IOWA CONSERVATIONIST



olume 15 March, 1956 Number 3

# THE MIRACLE OF THE FEATHER

## THE FISHERMAN'S RIGHTS TO THE WATERS OF IOWA

By Bruce F. Stiles
Director
tate Conservation Commission

*iven at the Iowa Water Resources eminar, Iowa State College, March 5*

Among the many functions of e State Conservation Commis- n, as they relate to the use of ter, one of the most important that of preserving, promoting, d improving the interests of the herman.

We read and hear many argu- nts about the legal rights to the e of water: riparian rights, ap- opriated rights, the rights of in- viduals, of corporations, and of unicipalities, for water from our es and streams; but very little, anything, is stated about the hts of the sportsman, particu- ly the fisherman, in using Iowa's tural waters in the pursuit of ort and recreation.

### One Per Cent Water

Iowa, with 55,586 square miles area, has only 561 square miles water. For the use of this one r cent of area last year 321,592 ople were licensed by the State fish. If there is added to this e number of people who use our ter for hunting, boating, swim- ng, etc., it is reasonable to imate that more than a million ople depend upon Iowa lakes and eams for sport and recreation.

Fishing in Iowa Waters is not nething that is recent in origin, d no group can successfully ablish a prior claim. Back to, d even before, Iowa became a rt of the Louisiana Territory, w s—practically without inter- otions—have made it clear that e ". . . rivers, ports, and public ads belong to all men in com- on." Obviously access and use of e rivers by the fisherman is one our inherited rights.

The amended Congressional Act March 3, 1845, which admitted va to statehood, made this spe-

(Continued on page 23)

Stanley Photo.

Egret plumes—or *aigrettes*—are among the loveliest of feathers. Seeking plumes similar to these, market gunners nearly exterminated the snowy egret, killing the parent birds as they visited the rookeries.

## EARLY MISSISSIPPI CRAPPIE FISHING

By Bill Tate
Area Fisheries Manager

Some of Iowa's best crappie fishing is in the backwaters of the Mississippi, and one of the best times to catch these fish is in early spring, just after the ice is out.

Although crappies may be taken at the edge of the main river channel, the sloughs and backwaters—with their stumps, standing trees and brushpiles—offer much of the best fishing. Most of my own crappie fishing has been in the Harper's Ferry-Lansing area, in the vicinity of channel dam 9. However, there is excellent crappie fishing above or below any of the other big channel dams. Lake Odessa, Sabula and Guttenberg rank among the best.

If you are not familiar with the Mississippi, it might be wise to contact someone along the river before you go fishing. Some river towns and sportsmen's clubs publish small maps, and most river anglers would be glad to give you information on Mississippi fishing areas. Some of this may be available from various boat liveries and resorts.

Conservation officers along the river can furnish information about crappie waters. Some of these river officers are: George Kaufman, Lansing; Robert Timmerman, Box 326, Elkader; Harlan Frankl,

(Continued on page 23)

By John Madson
Education Assistant

In spite of man's massive brain and opposable thumb, he's never really gotten off the ground. His tin machines have fooled him into thinking he can fly, but he really just goes along for the ride.

He surpasses all other animals in the number of pyramidal cells in the supragranular cortex of his cerebrum. He's bright. But man will never—for all his ancient longing—fly like a barnyard sparrow.

One reason is that he doesn't dress like a sparrow. For flight belongs to the creatures who have adapted—and sacrificed—themselves for it. Especially to the birds, who have developed light, strong, hollow bones and the strange "hair" that we call feathers.

Few other structures in nature are so highly specialized for one job. The structure of a bird's wing must be a perfect airfoil; a shape that could never be successful if formed of solid bone, horn or chitin. For avian use, these materials would be far too heavy. The alternative is an airfoil formed of a slender, bony "arm" clothed with feathers—flattened, flexible, strong and of great lightness.

Bird feathers are derived from the skin, just as the hair and fur of animals. Some scientists think that the feather is a highly modified scale of the bird's reptilian ancestors, the embedded quill section being analagous to the embedded portion of the reptile scale and webbed section of the feather being similar to the exposed part of the reptile scale. Since birds stand between the reptiles and higher mammals in the scheme of things, this may be good reasoning.

A young feather develops as a hollow cylinder, with the tightly rolled vane fitted within. At this stage it is a "pinfeather" and is set in a pocket of skin with its hollow base over a papilla or small knob. As the feather grows, its hollow quill takes blood and nourishment from this papilla.

At feather maturity, the blood supply is cut off and the feather

(Continued on page 22)

**Iowa Conservationist**
Published Monthly by the
IOWA CONSERVATION COMMISSION
East 7th and Court—Des Moines, Iowa
(No Rights Reserved)
LEO A. HOEGH, Governor of Iowa
BRUCE STILES, Director
JOHN MADSON, Editor
EVELYN BOUCHER, Associate Editor



**CIRCULATION THIS ISSUE.....51,000**
Subscription rate.....40c per year
**Three Years $1.00**
Entered as second class matter at the post office in Des Moines, Iowa, September 22, 1947, under the Act of March 24, 1912.
Subscriptions received at Conservation Commission, East Seventh and Court Avenue, Des Moines 9, Iowa. Send cash, check or money order.

# DO CATFISH STAY AT HOME?

**By R. J. (Jess) Muncy**
**Iowa Cooperative Fisheries Research Unit**
**Iowa State College**

How good is the old fishing hole after the catfish season is well under way?

Research on tagged channel and flathead catfish in the Des Moines River near Boone has given some information about late-season catfishing. This study—sponsored by the Conservation Commission and Iowa State College, and conducted by the Iowa Cooperative Fisheries Research Unit—has shown that anglers have caught tagged catfish a considerable distance from the place of tagging and release. However, the majority of tagged catfish were taken at favorite fishing places within a few miles of their release.

### Catfish Trapping

Last summer, 975 channel catfish nine inches or more in length, were trapped in hoop nets near the Y. M. C. A. camp near Boone. After being measured and tagged, they were released at the location of capture.

The number of fish taken in the traps per day varied greatly. Some days the traps were practically empty, but on other days they were almost filled with fish. During May and June, on days with a small rise in water levels, the catch proved exceptionally good. On four such days one trap alone accounted for 233 of the 975 catfish tagged, and catfish taken on these days were usually much bigger. Ninety-one channel catfish were taken on June 8 in one trap, with 42 fish over 16 inches in total length. Eighteen of these fish were over 20 inches long. These catches during rising water levels supplied 21 of the 29 tags returned later by fishermen.

### Long and Short Journeys

The greatest distances that any of these fish had been taken from the point of tagging were 12 and 24 miles downstream. These two fish, apparently smitten by wanderlust, were taken by fishermen about two months after trapping. The remaining 27 tagged fish were caught at heavily fished spots within 5 miles of the Y. M. C. A. camp; 13 were taken 1 to 2½ miles upstream, and 6 were taken 1 to 5 miles downstream.

Jim Sherman Photo.
For scientific studies, baited hoop nets are usually used to take catfish. Fish are marked and returned to the river, and the value of such work depends on tag returns from anglers.

Tagged fish were caught during the entire summer period with the peak tag returns about July 4 and July 20. One favorite fishing place below Fraser Dam produced 7 tagged channel catfish from July 2 to July 25. This long period of time indicates that these fishing places were not "fished out" during the early part of the season. Either these fish continued to move into the holes or they were there all the time and not easily taken.

The reported 29 tag returns represent a 3 per cent catch of the 975 channel catfish tagged. Several fishermen contacted on the river told of throwing away tags since they didn't know whether to report the tag number to the local conservation officer or to the Iowa Cooperative Fisheries Unit at Ames. One fisherman reported catching 4 tagged fish but had not recorded them. Therefore, the angler harvest as indicated by the tags is a minimum estimate.

### Revealed Flathead Catfish

Flathead catfish were taken in small numbers in the trapping period with a total of 31 fish over 10 inches in length being tagged. In addition, 13 flathead catfish were captured by tagging by using a trammel net-electric shocker combination. While the peak tagging period for the channel catfish was in May and June, most of the flatheads were taken in late July and August. Only one tagged flathead was said to have been taken by angling, and this tag was thrown away without being reported. Although few flathead catfish were tagged, they were good-sized ones. Four of the 31 fish taken in traps were over 30 inches in total length.

Results from the trammel net-electric shocker combination indicated interesting flathead fishing possibilities in the Des Moines River. Under one brush pile near the Y Camp, six flatheads weighing a total of 99 pounds (11 to 28 pounds each) were taken on August 23. From the next brush pile downstream, one channel cat and 3 flatheads totalling 6½ pounds were taken September 1.

Although this area is fished rather heavily, there were still some pretty big fish left to be caught. There is no assurance that all the fish present under those brush piles were taken even by the use of the electric shocker and net. Those that were caught were released unharmed in the same area.

### Rising Waters—Moving Fish

Results of the tag returns on channel catfish show that they have a tendency to spread out over a fairly large area after the periods of rising water levels. Also, they were taken by anglers during a 4-month period at very heavily fished spots such as the Fraser and Boone dams. Therefore, these spots were still good fishing places during the end of the season. More important is the fact that few of the very large flathead catfish present in these areas are being taken.

These large fish were still in the river at the end of the season. How can they be caught? It's an old question, but a couple of answers are provided by this research.

A concentrated effort with large baits at the large brush piles in midsummer and early fall might be very rewarding if big flatheads are desired. For the large channel catfish, those days with small river rises during early spring and summer look promising. Yet, during those periods of rising water levels last summer, not a single fisherman was seen at the tagging area. This condition of higher water levels makes fishing more difficult but that is a time when the big channel cats seem to be moving about.

The next question is whether they are feeding at that time. There's only one way to find that answer—feed 'em and hope.

## WALT TRUSELL, VETERAN OFFICER, DIES

Walter W. (Walt) Trusell, 65, one of Iowa's long-time fish and game conservation officers, died February 13 at the U. S. Veterans Hospital in Des Moines. He had been in poor health for some time, and had been hospitalized since November.

Trusell was first appointed state conservation officer in September, 1934, for Woodbury County. In July, 1946, he was appointed supervisor of predator control for Iowa and served in that capacity until July, 1948, when he was reassigned to Woodbury County as a conservation officer.

He was in charge of Brown's Lake near Sioux City from 1953 until the time of his death.

Walt was one of the rugged, old-time wardens who helped enforce fish and game laws in the wild Missouri River bottomlands in the mid-thirties. For 26 years he was one of the protectors of the blue and snow geese during their annual March migrations up the Missouri.

He was survived by his wife, Lavonne Trusell of Sioux City; a daughter, Mrs. A. B. Bush of Cheyenne, Wyoming; a brother Frank of Uhrichsville, Ohio; and two grandchildren.

Jim Sherman Photo.
anists Wallace Eslyn (left) and Dr. Harold McNabb demonstrate their Thulium X-ray nit. The small, powerful instrument may find application in other "field sciences".

* * * * * * * * * *

# TOMIC RESEARCH TAKES TO THE WOODS

**By John Madson**
**Education Assistant**

Use of atomic energy is expand- g faster than the average person n scan headlines. It has already tered a bewildering number of iences: military, naval, medical, ological and industrial. It was ly a matter of time until it en- red Iowa forests.

Within the past year, an amaz- g device has appeared in the lab- atories of Iowa State College. alled the Thulium X-ray Unit by e scientists who developed it, s essentially a 13-pound lead linder contained in a brass hous- g 4 inches in diameter and 4 ches high—a tiny X-ray machine at can almost be carried in the cket.

In this lead cylinder is a lead ng that can be pivoted by con- ol wires. Mounted on one side the ring is a pellet of radio- tive thulium, a rare, silvery met- almost as heavy as lead. When e lead disk is pivoted, the radio- tive pellet is aligned with an perture in the brass housing. rom this hole radiates a stream X-rays—energy that can pene- ate any organic substance.

The little device can be strapped the side of a tree and a photo- raphic film within a pliable holder mounted on the opposite side of ie trunk. X-rays of the trunk can taken and decay or injury cated without cutting down the ee.

When Dr. Harold (Sande) Mc- abb, Jr. came to Iowa State ollege three years ago, he was ready interested in the possibil- y of X-raying trees to determine ie presence of decay. But botan- t McNabb was faced with the roblem of portability and power ource. A heavy electrical X-ray achine has no place in the woods. is problem was solved with the refinement of thulium, and a compact source of powerful energy was provided. Working closely with fellow botanist Wallace Eslyn, and with Milo Voss and Gerald Daly of the Institute for Atomic Research at Iowa State, McNabb put the first Thulium X-ray Unit into use last summer.

Portable X-rays are not new. They had been used by private and governmental agencies before, but were not practical. They were heavy and cumbersome, and demanded a source of high voltage. Atomic research provided new power sources when metallurgists at Iowa State College recently produced the metal thulium in pure form. This metal, when treated with radiation, becomes the radioactive form of thulium which emits a steady flow of X-rays.

With the Thulium X-ray Unit, a 9-inch soft maple can be X-rayed in 4 minutes; a 12-inch tree requires about 8 minutes of exposure. This exposure time depends on the thickness and density of the wood and upon the power of radioactive thulium being used. Most of McNabb's studies have been with soft maples in lowlands, but exposure tables for various sizes and species of trees will be worked out.

The film is developed and "read" in the laboratory. Variations in shading indicate decayed or injured areas, and can usually be seen. The film may also be read with a densitometer, a sensitive instrument that records almost invisible variations in film density. Several X-rays may be taken around the trunk at the same level. From these plates the defective area may be accurately located by triangulation. McNabb reports that the entire procedure is "very accurate."

Only a small pellet of thulium is required. The charge used in this portable unit is a tiny pellet weighing about 4 grains and with a diameter of only 2 millimeters. Although the radiation strength of the metal diminishes steadily, one pellet is adequate for X-raying trees for a year. The steady decrease in radiation must be compensated for in exposure time, just as longer exposure must be given a photograph in dim light.

When newly charged with a fresh pellet, the unit's radiation is about the same as the diagnostic X-ray machine in your doctor's office. A new type of energized thulium is being planned; a material 10 times as powerful as the present charge. Although the weight of the lead casing must be increased to about 20 pounds, portability should not be seriously affected. This more powerful unit would reduce exposure times on the larger trees, and would allow foresters to survey almost any tree in the forest quickly and effectively.

The widespread use of the Thulium X-ray Unit will probably depend on the availability of radioactive thulium. At present, the metal is obtained from the Institute for Atomic Research at Iowa State College, and is charged with energy at the Argonne Laboratory in Illinois. Recent work indicates that other demands may be made on the thulium supply. When activated in certain ways it emits heat rays, and there is a possibility that small pellets of thulium may be useful in protecting sensitive instruments from extremely cold weather.

Dr. McNabb's work on tree decay is sponsored by the State Conservation Commission for studies of soft maples and other common Iowa tree species. So far, the X-ray Unit's primary use has been to study the decay of living trees and to determine the rate of decay in standing timber without putting trees to the axe.

The Commission has sponsored oak wilt research at Iowa State College since 1941, and in the past 5 years this program was stepped up to include studies on forest economics in Iowa, adaptation of various tree species, and tree decay.

We may be jumping the gun, but it would seem that this powerful, highly portable X-ray unit might have uses in fish and game biology. It might be used for X-raying the long bones of certain animals to determine age. In isolated, rugged areas without power sources, the device might be used to examine waterfowl for lead shot pellets.

The use of such portable X-ray units may be limited in the future, or may open up new areas of knowledge. But for trouble-shooting in remote places where electric power is lacking or where equipment must be packed in, these "hip pocket" X-rays hold a rosy promise.

* * * * * * * * * * *

Jim Sherman Photo.
**The Thulium X-ray Unit is a 13-pound lead cylinder contained in a brass housing. Note control wire lying on the hand. This wire is pulled to rotate the lead collar and bring the thulium pellet into "picture position".**

## NO FISHING ON SUNDAY

Atlanta, Ga.—It's still illegal to fish on Sunday in Georgia. The house of representatives failed to repeal a much-flouted law making Sunday fishing a misdemeanor.

The vote on the bill was 99 to 48. It takes 103 votes for a measure to pass the house.

Representative Dallas Veal put up a stout argument for taking the law off the books. He said it makes criminals out of a big percentage of churchgoers.

"I have not heard one preacher at home scorn fishing on Sunday," he said.

But Representative W. T. Bodenhamer, a preacher, said he is one minister who is against Sunday fishing. He said the law "stops inroads being made in observance of the Lord's day."

---

There are approximately 1,600 different kinds of frogs and toads. —*H.H.*

Jim Sherman Photo.

**One of central Iowa's spearing hotspots was the 'Coon River dam at Adel. Most fishermen congregated on the pool with spears, but one party took several hundred pounds of rough fish with bows and arrows.**

* * * * * * * * * * * *

# HOW WAS PROMISCUOUS FISHING?

Although Iowa's promiscuous fishing season had the effect of relieving late winter boredom for thousands of fishermen, it is doubtful that it had much effect on the fish populations, either for good or bad.

Spearing success in most rivers and lakes was spotty. It would wax hot and heavy for a few days and then taper off with weather changes or fishing pressure. Fishermen who kept at it usually took their share, but desultory fishermen generally didn't do too well. Spearing held up well in a few waters, but is was an "on again, off again" proposition in most rivers and lakes.

Here's a brief sketch of the season's results, garnered from the conservation office supervisors of Iowa's three general management areas:

* * * * * * * * * * * *

Jim Sherman Photo.

**Hundreds of water samples were taken last winter to determine dwindling oxygen supplies. Fisheries biologists like Harry Harrison were in the field almost constantly.**

## Basil Downing: Northern and northwest Iowa.

**Silver Lake at Lake Park: This** was the most heavily fished lake during the promiscuous season. The main catch was bullheads, most of which were taken by dipping. Efforts by local citizens to pump air into the lake and save fish were futile.

**East Okoboji (north of the Narrows):** Good numbers of perch and walleyes were taken during one 4-day period. For 8 or 10 days many bullheads were taken by dipping and spearing. Some good northern pike were speared, but few rough fish showed up in fishermen's catches.

**Five Island Lake:** This lake opened late in the season, and some northerns and rough fish were being taken almost up to March 1, when the season closed.

**Little Spirit Lake:** Many bullheads taken. Fish speared in lake areas were generally good eating, but some were "gassy" and inedible.

**Little Sioux River:** Many fish were taken in the vicinity of the Linn Grove Dam, but most of the catfish concentrated in this area had been rescued before the promiscuous fishing began. The majority of fish taken were rough fish.

**Big Sioux River:** A few game fish were taken by spearing, but the bulk of the take was rough species speared in Plymouth, Sioux and Woodbury counties.

**East Fork of the Des Moines:** Produced few game fish, but many large rough fish.

**Des Moines River from Fort Dodge to Fraser:** Reports are incomplete but good numbers of rough fish were taken in the Fraser Dam area and north. A few catfish were speared shortly after the opening.

## Lloyd Kiefer: Eastern and northeastern Iowa.

Many of the streams in this area have rocky or sandy beds, are often spring-fed, and have considerable fall and turbulence. Since fish were not seriously endangered in such waters, few of them were opened to promiscuous fishing.

**Cedar River near Cedar Rapids:** The most important fishing on the Cedar was in and around Cedar Rapids. When the season opened in late January, there was an open pool about 50 feet wide and 150 feet long just above the dam in Cedar Rapids. This pool was filled with fish in poor condition. Fishermen dipped, waded shoulder-deep in icy water, and speared during a period of about 36 hours when fishing was best. The most severely affected fish were soon taken, and heavy fishing waned. Officer Clair Rausch estimated that thousands of pounds of fish were taken in this area, but that less than 5% were game fish. The bulk of the fish speared were carp, buffalo, suckers and quillback.

**Iowa River:** The area near the Coralville Dam, opened late in the season, held the most concentrated fishing effort. For about 24 hours after the opening the spearing was very good, but diminished as the most seriously affected fish were taken. Although there were more flathead catfish taken in the Iowa River than in the Cedar, the majority of fish was rough species.

## Dave Fisher: South, central and southwest Iowa.

**Raccoon River:** Some of the heaviest spearing was from Adel to Highway 141 and just west of Minburn. Fishermen concentrated around the Adel city dam and took thousands of pounds of rough fish. Most were reported to be poor-flavored. Just west of Minburn, fisheries biologist Harry Harrison reported over 6,000 pounds of rough fish taken from a half-mile stretch of the 'Coon during the first 8 days of the season. During this time, about 275 people reportedly speared

* * * * * * * * * * * *

Jim Sherman Photo.

**In most rivers, the "salvage" spearing produced about 98% carp and other rough fish; few catfish were taken and almost no walleyes and bass.**

* * * * * * * * * * * *

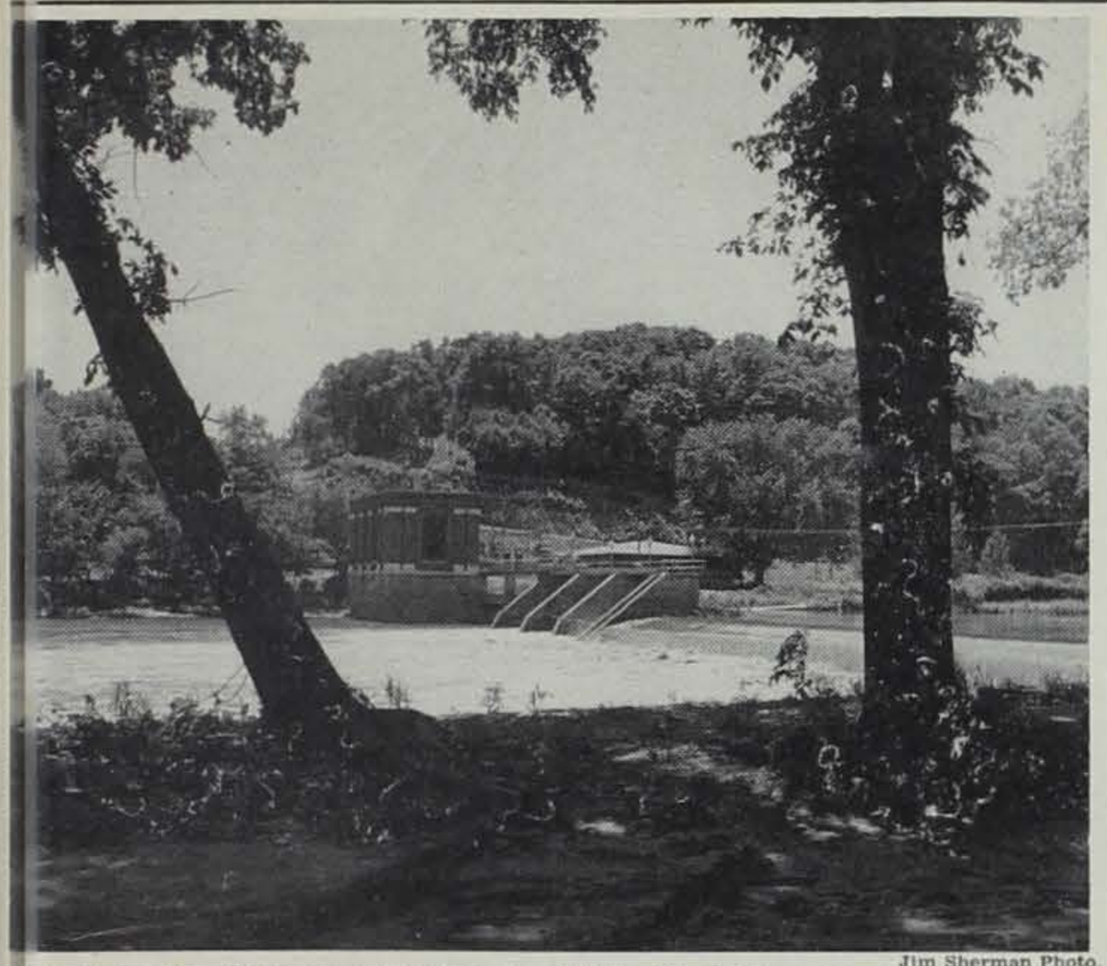
in this section of the river. According to Harry's field report, 98% of the fish taken were rough fish. Few game fish were speared.

**Grand River:** Some of the most productive waters were from Davis City north to Grand River in Decatur County. Many catfish were found frozen in the ice in Union County, and were chopped out and taken home by fishermen who reported them to be edible.

To most fishermen this was a special season; a sort of late winter bonus. It seemed to be a natural extension of the regular summer spearing season—the possibilities of winter rough fish spearing had been discussed for years. But last winter's promiscuous spearing was not just a "pilot" season to determine the effects of such spearing. It was a symptom of a critical situation. The season was set by the Conservation Commission in an effort to salvage some fish from the large numbers thought to be doomed.

Hundreds of oxygen checks and

(Continued on page 24)



Jim Sherman Photo.

re rocky formations have "choked down" the Skunk River in southeastern Iowa, a power station was erected at Oakland Mills.

* * * * * * * * * *

# OAKLAND MILLS STATE PARK

By Charles S. Gwynne
Department of Geology
Iowa State College

Much of the geological story of kland Mills State Park is told ng its numerous trails. Broken k is everywhere on the steeper s and the bottoms of the ra- es. Here and there are solid k outcroppings. These rock ges are a good place to start our ry about the geological past of s southeastern Iowa park.

t is a wooded, hilly area of ut 100 acres on the south side he Skunk River in Henry Coun-

The village of Oakland Mills, m which the park takes its ne, is just across the river. unt Pleasant is a few miles th and east, and a power plant ocated on the Skunk River at park. This power plant is part our story—

he rock outcroppings referred are the hardened deposits of one the ancient seas which once ead over the interior of what ow North America. This was a time called the Mississippian iod. The seas were shallow, erally less than 600 feet in th.

Most of the sediment was of a ey nature and the final, hard- d rock is limestone. Some of rock exposed in the park and ng the river also contains some t sandstone and shale. These, as iments, were washed into the from near-by land. One promi- t shale layer is easily noticed ause of its bluish color. It is t, easily broken with a hammer, l when broken has a peculiar ving fracture.

### Teeth and Shell Fish

Some of the limey material was cipitated from the sea water, ch as ordinary salt drops out a saturated salt solution. Part of the material was formed of the shells—mostly broken to small pieces—of shellfish, distant ancestors of some of those living in modern seas.

Fossils, the imprints or replacements of shells, are found in some of the layers. Near the river level not far below the dam there is a ledge which appears to be made up almost entirely of shells and shell fragments, replaced by other limey material. There is an occasional replacement of the tooth or sharp spine of a fish of the Mississippian sea. These are hard to find. They are black, contrasting with the prevailing gray or brown of the inclosing rock. A prominent fossil in some of these layers is a brachiopod called *Orthotetes.* These form low bulges about 2 x 3 inches on the rock surfaces. A pattern of fine lines crosses the surface of the rock.

### Ancient Design: Modern Power

The rock exposed in the road-cut on the county road through the park also discloses part of the geological story. Here the rock is seen to be very irregularly bedded, a characteristic of part of the Mississippian system of rocks. In places shale, sandstone and limestone seem to be jumbled together. Near the river level the layers are much more even.

It is these more evenly bedded rocks near the river level that is partly responsible for the power development at Oakland Mills. Millions of years have passed since the ancient seas retreated from this part of Iowa. Weathering and erosion have been at work, before and after the glaciers. The Skunk River has cut the valley in which it flows. Here at Oakland Mills the river cuts into some hard limestone beds which are more resistant than the beds beneath, and a falls—or at least a rapids—has developed. This fall in the river is the reason for the location of the power plant at this spot. Below the power plant there is a small rapids, where the river flows over the edge of a limestone bed.

### Ice and Dust

Although the park area—and all of southern Iowa—has been glaciated twice, there is little evidence of this to be seen in the park. Away from the river bluffs, the subsoil must be mostly glacial drift. An occasional stone from the drift may be found along the gullies, or on the river bank. The writer recently noted only one good-sized glacial erratic along the river. It was an angular block of quartzite, dark reddish-pink in color. It was conspicuous because it differed in color from the limestone fragments which were all about. For the curious, it might be interesting to look for other glacial erratics along the river and in the gullies.

Above the glacial subsoil of the park there is a deposit of wind-blown silt—the *loess.* This is easily recognized in roadside exposures of the vicinity because of its lack of pebbles and larger stones, characteristics of glacial drift.

Several hundred thousand years have gone by since the passing of the glacial ice from this part of Iowa. The land, as it emerged, is believed to have been gently rolling, much like today's north-central Iowa. The years went on, erosion took its toll, valleys were developed, and now most of the land away from the river bottoms is in "slope".

A third glacier invaded southeastern Iowa, but did not reach the park area. This was the Illinoisian glacier, named from the deposits so conspicuous in Illinois. The western boundary of the Illinoisian drift plain lies about 10 miles east of the park, and cuts southwest through the southeastern corner of Henry County.

There was a fourth stage of glaciation following the Illinoisian. This was the Wisconsin glacier. In the first advance the Wisconsin ice sheet came within 60 miles of the park area; the last advance, reaching down through the middle of the state, moved as far as present Des Moines. The Wisconsin ice faded away some 10 or 12 thousand years ago.

All this must have meant changes in climate at the Oakland Mills park area. As a result, there must have been some changes in the character of weathering and erosion. For one thing, the flood waters from the melting ice probably swept down the Skunk River.

But of this and other more recent events there is no record at the park. Strangely enough there is a fine record—in the exposures of limestone, sandstone and shale—of the much more ancient events: the flooding of the midwest by shallow seas.

# NEW FISHING REGULATIONS

The 1956-57 Iowa fishing regulations have been set by the State Conservation Commission, with a number of changes over last year's regulations. These changes include a continuous open season on rock bass, silver bass, catfish, rock sturgeon, sand sturgeon and paddlefish; no size limit on largemouth bass and smallmouth bass and a continuous open season on these bass in Iowa's boundary waters; a continuous open season for trout with no daily fishing hour restrictions; and a reduction in the northern pike catch and possession limits to 3 and 6.

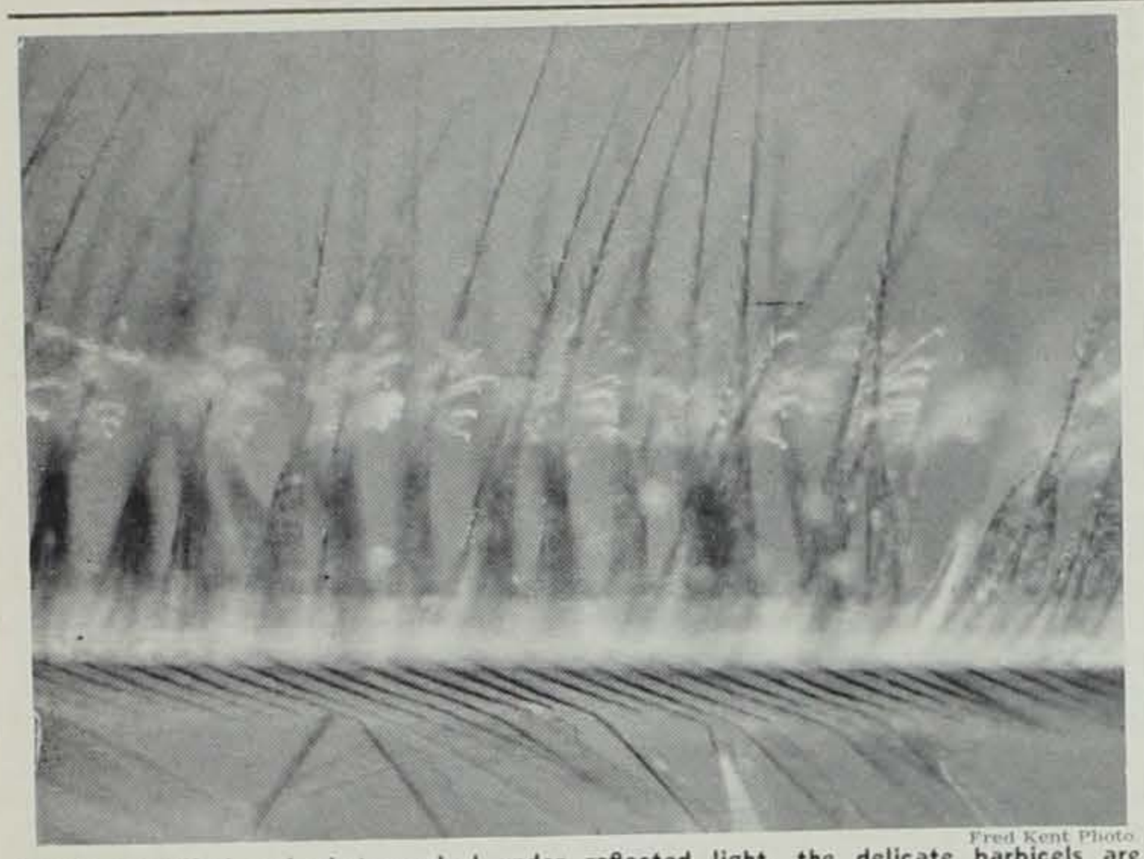
Commission officials said that these changes follow a nationwide trend of liberalized fishing laws. Biologists have found that pole-and-line harvest accounts for only a fraction of the fish in our waters, and that old fishing restrictions can often be relaxed without harming fish populations.

These regulations are effective from March 1, 1956, to March 1, 1957. All seasons open on the nearest Saturday preceding the old opening date.

The 1956-57 fishing regulations are:

| | INLAND WATERS OF THE STATE | | | | BOUNDARY WATERS |
|---|---|---|---|---|---|
| Kind of Fish | Open Season | Daily Catch Limit | Possession Limit* | Minimum Length or Weight | Mississippi & Missouri Rivers & Inland waters of Lee County |
| Sheepshead, Redhorse, Suckers, Buffalo, Gar, Gizzard Shad, Carp, Chub, Dogfish, Quillback | Continuous | None | None | None | Same as inland waters |
| Rock Sturgeon, Paddlefish | Continuous | 15 | 30 | 5 lb. | Same as inland waters |
| Sand Sturgeon | Continuous | 15 | 30 | 1 lb. | Same as inland waters |
| Bullheads | Continuous | 25 | 50 | None | Same as inland waters except no catch or possession limit |
| Crappie, Yellow Bass, Silver Bass, Warmouth Bass, Rock Bass, Perch, Sunfish, Bluegill | Continuous | 15 | 30 | None | Same as inland waters |
| Trout—All species | Continuous | 8 | 8 | None | Same as inland waters |
| Minnows | Continuous | None | None | None | Same as inland waters |
| Frogs—(except bullfrogs) | May 12—Nov 30 | 4 doz | 8 doz | None | Same as inland waters |
| Bullfrogs—(Rana catesbiana) | May 12—Nov 30 | 1 doz | 1 doz | None | Same as inland waters |
| Catfish—(except bullhead) | Continuous | 8 | 16 | None | Continuous open season with no catch or possession limit |
| Walleye, Sauger | May 12—Feb 15 | 5 | 10 | None | Same as inland waters except continuous open season |
| Northern Pike | May 12—Feb 15 | 3 | 6 | None | Same as inland waters except continuous open season |
| Largemouth Bass, Smallmouth Bass | May 26—Feb 15 | 5 | 10 | None | Same as inland waters except continuous open season |

*Not to exceed more than fifty (50) fish of all kinds in the aggregate, except that this aggregate possession limit shall not apply to fish in this table on which there is no daily catch limit.



Fred Kent Photo.

**Highly magnified and photographed under reflected light, the delicate barbicels are tiny, translucent hooks.**

## The Feather . . .

(Continued from page 17)

becomes a dead thing without sensation. The little papilla becomes dormant, although it still fits into the base of the feather. But if the feather is removed, the papilla is stimulated and a new feather begins to form immediately.

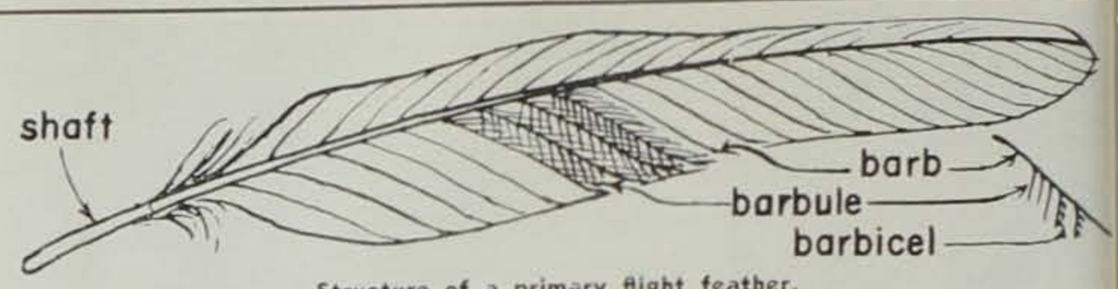
The hollow, lower end of the feather is the *quill*. At about the place where the webbing begins, this quill becomes solid and flexible and is called the shaft, or *rachis*. From this shaft grows the web, or vane of the feather—a masterwork of design and function.

Extended from the main feather shaft are the *barbs;* main subdivisions of the webbing. From these barbs branch the little *barbules*, fibers armed with tiny hooks. These microscopic crochet hooks—or *barbicels*—interlock tightly with those of adjacent barbs, forming the dense, tight webbing that is the flight planes of the avian wing.

The greatest degree of this interlocking is in the stiff, strong flight feathers of the tail and wings. Without such interlocking the feathers would be soft and fluffy. If the shaft is lengthened and the barbules and barbicels are lacking, there is a delicate plume.

Clothing the bird densely and giving the body its soft, rounded shape, are the contour feathers. These smaller feathers are not as densely webbed as the stiff feathers, and are usually softer. Beneath them are the *plumulae*—down feathers of exquisite softness. These fluffy feather tufts lack a central shaft, and the barbs branch directly from the hollow quill. With almost no weight or bulk, these down feathers insulate the bird completely. Which explains why mallards can swim happily in water that is liquid ice. They're wearing the warmest underwear known.

Feathers do not usually grow evenly over the entire body. They occur in well-defined areas called "feather tracts", and the sizes and patterns of these tracts vary with species. There may be areas on a bird's body where feathers are virtually lacking. This is especially true of the "armpits" of most flying birds, where feathers are scanty to accommodate the folded wings. Feathers tend to be almost lacking where they might hamper flight or running. Ostriches and penguins, species that do not fold their wings tightly to their bodies or fly, are rather uniformly feathered.




**Structure of a primary flight feather.**

Sometimes in late summer—usually in August—most of our birds moult. The worn, year-old feathers are discarded and new flight equipment grows in. Moulting originates in a specific area and proceeds in a sensible way. When a feather is shed, a new one begins to grow at once. Only when this growth is well underway is the next feather discarded. By the time a third or fourth feather is shed, the first one is nearly full-grown.

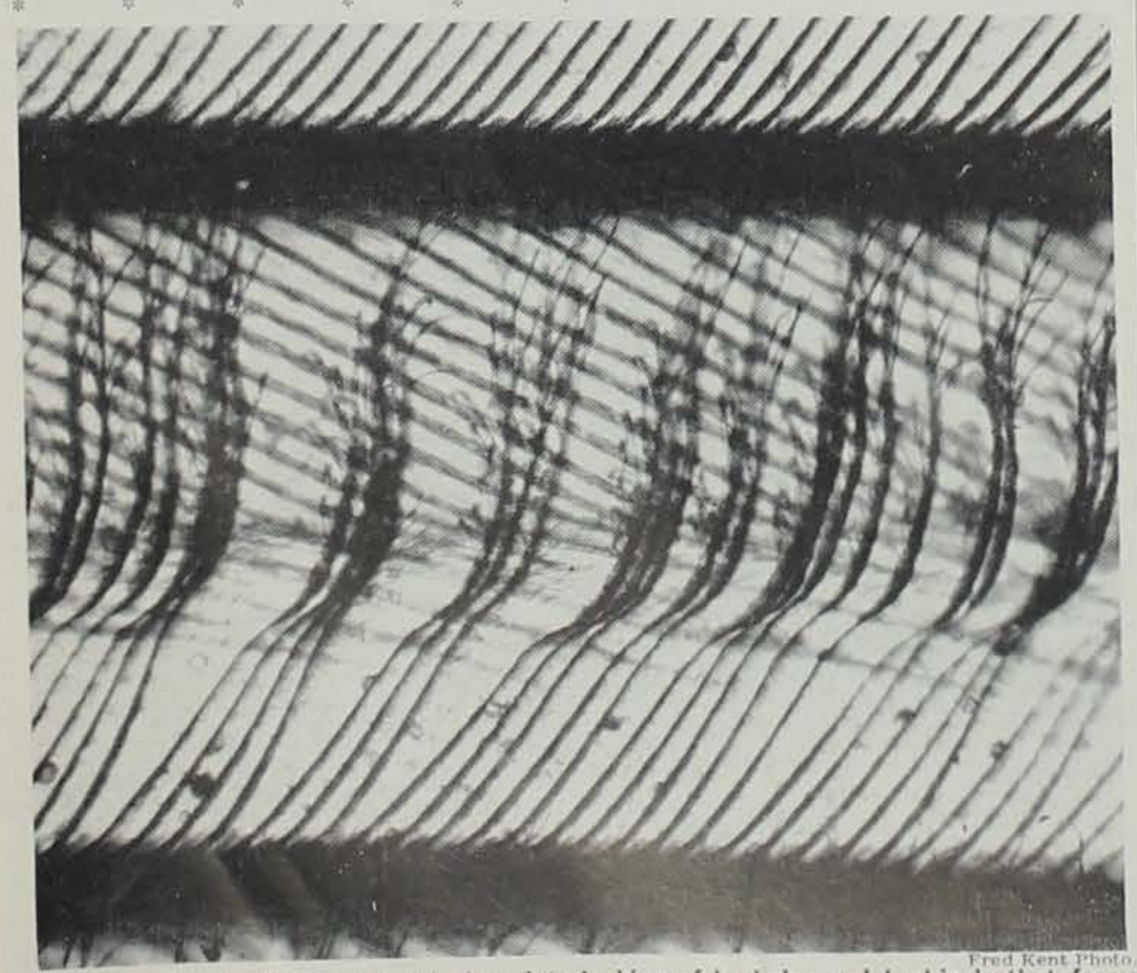
In this way, the bird doesn't lose flight and mobility while losing plumage. No old feathers are shed until adjacent new feathers take their place. Ducks and diving birds do lose flight while moulting, but they can easily swim to safety and do not need flight for feeding. For a brief period, they can afford to lose their wings.

During the moulting time many birds are shy and cease singing. Perhaps they realize that they aren't quite their old selves. Or perhaps—as the old stories say—they are grieving over their loss. If they are, they are fooling themselves as much as they fool us, for the great beauty of much bird plumage is only illusion.

Only three color pigments exist in most feathers: reds, yellows and browns. All other colors are "apparent", caused by the refraction of light. Although a few tropical birds do have green feather pigment, most greens are caused by yellow or brown pigment overlaid with a thin (8/1,000 of an inch) material that refracts light and gives the impression of green. A drake mallard's head, for example, is not green. It's black. Blues, violets, and most greens and metallic colors are caused by a breakdown of the spectrum of sunlight.

Nor is an indigo bunting indigo, or a bluebird blue. Sometimes, when a bluebird is wet or is between the observer and the sun, it will show its true colors: brownish or black. A strange and wonderful thing, but we wish we'd never known it. We like our bluebirds blue—true blue.

When we planned this story, we thought of titling it something like "Feathers: A Ticklish Subject." But it wasn't very funny, and the more we researched the less funny it became. For the miracle of feathers is the miracle of flight, and we've always envied a barnyard sparrow too much to laugh at him.



Fred Kent Photo.

**A duck's wing feather shows the close interlocking of barbules and barbicels that forms a dense, strong web and offers fanlike resistance to the air.**

## REFINISHING YOUR BOAT?

Now's the time of year when thoughts turn to open water, and many hands turn to sandpaper and paint. If your boat is looking a little rough, March is the month to put it in shape.

To revamp an aging boat, first remove all old, checked or peeling paint and take the finish down to the bare wood. On an all-wooden boat, this may be done with paint and varnish remover. Don't use such remover on any canvas-covered portions, however. The remover may soak into the fabric and resist paint for a long time. Before painting, be sure that this remover has been well removed with some good solvent, but be careful!

Before filling and painting, examine the hull and fittings carefully. Replace any broken or rotted planks, tighten screws, and refill screwholes or nailholes if necessary. Watch for any loosened putty, remove it, and replace with trowl cement: a putty of white lead, whiting and fillers. Now, incidentally, is a good time to replace a beat-up transom plate or motor mount.

Fill the wood thoroughly. Some boatmen prefer two or three coats of white lead for this job. You may prefer a commercial wood filler. Fill the wood completely and if the grain is raised it may be knocked off easily with sandpaper.

Use good paint on your boat. House paints and most general purpose enamels are second-rate boat paints at best. There are many good boat and marine paints and finishes available in a wide range of colors. These were specially developed for use in and around water and are well worth the price. If possible, apply paint with a spray gun. It will give a neat, smooth job with few spots. As each coat dries completely, sand lightly with fine garnet paper and carefully dust away all sanding dust. Apply a second coat, and repeat the sanding process. Some boat-builders apply as many as 6 or 7 coats of finish, and use mask-

(Continued on page 24)

Jim Sherman Photo.

One of Iowa's finest crappie fishing is in the April backwaters of the Mississippi. Of these areas, Lake Odessa near Muscatine ranks near the top.

* * * * * * * * * * *

## rappie Fishing . . .

(Continued from page 17)

8 E. DeWitt, Dyersville; Guy all, Box 979, Maquoketa; oward Lovrien, Box 48, Goose ke; Charles Adamson, 1815 and Ave., Davenport; Dan chols, Box 202, Muscatine; Ken-th Kakac, 518 Ramsey, West rlington; and Wm. Fuchs, 1608 e. D., Fort Madison.

### Stumps and Fish

The main problem in crappie hing is finding the fish. They e almost always schooled, and ce found there is no serious oblem in catching them, particu-ly in early spring. This is true other game fish as well; later in e spring and during early sum-er there is an increasing abund-ce of natural food, but during oril the aquatic larder is well-

* * * * *

Jim Sherman Photo.

Mississippi crappies come big. This 13-incher, taken from Odessa, isn't anything special to most rivermen.

nigh empty, and fish may be ravenously hungry.

I have always preferred stumpy, brushy, log-filled areas for Mississippi crappie fishing. "Calico bass" abound in such quiet sloughs, and although you may lose hooks and leaders frequently, you will be paid off in fish.

Fish right beside stumps and logs; not just in their vicinity. Many crappie fishermen don't fish at the edge of brushpiles, but within the brushpiles themselves! Fish at various depths until you find a school of crappies—they are usually caught at only one level at a time.

If you are fishing in what appears to be a likely place, and have tried different depths and locations for about 5 minutes with no luck, move on a short distance. While moving, let your bait trail slowly behind the boat. Motion is important in crappie fishing, and you may find a school of fish while you're on the move.

### Slow Biters

Crappies are notoriously slow biters, but in the spring they are hungry and may bite faster than usual. Allow plenty of time for setting the hook. If using minnows, allow at least 10 seconds or until the fish runs 10 or 15 feet. (Brush permitting.) Five or 6 seconds is usually long enough to let a crappie run with a worm bait. If you are using larger nightcrawlers, let the fish run 10 or 12 seconds. Fishermen usually fail to hook crappies by setting the hook too soon, rather than not soon enough.

Just about the best early-season crappie baits are angleworms and nightcrawlers if you can get them. Minnows are best later in the season, but for April fishing worms are hard to beat.

### Hooking Bait

Avoid fragments of worms for crappie baits. Use the entire worm, and hook it so that it shows action. A nightcrawler may be hooked for about a half-inch in the center of the body, with the ends hanging free. Small angleworms may be hooked in a similar fashion, but with several worms on one hook.

For fishing in open water areas with minnows, the minnow may be hooked just through the muscle of the top of the back, taking care not to injure the spine. In water with a lot of brush or other obstacles, I prefer to hook the minnow through the vent, with the point of the hook running up along its side just under the skin. This keeps the minnow in good shape and permits a fish to be easily hooked as it mouths the bait. Incidentally, this is a good way to bait minnows for walleyes and perch.

Where water is clear—as in the mouths of small creeks flowing into the river sloughs—flies and small plugs are very effective on crappies. In more turbid water, natural baits are usually best and when used in conjunction with small bright spinners they are extremely effective.

### Crappie Gear

Crappie tackle should be light, and its type depends on individual preference. Most good crappie fishermen use quill bobbers, light nylon leaders or monofilament line, and split shot sinkers. Spinning rods and bait rods are good for casting in open water areas, but they may be too short to use for fishing in and around brushy areas. A long, light cane pole is excellent in such waters. With such a pole and a short length of line, you can drop a bait straight down into the center of a brushpile or patch of stumps. This would not be possible with a short rod.

For Mississippi crappie fishing, I prefer a number 2 to number 6 hook, depending on the size bait being used. One of my favorite crappie hooks—especially for fishing in stumpy backwaters—is an aberdeen hook of light wire, which has a good design and will straighten out easily instead of breaking when snagged. It can easily be bent back into shape and saves a frayed temper. Crappie fishing in brush is one of the few times when you can get by with using a cheap, easily bent hook.

### Anything Can Happen

It's worth making a special trip for these Mississippi crappies. They run big: Odessa has produced 4-pound crappies, and in most areas it's not unusual to take crappies that will average 1-2 pounds. Most Mississippi "keeper" crappies will run 12-13 inches and two years ago I hit a good slough that produced 13 crappies that weighed just 15 pounds.

Anything can happen in this early spring slough fishing. Every game fish species in Iowa waters (and many rough fish, too) will hit worms this time of year. On one fishing trip late last April, two of us caught bluegills, sheepshead, catfish, bass and walleyes while fishing with worms during one day! Since we were using light crappie tackle, we hung several big fish that we couldn't handle.

But that's one of the chances that fishermen have to take in the course of early panfishing. If you fish the Mississippi long enough, you'll get used to breaking line.

## Rights to Waters . . .

(Continued from page 17)

cific reference: ". . . and that said river, Mississippi, and the navigable waters leading into the same, shall be common highways, and forever free to the inhabitants of said State as well as to all the other citizens of the United States."

### Watery Highways

If navigable waters are common highways they are public waters, and as public waters all public rights apply in their use. Iowa, therefore, was admitted to the Union with explicit provision that the navigable waters which flow in the Mississippi shall forever be public waters. In accepting sovereignty for the Iowa land, acceptance was also made of the responsibility of sovereignty, which implies that the protection of navigable lakes and streams, or public waters, against encroachment, contamination, or any other use which might impair their value for public use—even for fishing—is clearly the responsibility of the state.

The streams of Iowa if they are to be tested by the term *navigable* was used when the land was first must be tested by that term as it settled, and during the period that the term first came into existence. As is shown by territorial laws the term was used before Iowa became a State, therefore, it is not what navigable means now, but what did it mean at the time the territory became sovereign? This does not conflict in any manner with the interstate commerce law on navigable rivers under which congress has control, as cited in Item 8 Article II of the Constitution. The true test of navigability is a question of fact. Every major stream in the State of Iowa has been and can be navigated.

### Fur Routes

Prior to the opening of the Black Hawk purchase in 1833 the economy of what is now Iowa was the economy of furs. The fur trade was dependent upon the canoe for travel, and virtually every river and creek in the state was navigable by canoe in the transportation of furs to their immediate market in St. Louis.

The more we examine each premise the more clearly the conclusion becomes that the streams of Iowa are public waters and as public waters no private use or regulating laws can possibly be justified that in any manner limits their quantity, impairs the quality, or is detrimental to the fisherman.

Jim Sherman Photo.

**An expert job of boat finishing will last for years. Herman Leinen, builder for a Des Moines boat firm, carefully stains a mahogany hull, using masking tape to define a center plank.**

## Your Boat . . .

(Continued from page22)

ing tape for painting the sharp edges of waterlines and other patterns.

The special bottom finishes compounded for salt water use—the copper and bronze paints—are also excellent for fresh water. They penetrate wood rapidly and deeply, and help protect it from moisture and rot.

Canvas-covered decks and hulls may require refinishing or replacement of canvas. Avoid commercial paint removers for stripping paint from fabric. The paint may be carefully raised with a blow-torch. Use infinite care not to scorch the canvas, but just "kiss" away the old paint with the flame. (By the way, some builders warn against using either commercial paint remover *or* a blow-torch on a boat that is to be covered with fiberglass. Paint remover is said to leave residue in the wood, and a blow-torch—to an extent—drives paint into the pores which must be open if the fiberglass is to adhere. These builders recommend paint removal with a power sander.)

When paint is removed from the canvas, fill it thoroughly. As many as 5 coats of filler may be used, but there are special preparations on the market for this purpose. The canvas may be cemented to the hull area by a material such as Ferdinand's Canvas Cement. Some builders fill and prime their canvas with a mixture of one part turpentine and three parts canvas cement. Allow to dry thoroughly before painting.

The greatest enemy of boat finish — other than abrasion—is bright, hot sunlight. This is particularly true of the plywood kit boats. Keep your boat covered or in the shade when not in use during the week. If kept at a dock, provide rubber or hemp fenders to protect the hull from chafing and bumping against hard surfaces. With reasonable care, a well-finished boat will stay that way for years.

### INSURE TACKLE?

How many of us carry any insurance on our boats, outboard motors, trailer, accessories, or fishing tackle?

I haven't a dollar's protection on at least a thousand dollar investment. Fire can destroy, collision may ruin, thieves may steal, wind or floods may wreck.

Could be half-smart to include our fishing investment in our insurance program. — *Manchester Democrat.*

---

Drifting with the current or the wind is one of the best fishing methods known. But there is more to drift fishing than killing the motor, tossing over a line, and dozing comfortably until a fish threatens to yank you overboard. A drift is governed by wind or current or by one of the endless combinations of these two. And each individual boat, because of its construction, has its own idiosyncracies as to how it will react to wind and current—*The Fisherman Magazine.*

---

Some of the Chippewa or Ojibway tribe of Indians whose name means "puckered up"—as the seam of a moccasin—were residents of Iowa. Tradition claims that these Indians had migrated from the east. The 1937 census showed 26,457 of these people in the United States—*E.S.*

---

In 1833 a band of Potawatomi Indians moved to southwestern Iowa after surrendering their lands near Lake Michigan. In 1847-48 these people moved to Kansas. Pottawattamie County, of which Council Bluffs is the county seat, was named after this group—*E.S.*

## Promiscuous Fishing . . .

(Continued from page 20)

thorough surveys of water areas indicated a widespread, potential fish kill. Nothing could be done, and the promiscuous fishing was opened in an attempt to make the best of a bad situation.

Commission biologists believe that this fish take was insignificant when compared to the total fish populations in the affected rivers and lakes. The few game fish that were speared will not be missed next summer. Unfortunately, the same is true of the rough fish taken. Although tons of rough fish were removed from Iowa rivers these were only a fraction of the total numbers.

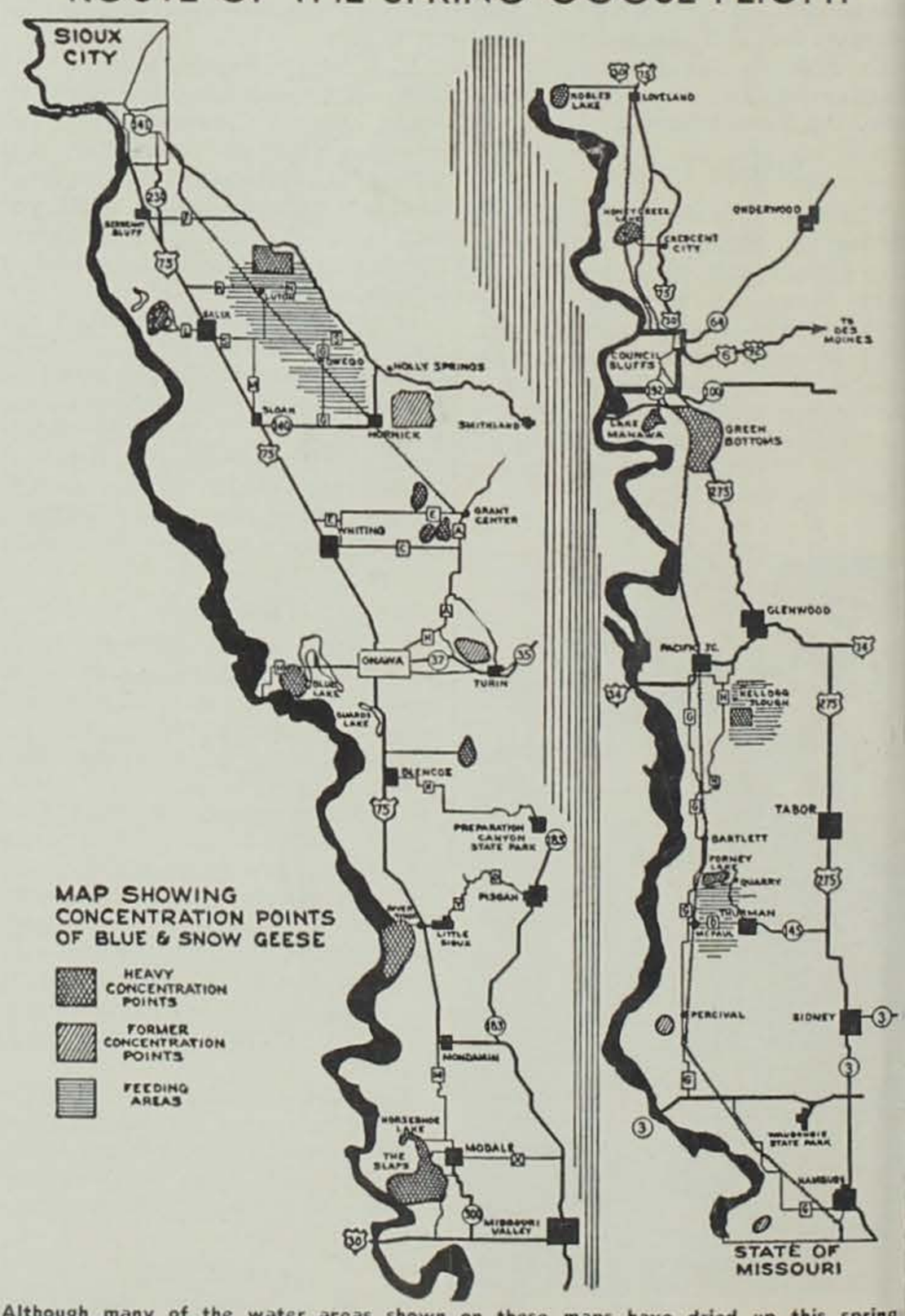
More sportsmen have become aware of winter fish kills in recent years, and what causes them. Late in 1955 they watched thick ice form early on waters that were at their lowest levels in years. This "5-month" ice alone was a threat to fish populations, but when coupled with low waters its effects were doubly severe. Low water levels do not permit a high dilution of agricultural, municipal and industrial pollutants, and "normal" pollution may be more concentrated than usual. Pollution which might normally have little influence on fish can become deadly under such conditions.

With these things in mind, biologists, officers and sportsmen kept closer watch on fish kills and as a result more dead fish were reported than usual. Perhaps this was because more men were watching more waters for fish kills—or it might have been because more fish were actually dying. We can not be sure now of the extent of this winter's kill or how it will affect next summer's fishing. We may never know.

If next summer's angling does suffer from a lack of fish, it won't be because of the promiscuous fishing season. It will be because of the magnitude of winter kill. A combination of drought, thick ice that comes early and stays late, and normal pollution can kill more fish than all the spearman in the state.

Fishermen may or may not agree with this. But there's one thing that all agree on: our rivers and lakes need plenty of water, need it badly, and need it now.

## ROUTE OF THE SPRING GOOSE FLIGHT




**Although many of the water areas shown on these maps have dried up this spring large flocks of geese are expected to concentrate in the same localities. The peak o the flight will probably occur from March 15-19 and conservation officers predict tha most bottomland roads will be in good condition for photographers and sightseers.**