

A "taste panel" of college students examines one hot fish at a time and two hot fish in a given group per session. Aroma is checked first, then flavor. The sub-dermal layer is scraped away before tasting. Small, bite-size samples are taken from the belly and top side (toward the anterior), and two areas (dorsal and ventral) of the tail.

Panelists independently record aroma and flavor findings and discuss these features, using such descriptive vocabulary as "chickeny," "fishy," "lemony," "muddy," "rubbery," and "spinachy."

Those making up the panel are students who have passed the classroom course "Fundamentals of Food Flavor Analysis." They receive additional instruction and orientation from Lilia.

Dr. Tiemeier emphasized this research is intended to improve the flavor of good quality, fresh fish. Pre-flavoring is not intended to hide a bad aroma or odor.

"We won't doctor a poor product," he points out. "We want a flavor that appeals to many people in the market place."

Lilia's research doesn't end in the pre-flavoring lab. She has been doing additional research in the food chemistry lab in Leland Call Hall, the dairy science building, under the su-

pervision of Dr. Richard Bassette. In this lab the metabolism of fish is studied to determine what gives it a natural odor or flavor.

Data for this research is analyzed through the use of gas chromatography. Dr. Bassette defines this as an instrumental method of separating and analyzing the components of a chemical mixture. It has earned the distinction of being the most significant advancement in analytical chemistry in the last 100 years.

Lilia, working as an operator or analyst, works with the chromatogram machine which resembles the electrocardiograph that measures the human heartbeat. From this she can pinpoint what a catfish is made of (qualitative analysis) and also the percentage of each of these component parts (quantitative analysis) by measuring the area under the "peaks" or high points on the chart.

"We have more to learn here," Dr. Caul said. "We would like to do research on deep fat fried fish to see whether pre-flavoring will survive this type of cooking."

Lilia, who completed her studies at KSU at the end of the fall semester, is returning to the Philippines where she hopes to use this knowledge back home. She would like to continue working in fish culture and research.

Keren Clithero, a graduate student in foods and nutrition from Wichita will carry on the research started by Lilia at K-State.

Wildlife Habitat Improvement Program

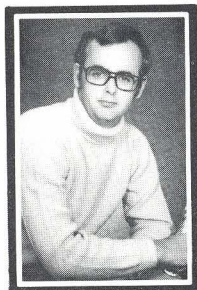
By Ross Harrison, Staff Writer

THE SITUATION:

Fact # 1—

The key to wildlife abundance is the quality of its habitat—simply a place for wildlife to feed, rear young and escape the rigors of nature.

Fact # 2—



Harrison

continue to shove wildlife considerations into lower priorities.

Fact # 3—

Public hunting lands owned or operated by the Forestry, Fish and Game Commission and managed for game production total about 200,000 acres. These public hunting areas have accounted for 10 to 15 percent of all hunting activities in the state. Obviously, many farmers and ranchers allow hunting on their lands,

accounting for 85 to 90 percent of all hunting activity in the state.

Fact # 4—

A poll of the state's landowners by the Forestry, Fish and Game Commission in 1971 showed almost one-third of them would like to improve wildlife habitat conditions on their land if the FF&G Commission would provide technical assistance. Another quarter said they also wanted to improve habitat, but would like cost-sharing funds to help.

Fact # 5—

Talking and writing about declining habitat probably will not change the situation.

The Solution

WHIP—Wildlife Habitat Improvement Program, WHIP is a new, action program of the Forestry, Fish and Game Commission in which district game biologists provide technical assistance to landowners to improve and develop wildlife habitat on private land. Although the FF&G Commission at present cannot provide cost-share funds for

habitat improvement, some federal conservation programs make such funds available. All landowners and tenants of Kansas are eligible to participate in WHIP and all WHIP cooperators still retain the right to allow or not to allow hunting on their land. WHIP got underway last March as one of the five goals of Project SASNAK.

A Wildlife habitat improvement program is not a novel idea. The Kansas version of WHIP was created by borrowing bits and pieces of successful habitat programs from other states and adding those ingredients that will make it work in Kansas. WHIP is larger in scope than the "Acres for Wildlife" program of the Extension Service which is aimed primarily at setting aside small tracts of land for wildlife. Its plan of attack is simple.

First, a Kansas landowner has to decide wildlife on his farm or ranch needs a helping hand. He then must get in touch with his local Forestry, Fish and Game Commission employee, game protector, or biologist. Or he can write the Forestry, Fish and Game Commission headquarters, Box 1028, Pratt, Ks. 67124, for the WHIP brochure which explains the program and contains a WHIP application form.

To apply, the landowner obtains two copies of the aerial photographs of his land from the county ASCS office and mails them with the application to the appropriate regional office of the FF&G Commission. These addresses are shown in brochure.

From that point the regional office assigns the farm or ranch unit to a district biologist. He studies the aerial photos, makes some preliminary suggestions then meets with the landowner. Preferably with the accompaniment of the landowner, the district biologist will evaluate the situation of the land and its potentials and take into consideration the particular desires of the landowner. From this, final recommendations are drawn and methods to carry them out are explained.

A landowner can direct such recommendations to particular habitat types



Programs like WHIP are designed to improve and increase habitat for species like the prairie chicken and quail pictured here, as well as many non-game species.

for particular wildlife species. He will be provided several informational sheets clearly describing certain habitat management practices and he will receive advice on the best and most economical sources for planting materials if they are needed.

Included in the assistance by the district game biologist will be information on how landowners can receive federal cost-share funds for habitat improvement if available in that country.

In general, WHIP is designed to be flexible enough to fit the needs of wildlife and landowners throughout Kansas.

It is designed so there is little or no cost or sacrifice of agricultural production.

It should be stressed: All landowners still retain the right to allow or not allow hunting. Cooperators will receive upon request "Safety Zone—No Shooting" signs for placement around buildings and work areas.

As mentioned before, WHIP is not a novel idea. Versions of wildlife habitat improvement programs for private

landowners have been tried in many other states with varying degrees of success—from dismal to outstanding.

Even Kansas had a statewide habitat improvement program in the late '40s through the '50s. If you recall it, which many can't, you'll remember it wasn't totally successful.

So then, is the FF&G Commission gambling on another habitat program that will consume the time of many biologists and the dollars of many sportsmen?

Sure, it's a gamble, but the odds now are more favorable. Project SAS-NAK has provided the funds and 21 new game biologists to see that WHIP works. And, nearly all the "bugs" in Kansas' old system, as well as those of other states, have been ironed out.

Game chief of the FF&G Commission, Lee Queal, believes the severe drought of the 1950s was the biggest reason for the failure of the earlier attempt at a private land habitat program. He lists the lack of manpower and funds as other causes for its failure.





Without adequate cover, game birds are more susceptible to predation like this coyote-killed quail.

Other causes may have been the lack of a statewide habitat inventory. Such an inventory would show what and where the habitat needs bolstering throughout the state and it would provide a basis for comparison to see how the WHIP program is working. Also, there was no follow-up on the grass roots level to see if landowners took to heart the recommendations for improving habitat.

Queal now feels these ills, except for a possible drought, have been remedied. A statewide habitat inventory technique is being developed.

That 1971 poll of landowners referred to in Fact No. 4 indicates at least 20,000 farmers and ranchers are willing to give WHIP a try.

WHIP is by no means designed to benefit only game animals. As mentioned before, a landowner can channel WHIP to any particular wildlife species or group of species he wants, within reason. Still, what is good for song birds will also be helpful to numerous other critters such as quail and rabbits.

Landowners can view WHIP as one

way to boost the value of their land. More often than not, good wildlife habitat aids in control of soil erosion from wind and water. And an abundance of wildlife on a farm or ranch can make it just that much more attractive to a possible good tenant or prospective buyer.

There are a number of speciality management practices for wildlife habitat, one, some or all of which may be incorporated into a farm unit. Following is a brief discussion of three such practices to give an idea of what WHIP is all about. WHIP cooperators will be given informational bulletins on these and other practices for more detailed information.

Managing Pond Areas for Wildlife—Waterfowl, pheasant, quail, shorebirds, mammals and song birds all are attracted to the well managed farm pond area. Those ponds with water level control structures can be lowered several feet in July, shoreline seeded to a cover crop, then reflooded in early fall as an excellent waterfowl attractant.

With adequate fencing, any pond can become attractive to a variety of wildlife. Where ponds are used for stock watering, fences could surround just the main basin of the pond near the dam or around and below the dam, where the outflow moistens the soil for good vegetative growth. Vegetative cover around ponds in rangeland of native grasses generally will bounce back in good shape after it is fenced from grazing. Reseeding may be necessary if an adequate natural seed source is not available. Tame grasses are of poor quality for such wildlife areas.

Miniature shelterbelts and clumps of shrubs also add to the wildlife drawing power of ponds. Using live fence rows of multiflora rose, for example, sometimes can replace traditional fencing. Shrub clumps should be at least four rows wide and 50 feet long, scattered throughout the fenced area about 100 feet or more apart. If enough room exists, establishment of weed patches is encouraged. These patches need annual attention, such as burning in April or early May, otherwise grasses and perennial weeds may take over.

Managing Brush Piles—High quality cover is the main ingredient of wildlife habitat usually lacking on most Kansas farmland. It may take a number of years for new plantings of shrubs and trees to provide good wildlife cover, but creation of brush piles can solve this problem immediately and you can't beat the cost.

Since wildlife will not spend their entire lives in brush piles, their other needs must be close at hand. Brush piles should be located near or adjacent to cultivated land and other cover, such as in field corners, odd grassy areas or along the edge of creek timber. A series of piles 100 to 200 feet apart will provide good escape cover and travel lanes as well. The piles should measure about 20 feet wide and from three to five feet high. Any shape will do.

A good brush pile must be built dense enough to protect wildlife during storms and loose enough to provide access into it and a comfortable loafing area.

Construction should begin with a base which will support brush and is elevated anywhere from six inches to three feet off the ground. This is accomplished by placing the butt end of large branches on a rock or stump or similar object.

Half Cutting—Half cutting is another way to provide a good brush pile. If trees are removed from the middle of a hedge row for firewood or corner posts, the edges of that hole in the hedge row can be half cut for an effective brush pile. Cut the two or so trees on the edge of the hole three-fourths through and about two or three feet above ground. Push them towards the hole so their bases hinge on the tall stump. Place smaller limbs on this base, butts pointing

towards the center of the pile. This makes a brush pile dense in the center and loose on the edges where grass and weeds can grow to further improve the habitat. If the pile sags later, pile more branches on it.

It may be desirable to scratch the ground around the pile, scattering lespedeza, millet or sweet clover seed for additional food and cover.

Slash from cottonwood logging in central and western Kansas can be turned from a problem into a boon for the rancher and wildlife. By making brush piles of the slash, more grazing land is opened and wildlife are provided new homes.

A sidelight to creating instant cover is to fell a tree while the leaves are still on it during the fall. The tree will

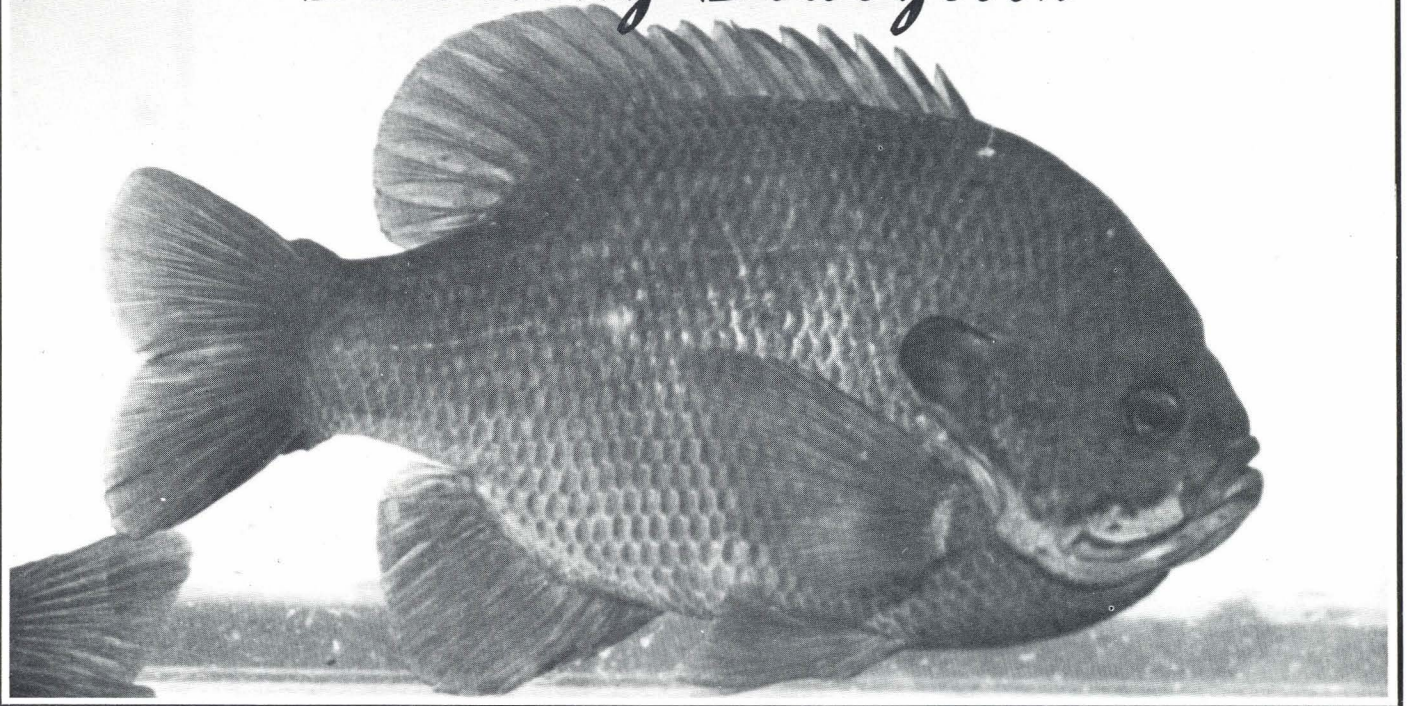
keep its leaves most of the winter, providing good escape cover and loafing cover for quail and song birds.

These are but a few of many wildlife management techniques. Like any project there is a right and a wrong way to do it. Just a plain old pond in your field may never be worth anything but a stock watering hole unless properly managed. Throwing a bunch of sticks into a pile may be good for nothing but a fire.

It is the duty of WHIP and the district game biologists to see that the farmer and rancher get the right guidance so their lands can be as beneficial to wildlife as they are in providing food for the nation.

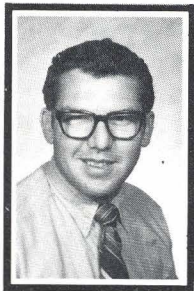


Battling Bluegills



By Farrell Brewer, Staff Writer

DON'T LET the gas shortage spoil your summer angling fun. There's excellent fishing as close as the nearest water. Many anglers turn their noses up at bluegill fishing, but they're missing out on some excellent sport fishing if they do. This little dandy, often referred to as the poor man's trout, will provide some good sport with proper tackle.



Brewer

This scrappy little bugger can be found in almost any body of water in Kansas and is sure to be located in state fishing lakes and farm ponds.

Last fall Lanny Jones, regional fisheries supervisor at Newton, and I journeyed to Barber State Fishing Lake, just north of Medicine Lodge, in search of a trophy bluegill. Although we didn't break any records we had an exciting weekend of fishing.

As we arrived in the late evening, the first thing on the agenda was to make camp. If the fishing got hot we didn't want to have to stop for this chore later. With this task completed we headed for the water.

Lanny knew the lake well as he had been there many times. He took off for some submerged cattails to start, while I selected a batch of lily pads. While I was still rigging my equipment, Lanny reported he hooked a good one. I stopped to take a look; his bluegill was a dandy, it probably would tip the scales near a pound. This is at the top end of the bluegill in Barber and the average is in the half pound group. These aren't too small considering the state record is 2 pounds 5 ounces.

After eyeing Lanny's catch my fishing fever was near the boiling point. I hurriedly finished tying on a fly and began to cast. The trick to bluegill fishing is not to scare the fish with your delivery. I dropped my fly in among the lily pads and in less time than it takes to tell the battle was on.

It doesn't take long to pull 'em in but they sure do scrap on light tackle.

We fished for an hour or so, moving around the lake's edge with good success and for some reason unknown to us the fish stopped biting as fast as they started. This suited both of us as it had been a long time since lunch; the pangs of hunger were striking and the fish weren't.

Lanny started frying potatoes and onions as I began the task of cleaning the catch. This was an easy task as they were large enough to fillet. The timing was perfect—as I finished the fish Lanny said he was ready to put them in the frying pan. I guarantee there's nothing better than sitting around a camp fire eating freshly caught fish.

It stands to reason that you would not use salt-water rigs to take up an eight-ounce fish, but I have found that many fishermen don't know what tackle is suited for this type of fishing. I have seen many anglers using stiff worm rods and casting reels, grumbling that bluegill fishing wasn't fun.

The secret of any sport fishing, in my opinion, is fitting the tackle to the fish you are seeking.

Fishing is fun, the key to that fun is balanced tackle, equipment that goes together to make the job easier. Bluegill don't grow very big, and that often means you can get by with less adequate gear, but when you want to reach that out-of-the-way spot or happen to connect with a good fish, the choice of tackle will make a difference.

Balanced tackle begins with the rod and reel, but continues to the hook on the end of the line. A glance at the walls of a well-stocked sporting goods store will assure you that there are more different types of rods than you ever dreamed.

Making the proper selection will appear difficult at first but with a little planning and assistance from the dealer you can narrow the choice with ease.

It might be well to point out that while fishing for bluegill you might suddenly find yourself hooked into a hefty largemouth bass. So you should always be certain that your tackle is up to the challenge.

Before selecting a specific outfit, you should first consider the four types of equipment that can be used. Spin casting and spinning are the more popular methods, with flyrods ranking in third place and bait casting gear bringing up the rear. All of these methods enable you to cast to the fish. This is important if you intend to become a successful angler.

My favorites for taking bluegill are spinning and the flyrod; just any spinning outfit won't fill the bill for me; I prefer an ultra-light rig. This is the perfect way to fish for bluegill.

Catching one on a flyrod is not only challenging, but is the most satisfying method I have stumbled onto. The flyrod is used with an artificial fly created from animal hair or feathers and is not really meant for fishing with bait. However, from time to time I tie on a hook and bait because I enjoy the lightness of the outfit. I switch back and forth from my ultra-light rig to the flyrod as the circumstances dictate. As I said earlier, bluegill can

be found in almost any body of water in the state, including rivers and streams, and I'll assure you there are many places that you can't use a flyrod.

Another secret of successful bluegill fishing is a delicate presentation with extremely fine and seemingly invisible lines and leaders. Many make the common mistake of using lines that are too heavy and then tying on leaders that stand out in the water like a sore thumb.

A general rule is that you will seldom require a spinning or spin casting line over six-pound test. You'll discover that the lighter line will permit you to cast farther and use the lighter baits. They are also less visible in the water and add delicacy to the procedure.

Monofilament is the only type line I use for my spinning outfit. It's relatively inexpensive and available in 100-yard spools. Many tackle shops will load spools for you or you can purchase pre-wound spools for your reel.

A limp monofilament will cast slightly better than the stiffer material but it also lacks abrasion resisting qualities. When fishing near rocks or docks where a line could fray, select

a line that has a harder outside finish.

Fly lines are another ball of wax; your best bet is to go to a reputable tackle dealer and ask for assistance. They come in many sizes and must be balanced to the rod.

As mentioned before, the hook is also an important part of the tackle. It won't do you any good to select a balanced rod and reel and then put a hook on the line that the bluegill can't get in his mouth. Every angler I know has a preferred hook size for a particular fish. I disagree with many on the desirable size for bluegill, but they are successful and I put my share in the creel. I prefer a good sharp number 12 hook while many use size 8.

You will note I said a good sharp hook; this is a must regardless of the size. Although the hook point might feel sharp to the touch, you should be concerned with its penetrating power. Unfortunately, round points will not drive through the mouth of a fish as readily as one that is triangulated.

Therefore, sharpening a hook is vital to good fishing. This is especially true when you attempt to set a hook with a flyrod. The rod tip is generally soft and a substantial amount of force is lost by the time it reaches the hook.

The author plays a scrappy little bluegill on a flyrod at Barber State Fishing Lake near Medicine Lodge.



Lanny Jones

To triangulate a hook, take a file or hook hone and flatten the side of the point opposite the barb. Now, file two additional sides between the point and the barb, working toward the edges of the flat base.

The experienced fisherman has developed a knack of looking at a body of water and knowing instinctively where fish are most likely to be. To do this he considers the known habits and habitats of the species in question and combines this with the ability to understand the characteristics of the water.

You'll note I said the experienced fisherman; let's assume you are not experienced, what do you do then? Well for openers you can read the many volumes that have been written on the art of angling which will help some, but you'll find that your own experience will be the best.

For bluegill, you might make a note of their basic requirements for existence. They inhabit those areas that provide shade and cover and have a good food supply. During the heat of the day in the summer, they seek deep water from ten to forty feet. Early morning or evening fishing will be your best bet during the summer.

They will take most small natural bait and will often hit a wide variety of artificial flies and lures. If you have an opportunity to watch a school of bluegills, you will note they tend to stalk a slow moving bait or watch a natural bait for a second before deciding to strike. This indicates you will have better success by moving your flies or lures slowly. A natural bait should be allowed to sit still or move very slowly.

Some of the best fishing for this species is in the late spring and early summer when they are spawning. They build nests and guard them until the young are hatched. During the spawning and just after they appear to be particularly aggressive.

Farm ponds are my favorite locations to fish for bluegill; they have two advantages. First, there is usually one close by, and secondly, they are tremendously under-fished. Most people don't realize that in a new pond bluegill should be harvested at the



Taken on light tackle like ultra-light spinning gear or flyrods, the bluegill is a real battler and this sport is as close as the nearest farm pond.

ratio of 4 pounds of bluegill for every pound of game fish taken. In older ponds the take of bluegill should be increased. Many fisheries biologists recommend that any bluegill caught be taken home, even if they are not big enough. They can be used for cat food or as fertilizer for a garden. They don't want the small ones returned to the water as bluegill are prolific and easily over-populate a pond or lake.

If you can explain to the owner of the pond why the bluegill should be harvested, normally you can again access for fishing purposes. One of my favorite ponds has some lunker bass in it and the farmer will not allow the general public to fish it because he dearly loves to fish the bass population. However, he allows me to fish for bluegill providing that if I do catch a bass I return it to the water. This is a good arrangement as far as I'm concerned because I would rather eat bluegill than bass any day.

I take my seven-year-old son with me on many of my bluegill expeditions and he really has a ball. As of now he has not mastered the art of casting, so

I equip him with a cane pole and a bobber. I have taught him what many adults have not learned, which is that a bluegill's heart may be stout but his mouth is small, and it takes time for him to swallow the hook. Many people have the tendency to set the hook the instant their float disappears beneath the surface. This usually results in a missed fish. You have plenty of time; let the float get pulled under and give the fish a chance to really take the bait, then set the hook lightly and bring him in.

The bluegill doesn't have the stamina of the larger gamefish, but he'll give a good account of himself. His favorite technique is to head for the bottom or protective cover in a series of circles. For his size, he puts up quite a scrap and it's a lot of fun on light spinning or fly tackle.

Remember, bluegill fishing is as close to you as the nearest water, so get out there and give it a go. I'm sure you will enjoy it and ounce for ounce he has as much fight as larger fish.

Good fishin'.

Current Kansas Fish Records

LARGEMOUTH BLACK BASS—Weight: 11 pounds, 3 ounces. Length: 25 inches. Date: January 6, 1965. Taken from a private lake in Bourbon County by Charles Prewett, Pittsburg, Kansas. Tackle: spinning rod and reel with Johnson spoon and porkrind.

SPOTTED (KENTUCKY) BASS—Weight: 4 pounds, 2 ounces. Length: 19½ inches. Date: September 9, 1973. Taken from Council Grove City Lake by Newell Julian, Council Grove, Kansas. Tackle: rod and reel with jig and worm.

SMALLMOUTH BASS—Weight: 2 pounds 9½ ounces. Length: 17¼ inches. Date: May 15, 1972. Caught at Norton Reservoir by Mrs. Max Ball, Norton, Kansas. Tackle: rod and reel with yellow Agitator lure for bait.

STRIPED BASS—Weight 14 pounds 10 ounces. Taken by Gene Rosenberg, Beatrice, Nebraska, from Wilson Reservoir on May 20, 1972. Taken on rod and reel and homemade maribou yellow jig. Length 32 inches, and girth 21 inches.

WHITE BASS—Weight: 5 pounds, 4 ounces. Length: 17 inches. Date: May 4, 1966. Taken from the spillway area below Toronto Reservoir by Henry A. Baker, Wichita, Kansas. Tackle and reel (spincasting) with "Tiny Tot."

WALLEYE—Weight: 13 pounds, 1 ounce. Length: 31½ inches. Date: March 29, 1972. Caught by David Watson (16 years of age), Manhattan, from Rocky Ford fishing area. Tackle: rod and reel with jig.

YELLOW (RING) PERCH—Weight: 12 ounces. Length: 11½ inches. Date: July 12, 1970. Caught by Merlin Sprecher, Manhattan, Kansas, at Lake Elbo in Pottawatomie County. Tackle: rod and reel with Gold Nuggett.

CHANNEL CATFISH—Weight: 32 pounds. Length: 40½ inches. Date: August 14, 1962. Taken by Edward S. Dailey, Gardner, Kansas, from Gardner City Lake. Tackle: Throwline with small sunfish.

FLATHEAD CATFISH—Weight: 86 pounds, 3 ounces. Length: 55½ inches. Date: August 24, 1966. Caught by Ray Wiechert, Brazilton, Kansas, from the Neosho River near St. Paul. Tackle: trotline with sunfish.

BULLHEAD CATFISH—Weight: 4 pounds, 6 ounces. Length: 17½ inches. Date July 16, 1973. Taken from Ford County Lake by Charles Gunkel, Kinsley. Tackle: rod and reel with jack-rabbit meat for bait.

BLACK CRAPPIE—Weight: 4 pounds, 10 ounces. Length: 22 inches. Date: October 21, 1957. Taken by Hazel Fey, Toronto, Kansas, from Woodson County State Lake. Tackle: rod and reel with live minnow.

NORTHERN PIKE—24 pounds, 12 ounces. Date: August 28, 1971. Taken from Council Grove Reservoir by Mr. and Mrs. H. A. Bowman, Manhattan, Kansas. Tackle: rod and reel with silver spoon and skirt for bait. Length was 44 inches and girth 20 inches.

WHITE CRAPPIE—Weight: 4 pounds, ¼ ounce. Length: 17½ inches. Date: March 30, 1964. Caught by Frank Miller, Eureka, Kansas, from a farm pond in Greenwood County. Tackle: rod and reel with live minnow.

BLUEGILL—Weight: 2 pounds, 5 ounces. Length: 11 inches. Date: May 26, 1962. Taken from a Scott County farm pond by Robert Jefferies, Modoc, Kansas. Tackle: rod and reel with worms.

GREEN SUNFISH—Weight: 2 pounds, 2 ounces. Length: 12 inches. Date: May 28, 1961. Caught by Louis Ferlo, Scammon, Kansas, from a strip pit in Cherokee County. Tackle: rod and reel with Abu spinner.

GOLDEYE—Weight: 1 pounds, 14½ ounces. Length 17½ inches. Date: May 20, 1973. Taken by Kris Eenhuis, Wakefield, Kansas, from Milford Lake. Taken with rod and reel and white spinner for bait.

DRUM—Weight: 27 pounds. Length: 37 inches. Date: June 27, 1953. Caught by Louis Hebb, Howard, Kansas, from Howard City Lake. Tackle: rod and reel with live crayfish.

CARP—Weight: 35 pounds, 4 ounces. Length: 42½ inches, girth 27½ inches. Date: May 2, 1970. Taken from a sand pit near Lyons by W. Amos Henry, Lyons. Tackle: rod and reel with corn for bait.

STURGEON—Weight: 4 pounds. Length: 30½ inches. Date: November 17, 1962. Caught by J. W. Keeton, Topeka, Kansas, from the Kaw River near Topeka. Tackle: rod and reel with worms.

BUFFALO—Weight: 54 pounds, 4 ounces. Length: 45 inches. Date: May 24, 1971. Taken from a farm pond north of Tescott by Randy Lee, Minneapolis, Kansas. Tackle: bank-line with worms.

PADDLEFISH—Weight: 73 pounds. Length: 69 inches. Girth: 34½ inches. Date: April 10, 1973. Caught by John D. Krider, Chetopa, Kansas, at dam on Neosho River east of Chetopa. Caught with rod and reel (snagged) during second open snagging season.

GAR—Weight: 28 pounds. Length: 60 inches. Date: June 17, 1966. Taken from the Neosho River below Chetopa Dam by Mike Carter, Chetopa, Kansas. Tackle: rod and reel rigged with small jig.



Fish and Game Forum



Q. Why did the Commission establish a turkey season in the spring instead of setting it in the fall like other hunting seasons?

A. Spring turkey hunting for "gobblers only" is a widely accepted harvest management practice. More than 25 states have spring seasons. In addition, most of these states have fall hunts for turkeys of either sex. Then too, wild turkeys generally are spread over a larger area in the spring than they are in the fall—a fact which makes them accessible to more hunters. In Kansas, flocks usually break up between March 15-25. Most of the breeding occurs from late March to mid-April. Following breeding season, hens begin egg laying and incubation. During this period they become extremely shy and secretive, while the toms—most of which are surplus as far as maintaining the population goes—continue to display for another month. The 1974 April 20-28 season occurred after the turkey's breeding period, so the Rio Grande turkey population wasn't harmed. And the loss of a few gobblers doesn't have any effect on the young turkeys since they are raised and cared for solely by the hen. Spring hunting, under a limited permit system, provides a quality hunting experience. With this type of season the Fish and Game Commission will be able to continue its trap and transplant programs in an effort to expand turkey distribution in Kansas.

Q. Why did the Fish and Game Commission cut off hunting for Canada geese on December 16 instead of letting it run through December 26 like the season on snow and blue geese?

A. The Bureau of Sport Fisheries and Wildlife, a division of the Department of Interior, has management responsibilities for all migratory game birds. Following recommendations

EDITOR'S NOTE: Each month, hundreds of letters reach Fish & Game Commission headquarters with questions regarding various phases of the department's activities, policies, projects and plans. In addition, we receive numerous queries about hunting, fishing, trapping and wildlife. As space permits in future issues, we'll publish some of these questions and their answers to provide Sunflower sportsmen with a greater appreciation and understanding of their Fish & Game Commission and the Kansas outdoors. If you have a question, mail it to FISH & GAME FORUM, Box 1028, Pratt 67124.

from the Central Flyway Waterfowl Council, the BSF&W established a framework for goose hunting regulations which would provide greater protection for the maxima subspecies of the giant Canada goose. This bird, once thought extinct, is now being restored throughout much of its former range. In an attempt to decrease hunting pressure on this big goose, the 1973 framework did not permit Canada goose hunting in Kansas beyond December 16. These big geese generally arrive in Kansas about December 10 and many of them spend the winter in the Sunflower State. Few migrate further southward. The individual states have no authority to extend a season beyond the framework dates provided by the BSF&W. The hunting seasons in northern states were curtailed even further. Nebraska, for instance, could not permit hunting Canada geese beyond December 9; South Dakota beyond December 2, and North Dakota's Canada goose hunting season was stopped after November 18.

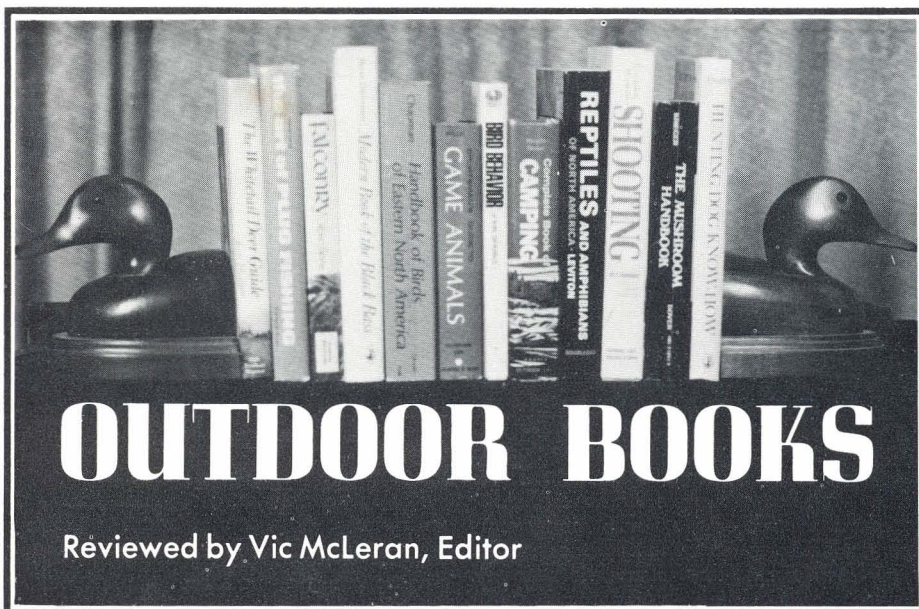
Q. Was there much interest in the 1974 spring turkey season and if so, how many applications were received by the Commission?

A. The level of interest in the 1974 spring turkey hunting season was

much lower than game division officials anticipated. A total of 400 permits were issued for the 1974 season; 100 of these were authorized for the eastern management unit while 300 went to the western unit. Fifty percent of the permits in each unit go to landowners or tenants and 50 percent are distributed to general residents. The Commission received 963 applications for the 400 permits. Of these, 197 were landowner applicants for the 150 landowner permits in the west; 546 were general resident applicants for the remaining 150 permits in the western unit. In the eastern management unit, there were 61 landowner applicants for 50 permits and 160 general resident applicants for the remaining 50 permits. Nonresidents are not eligible for turkey hunting in Kansas.

Q. Do Kansas hunters like the concurrent openers for quail, pheasant and prairie chickens and is there any great interest in going back to the old separate opening dates for these game bird hunting seasons?

A. Changing the opening dates from separate Saturdays in November to one concurrent opener has been widely accepted by Kansas hunters. We expected some expression of a desire to return to separate openers following the 1971 season but most hunters appeared to be well pleased with the new opener. A limited concern for this was expressed on one area of the Flint Hills but primarily for economic reasons. Local hunting pressure on opening weekend has been reduced throughout most of the state by this regulation. Central Kansas, however, still has relatively high opening weekend pressure because of the general availability of good populations of both quail and greater and lesser prairie chickens.



SPORTSMAN'S GUIDE TO GAME ANIMALS by Leonard Lee Rue III; Harper and Row, New York; 655 pages, \$6.50.

Leonard Lee Rue spends his days as gamekeeper for a private hunting club in New Jersey. As such, he's in the woods and fields each day, observing and working with wildlife. In addition, he's probably one of the best wildlife photographers in the country. He's also the author of several other books on wildlife. Combining his talents as writer-photographer, the author has compiled a great deal of interesting information on 44 of our more common mammals. Under each animal, Rue provides a detailed physical description; talks about the animal's range and where it's found; mentions the species' habits, senses, communication, locomotion, breeding, birth and young, life span, enemies, human relations, and trophy and record sizes. All in all, he provides a great deal of insight to the habits of our game animals. Each section is illustrated with the author's excellent black and white photos. Regardless of whether you're a hunter or naturalist, *The Sportsman's Guide to Game Animals* is bound to make you more knowledgeable about many of our native Kansas wildlife species.

THE ART OF PLUG FISHING by Homer Circle; Stackpole Books, Cameron and Kelker Streets, Harrisburg, Pa., 17105; 223 pages, \$2.95.

Homer Circle, angling editor for *Sports Afield*, is well known in fishing circles, especially bass fishing circles. In *The Art of Plug Fishing*, Homer draws on nearly a half century of fishing knowledge and experience to cover thoroughly all phases of plugging. The book is a virtual angling education for the beginning fisherman and a thorough refresher course for the experienced angler. The author shows the reader how to find fish in ponds, lakes and rivers; talks about the best times to catch fish in the various seasons; devotes a special chapter to catching big bass; and tells how to select the proper tackle, including rods, lines and reels. Homer also devotes five chapters to plugging techniques including the various types of retrieves. In the book's last section, he goes into some regional tricks used by expert bass fishermen around the country. Homer has done a lot of bassin' in the midwest and he talks the kind of language Kansas bass men understand.

MODERN BOOK OF THE BLACK BASS by Byron Dalrymple; Winchester Press, 460 Park Avenue, New York, N. Y. 10022; 206 pages, \$6.95.

If you read any of the major outdoor magazines—*Sports Afield*, *Field & Stream*, *Outdoor Life*—you're no stranger to Byron Dalrymple. He's one of the most prolific outdoor writers on the scene. Living in Texas, Dalrymple has some of the country's finest bass water at his disposal for bass fishing research. After reading his book, it's obvious he took advantage of the opportunity.

The author leads off with a chapter entitled "The Unchanging Basics," in which he talks about the few things in bass fishing that haven't changed recently. He goes on to talk about the "new" bass waters of the large impoundments and outlines some keen strategy for fishing them. He thoroughly explains the more sophisticated points about bass fishing, especially those regarding new electronic devices like fish finders and thermometers.

A sampling of chapter titles includes: Science Unlocks Bass Secrets; Light, A New Consideration; The Senses of Bass; The New Science of Locating Bass and The Controlling Influence: Temperature.

About the only phases of bass fishing which Dalrymple doesn't cover are bait fishing and night fishing. But if the reader absorbs and learns to apply all the other information Dalrymple puts out, he won't have time for night fishing. *Modern Book of the Black Bass* is must reading for the serious bass fisherman.

REPTILES AND AMPHIBIANS OF NORTH AMERICA by Alan Leviton; Doubleday & Co., Garden City, N. Y.; 250 pages, \$9.95.

Dr. Alan Leviton is Chairman of the Department of Amphibians and Reptiles at the California Academy of Sciences and a lecturer in biology at San Francisco State College and Stanford University. He's eminently qualified to write a book of this sort and he's done an excellent job. This book is an extremely informative account of the structure, size, longevity, feeding, movement, breeding habits and behavior of the North American reptiles and amphibians. Space limitations prohibit Leviton giving a complete natural history for each species but the general information is presented in an interesting manner. The book is illustrated throughout with many excellent photographs, both color and black and white. *The Reptiles and Amphibians of North America* should find a home in libraries of amateur as well as professional herpetologists.

MUSHROOMS OF NORTH AMERICA by Orson E. Miller, Jr.; E. P. Dutton & Co., Inc., New York, N. Y.; 360 pages, \$17.95.

This is probably the most comprehensive field guide to finding, identifying and collecting wild mushrooms I've ever seen. The text describes 422 species with 292 outstanding full color photos. Miller provides the reader with some excellent information of natural history of fungi, on equipment for studying and collecting mushrooms, useful tips on where and when to find the mushrooms you're looking for and some delicious-sounding recipes for preparing the mushrooms. The author points out that those who confine their mushroom hunting to the spring season are missing out on some other tasty species which appear during the summer and fall. While the price may be a little steep for some, it's money well spent. In fact, the recipe section alone may well be worth the book's price.

