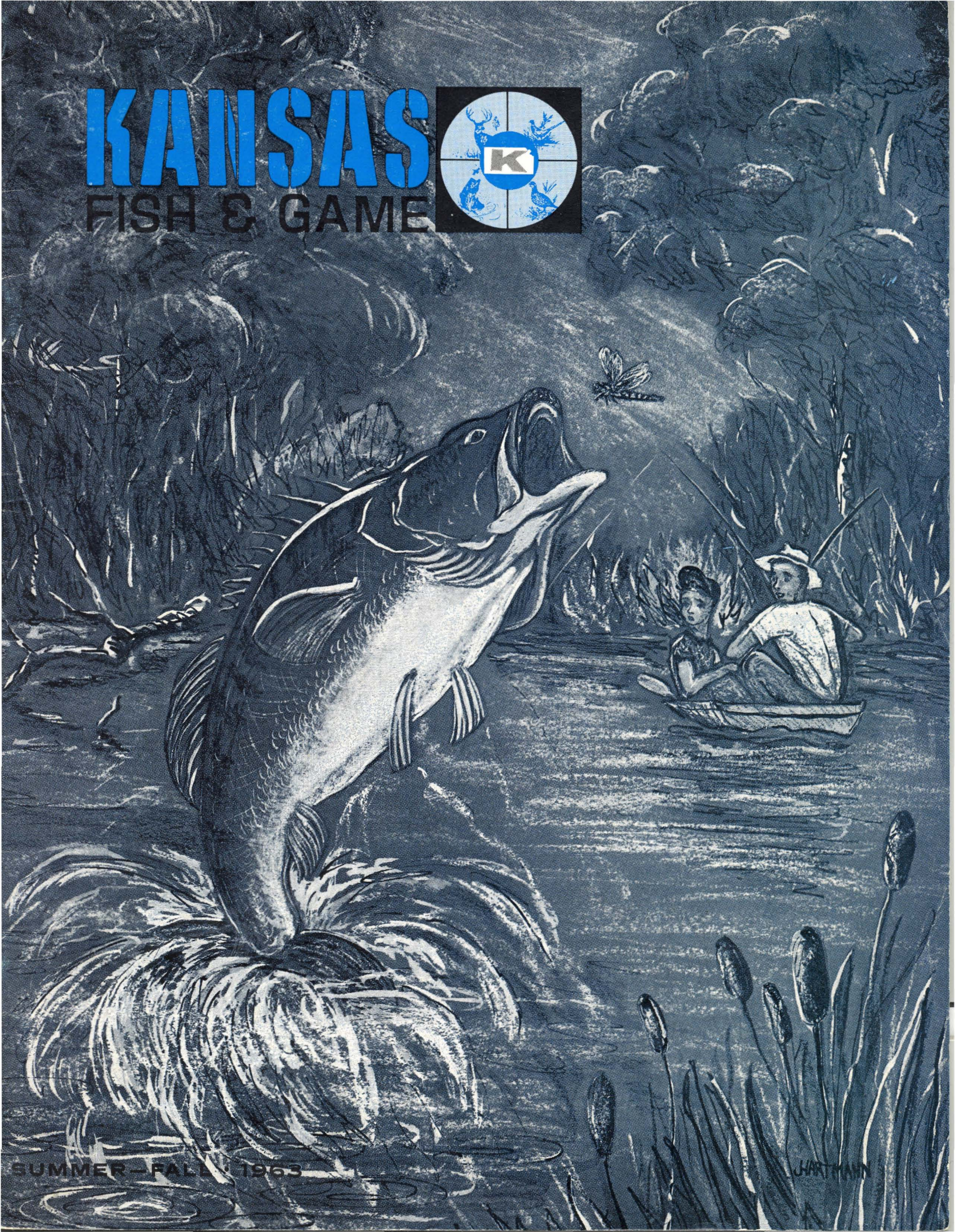


# KANSAS

FISH & GAME



SUMMER - FALL 1963

CHARTMAN

# Kansas Fish and Game

Vol. XXI

No. 1

*Summer-Fall*

## *Not Representative of Kansas Sportsmen*

A recent article in the Colorado weekly news release, which is sent to newspapers, radio and television stations, sportsmen's organizations, libraries, and other state fish and game commissions, reported a violation of fishing regulations which, in my opinion, affects all Kansans.

The violator's name or occupation will not be mentioned since it would or could be embarrassing to his colleagues, some of whom I know and consider to be sportsmen of the highest caliber. Actually it is insignificant. The important thing is the occurrence and the possible result.

A Kansan was stopped near Clark, Colorado. He had in his possession 93 fish, 83 trout over the legal limit. The man paid a fine of \$98. Those are the condensed facts reported in the story. The facts not mentioned are the impressions recorded into the minds of those in the local area where the offense occurred and into the minds of those reading it elsewhere. What do they think of Kansas "sportsmen?" No doubt the cause of good sportsmen-landowner relationships was not helped by this occurrence.

Unless you own land somewhere in the state you will have to ask permission to hunt or fish. If you don't ask permission, you are not only violating the law, you are making it difficult or impossible for others to get permission from the landowner to hunt or fish on that land. One person can jeopardize the pleasure of many.

If our favorite sports of hunting and fishing are to continue, a great deal depends upon the "old" problem of sportsmen-landowner relationships. The many sportsmen who hunt or fish must help protect their chosen recreation by educating the non-sportsmen hunters and fishermen who would condemn the sports, perhaps not intentionally but unthinkingly, by failing to get permission, committing destructive acts and by violating Kansas laws or the laws of other states. It is not a one-time or part-time job.

By observing the necessary regulations, showing courtesy to the landowner by obtaining his permission to hunt or fish and observing his desires as to restricted areas, following the common sense rules of gun safety and good sportsmanship, we can help eliminate much of the ill feelings held by some and as a result, change signs which read "No Trespassing" or "No Hunting or Fishing" to read, "Hunting and Fishing by Permission Only."—John Polson.

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Signs of the harvest remind sportsmen it is time for the hunting season to begin. (S. C. S. photo.)

## *This Game Crop—Let's Harvest It*

By **GEORGE C. MOORE**, *Director,*  
**Forestry, Fish and Game Commission**

At this time of the year when the leaves have turned to so many colors and are quietly falling to the ground we think of putting aside our fishing gear and oiling the old gun. There is "something" in the way the wind sounds, the variety of sounds in the woods and the extended shadows across the road as we drive along the countryside, that tells us that the hunting season is here. The zestful and carefree attitude of animal life and vivid colors of spring have passed into the monotony of summertime and now the seriousness of early

autumn plant and animals to complete their reproductive cycle has turned into the solitude of fall when we can reap the benefits of the fruits of spring and summer efforts. There is sadness about the fall but it is a good feeling to be able to go into the field in pursuit of one's favorite game. This feeling exists even though you may not be too successful in filling the bag. The genuine pleasure obtained from sitting on a moss-covered log in a dense wooded area watching for a squirrel to appear and noting the lazily falling leaves, the serene

surroundings, and admiring the many wonders of nature is an experience never to be forgotten. If you cannot enjoy your hunt without filling your bag you are a "game hog" and not a true sportsman.

Now that nature has been kind and blessed us with its magic of reproduction we have a crop that should be harvested. This year's crop of game should be treated just as any crop of tobacco, corn or timber and utilized when it has matured. Every acre of land will produce only so many pounds of

corn, tobacco or wheat. The same applies to a game and fish crop. Each 100 acres of quail land will produce only a given number of birds. The only way to change the yield or "carrying capacity" is to make the land more productive by adding some of the things that are needed by quail. If you want to increase your tobacco yields, you must add fertilizer, water or something else that is needed to produce a bigger crop. Just as "worn out" land produces little corn, you must expect poor land to produce less game than good land. Therefore, each type of land under normal conditions, produces a given crop yield. Similarly, each area has its game "carrying capacity." We often hear that quail are much less abundant than they were 25 or 30 years ago. This is correct because certain lands are producing few, or in some cases, no quail, and not because the hunting pressure has increased. The "carrying capacity" has also decreased in some areas due to misuse of the soil. Good quail range however, still produces as many birds as it ever did, but unfortunately much of our good quail land has been destroyed by modern agricultural practices or through gradual reduction of its productivity. There are no game species immune to this destruction and the only way we can increase the number of animals is to correct the factors that caused the reduction in "carrying capacity." This cannot be done by restocking only, but in cases where nature or other agencies have corrected the destructive factors or even improved them, restocking may be necessary. This applies to the restocking of deer into many areas in which the deer herd was depleted by the advance and ruthlessness of civilization, but has become good habitat and can successfully be restocked.

Since the change in the game "carrying capacity" has been to a great extent, due to agricultural and industrial progress, very little can be done to increase game on many areas. We must use what is



Scenes like this are a part of the sport of hunting. A true sportsman doesn't mind if he doesn't get his limit when he has paused for even a moment to look at the beauty of coloring leaves and lengthening shadows.

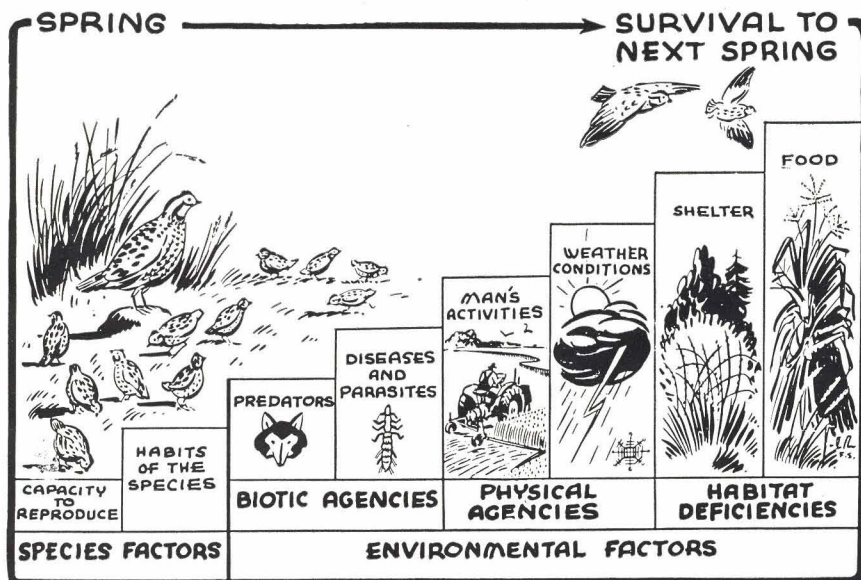
left wisely and improve those conditions necessary to increase the crop yield.

This article is not designed to discuss ways of improving the land "carrying capacity" for game but to show how we can use the present crop to the best advantage.

Since game is an annual renewable crop, those animals not needed to replace the resource should be harvested. If the surplus is not taken by the sportsmen, they will increase beyond the "carrying capacity" and die. The optimum carrying capacity of animals such as quail, rabbits, squirrels, dove and other multibrooded species is exceeded during each successful breeding season, therefore, these animals have a very heavy annual mortality, and regardless of whether or not they are hunted, the population remains within the limits of the "carrying capacity." In fact, experiments have shown that only 20 to 25 percent of these animals live to the ripe old age of one year. The remaining 75 to 80 percent die each year. Wouldn't it be wise if the hunter could harvest the entire annual loss? Unfortunately, this cannot be done, but, I believe if less restrictions were imposed, and we

realized that the sportsmen take only a small toll out of the annual turnover, and that it requires only 25 percent of the fall population to produce the number of animals that the land would support, we would let the sportsmen harvest a greater percentage of the crop that is now going to waste.

Restrictions and misleading ideas that more game should be left to breed often causes waste in those species which have a rapid turnover as well as in deer herds and other animals with a long life span. If deer are not adequately harvested the range will become severely damaged by overbrowsing, thus lowering the "carrying capacity" as well as female productivity. Studies have shown that female deer in overcrowded conditions produce as few as 0.5 fawns each year compared with 1.5 fawns per female where overcrowded conditions do not exist. Too often, good-intentioned sportsmen prohibit game departments from properly managing deer herds because they feel no females should be harvested but left to increase the already overcrowded herd. When this happens, disease and starvation take their toll and it may take many years for



Many factors govern the populations of game birds. The most important is habitat, including food and shelter. Deficiencies in habitat, man's use of the land and weather conditions directly effect the "carrying capacity" of any piece of land. Wildlife is a crop the same as wheat, corn or milo. Hunting regulations are based on harvestable surplus in relation to species capacity to reproduce.

the range to recover to the point where it can support a herd which could have been maintained under proper management.

The question of the value of game law enforcement may come to one's mind. Yes, law enforcement is definitely needed. Law enforcement men should, however, be something other than policemen. They should enforce necessary laws but not dictate which laws are needed. They should be public-relation personnel and furnish advice in a general way.

Seasons and bag limits are needed to distribute the harvest over as long a period as possible and to give a more equitable harvest to the sportsmen. In other words, the hunter can remove, through legal hunting only, a certain percentage of the population before he becomes disinterested due to the lack of game. It is obvious that if one individual could take this percentage on the first day of the season it would not be worthwhile to hunt in the area throughout the remaining part of the season. We must, however, make laws to help the sportsmen, yet benefit the game. We must not be so

strictive that the hunter cannot enjoy his sport nor prohibit his harvesting the crop, nor should regulations be adopted for the sole purpose of making law enforcement easier.

This game crop is valuable to us in food, clothing, recreation, beauty and direct monetary benefits to millions of people who make a living dealing in sporting goods. In fact, the pursuit of game and the necessary equipment is *big business*. Reliable reports show that about 18 million hunting licenses were sold in the United States last year. Add to this number the millions who do not have to have a license and you will have an idea of the number of hunters and what they pay for the privilege to hunt. The license cost is only a minor part of the monetary benefits because ammunition, guns, gas, food, transportation, clothing, dog up-keep and other costs connected with hunting is tremendous. In fact, the *annual hunting dog bill* in the United States is *greater* than the amount the public paid to see all baseball, football, basketball, hockey games, horse races, and prize fights combined. That ain't "chicken feed"; it's big business.

The above mentioned figures give you some idea of what the hunter is willing to pay for his sport. It is much more difficult to put a dollar value on all benefits because recreational and esthetical values cannot be measured with a dollar sign. No one can place values on a day or an hour spent in the field nor can a price be placed on the prevention of crimes by youth, many of whom would become delinquents for the lack of something creative to occupy their time if they could not turn to hunting or fishing. Statistics show that a much greater number of people without hunting and fishing licenses are apprehended for crimes committed than do those possessing a valid license.

Food from the game harvested is tremendous although few people pursue game for its food value alone. It is impossible to get an accurate value of the amount of food derived from game but over 1 million deer were killed in the U. S. last year. These animals probably averaged about 100 pounds each or a total of 100,000,000 pounds of usable meat. The number of squirrels, quail, rabbits, doves and other game harvested annually would bring the total value of food to a fabulous figure. In addition to the food there is a direct benefit to the hunter in clothing from hides, fur and feathers.

Hunting is big business by direct benefits to the sportsmen and indirect values to millions who make a living manufacturing and handling the items needed in the sport. Let us harvest our crop when it is available and not waste it through over-restrictions and false concept of game management through unwise conservation. An investment in good game management will pay big dividends in health, recreation, food and jobs but these dividends should be collected when they mature as they will not keep.



## *It Pays to Fish the Hatch*

By **BOB HARTMANN**  
District Fishery Biologist  
Southeast District

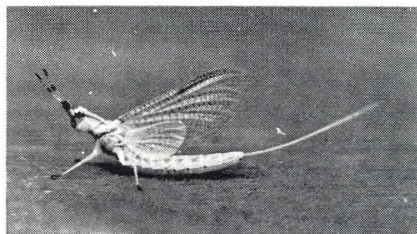
"Fishing the hatch" is a trout fisherman's term often used to describe a mayfly or willowfly "hatch" and the fast and furious fishing that ensues as the fish begin feeding on the emerging insects. It's a term rarely, if ever, used by Kansas fishermen. But this should not be the case.

Even though Kansas lacks suitable trout streams it does not want for the mayfly. Most all Kansas ponds, lakes, reservoirs and streams host several varieties and often large numbers of mayflies.

The large yellow and brown burrowing mayflies (*Hexagenia limbata* and *bilineata*) which frequent our state lakes, whether the lake be

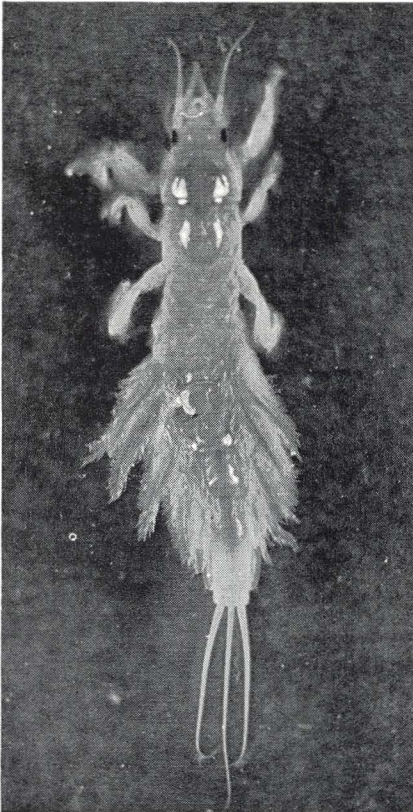
turbid with silt or not, should be of particular interest to the fishermen of the state, especially the fishermen who like the feel and fast action of a fly rod.

The immature *nymph* of these



**Adult *Hexagenia* molt several times, mate, lay their eggs and die (if not eaten by a fish in the process) within 24 hours.**

mayflies inhabit small burrows which they dig with their well-developed forelegs in the soft bottom mud. While living and growing in their burrows the nymphs feed on small, microscopic plant and animal life. As dusk of the still, warm evenings of late May and early June arrive the maturing nymphs leave their burrows, swim to the surface and emerge (or "hatch") into the large yellow and brown fly that is such a tasty, irresistible morsel for bluegill, crappie and often bass. *Hexagenia* emerge for several hours each evening after sunset. This evening affair continues well into August.

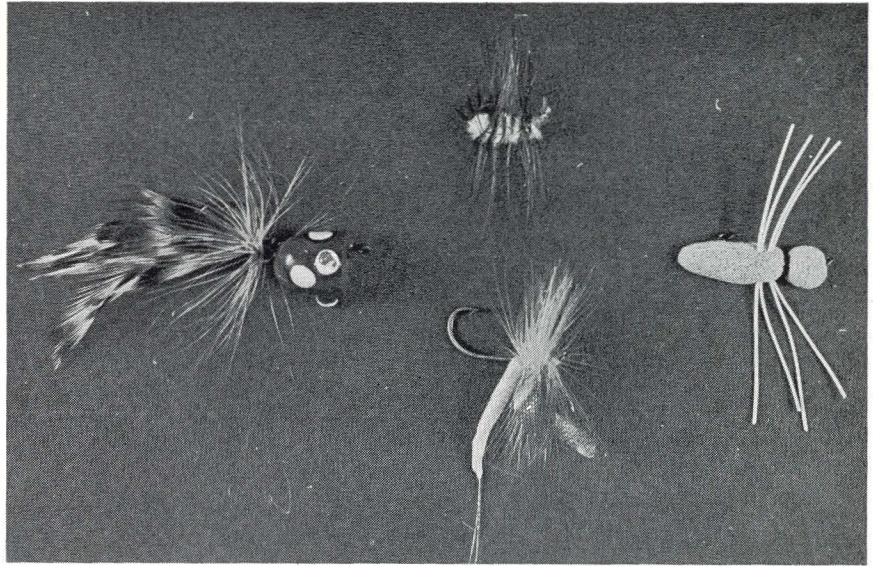


The nymph, too, is a tantalizing tidbit to bluegill, crappie and often bass.

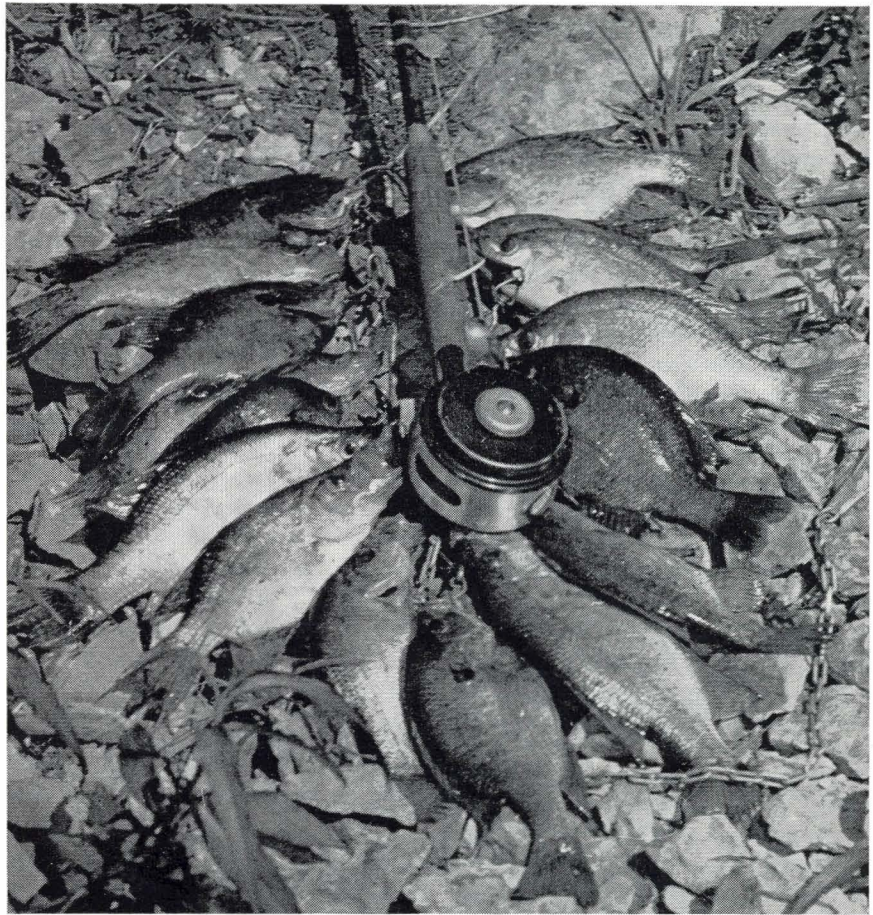
A fly fishermen equipped with a small artificial mayfly, popping bug or similar "high riding" lure is in for action "a-plenty" if he fishes as a hatch takes place. Later in the season, in July and August, a woolly-worm or comparable wet fly fished just below the water's surface and worked in an undulating manner to impersonate the nymph as it makes its way to the top to emerge will provide added zip to a normally slack fishing period of the season.

Many of our state lakes have an abundance of bluegill and crappie that are not easily caught by the usual daylight-hour fishing methods during this period of the year. Fishing the hatch cannot only provide you with added fishing fun but will also give you an opportunity to aid in maintaining a proper balance of fish life in our lakes by increasing the harvest of the prolific and over-abundant bluegill and crappie. And, there is always a chance of hanging into that "big one."

So try it some evening. As the



Artificial bugs fished during a hatch will catch fish even in the slack summer season.



These fish may not be in the lunker class, but to a fisherman they provide plenty of sport and fun.

sun sets and the heat of the day subsides into a cool whisper and as the emerging mayflies begin to

dimple the water—I'm sure you too will agree that it pays to fish the hatch!

# BONUS FOR SPORTSMEN

*Secondary Use for Neosho Waterfowl Management Area*

By JOHN POLSON

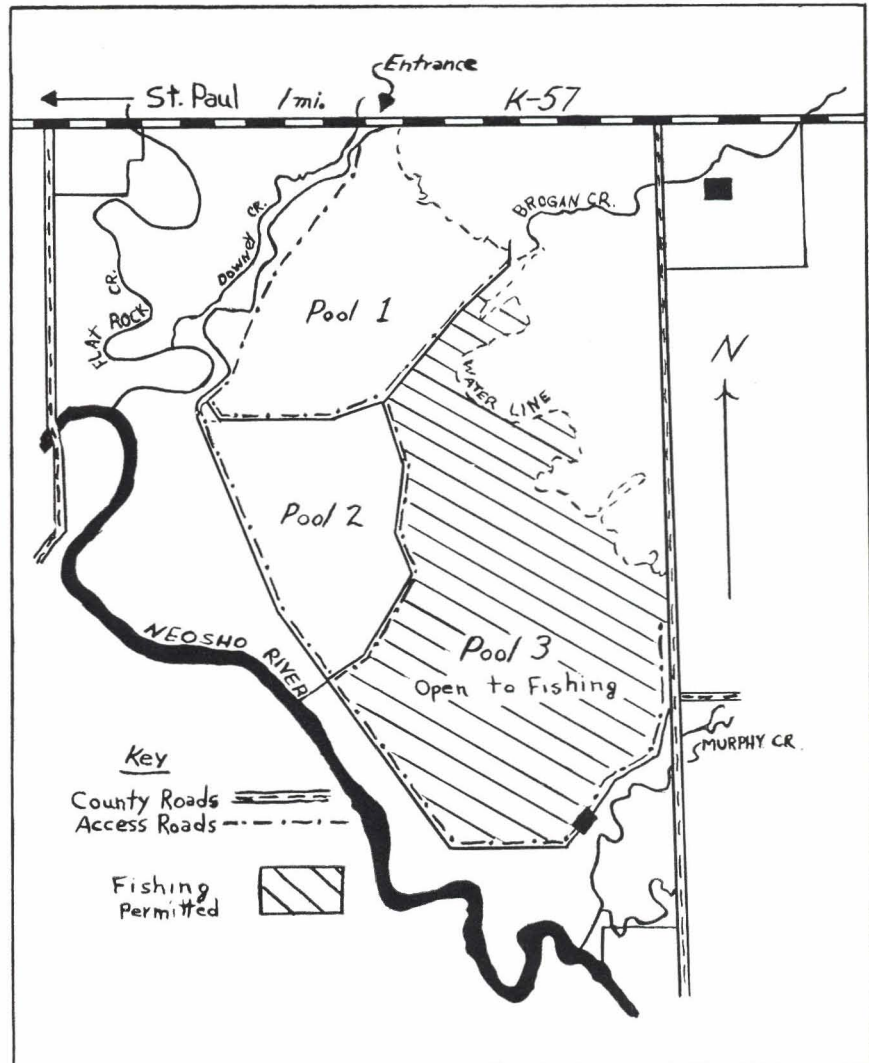
Fishing, which was permitted for the first time this year at the Neosho Waterfowl Management Area near St. Paul, became a secondary use for the area and a bonus for sportsmen. The primary use, as the name implies, is waterfowl management. There are three pools containing about 1,400 acres of water in the area. Crops are planted in some of the remaining acreage for waterfowl feed as well as in two of the diked pools. Pool No. 3, the only area open to fishing was stocked by the Forestry, Fish and Game Commission and opened to the secondary use May 15 through September 30, 1963. The area now provides hunting of waterfowl and upland game as well as fishing.

Approximately 5,000 people visited the area during the first five days of the fishing season even though the weather was not conducive to sight-seeing. Clouds and wind hampered fishermen to some extent as far as using light tackle was concerned, but many fish were taken as was evidenced by the creel check made by commission personnel.

Channel catfish taken averaged 2 pounds. The largest reported was 6 pounds 6 ounces. The largest bass taken was 3½ pounds with an average of 1½ pounds. Large bullheads up to 2 pounds, 2 ounces were also taken. The number 3 pool has continued to produce since the opening.

Most of the slightly less than 3,000-acre area of the Neosho Waterfowl Management Unit is Neosho River lowlands. It went into partial operation in the Fall of 1961 but hunting was not permitted until 1962.

The Neosho project was constructed with the aid of Pittman-



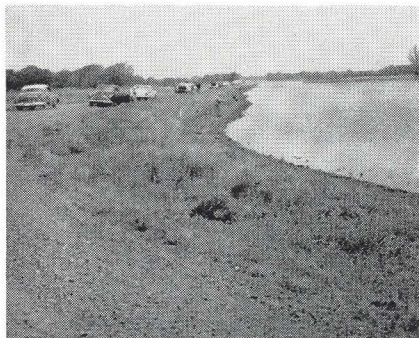
Map of Neosho Waterfowl Management Area which was opened to fishing for the first time this year.



Four anglers proud of their stringers of fish, with every right to be. Channel catfish, bass, bluegill and larger bullheads are displayed here.



Robertson federal aid funds. The federal government contributed 75 percent of the cost of acquisition and development of the area. Funds for the federal share of the project came from an excise tax on sporting arms and sporting ammunition. The state puts up the money for the project and upon completion and approval is reimbursed by the federal agency.



Vehicles of fishermen lined the banks of pool three. Scattered at first, fishermen and vehicles increased in number toward the south side of the pool.

#### OPENING MORNING

The banks of the fishing area were lined with people and cars on the opening morning of the fishing season. Scattered at first as you entered the area, giving the impression of slightly more than average interest. The further you traveled on the access road the more concentrated the fishermen's vehicles and equipment became. By the time you reached the half way point around pool three they appeared to be elbow to elbow.

Most of the satisfaction of fishermen is reflected in the faces of the anglers in the accompanying pictures. Of course, some were not "lucky" and didn't fill the "big stringer." There are hot spots in any fishing area and then there are the other places where things are not so good.

John Ray and Bob Hartmann, fishery biologists for the commission conducted the creel checks at each exit to the Neosho area. They estimated 300 fishermen took 530 fish on the opening day. The pool

three area was stocked in 1961 with channel catfish, largemouth bass and bluegill. Reduced limits of 6 catfish or 6 bass, with no more than 6 fish in the aggregate were in effect this year.

Public hunting, public fishing, waterfowl management, and upland game habitat, are all in one area to provide as much sport as possible for as many people as possible over as long a period of time as possible. This pretty well sums up the objective of the fish and game commission and with little reservation, it could be said this has been attained in the Neosho Waterfowl Management Area with-



Bob Hartmann, fisheries biologist, checks the stringer of young anglers trying the area. Creel checks were set up at each entrance. John Ray checked anglers at the other entrance.

out interfering with the primary purpose of the area.

#### Brant on New Duck Stamp

The 1963-64 federal "Duck Stamp Contest" on North American waterfowl drew 161 entries from 87 artists. The 14th annual contest was conducted by the Department of the Interior's Bureau of Sport Fisheries and Wildlife, Washington, D. C. Following a tie-breaking vote, a brant design created by Edward J. Bierly of Route 1, Lorton, Va., was declared the winner. The new stamp design is a black and white water color painting depicting a pair of graceful brant swooping in to land, with a lighthouse in the background. Runner-up is a design by David A. Maass of Owatonna, Minnesota, featuring canvasback ducks. . . . Entries on wood ducks exceeded those for all other species. Puddles topped the popularity poll of waterfowl. Geese, diving ducks and mergansers were next in order of popularity. The 1963-64 "Brant" stamp went on sale July 1, 1963. (Everyone over 16 years old is required to carry a stamp when hunting migratory waterfowl.) About 2,000,000 stamps are sold annually. . . . Contest entries came from 30 states and Canada: 19 entries by nine artists from Minnesota; 18 entries by nine from Illinois; 18 by seven from Arizona; 12 by six from Virginia; 11 by six from Pennsylvania. . . . Glossy prints of the winning stamp are available from

the Office of Information, Fish and Wildlife Service, Department of the Interior, Washington 25, D. C.

#### Keep Boat Cover Tied Down When Trailering

Unless it is tied down properly, a boat cover can billow out like the spinnaker of a sailboat when the rig is being trailered at high speed. This produces a needless strain on the cover as well as the fasteners. One solution is to run a piece of rope back and forth over the cover to keep it from flapping in the breeze. The rope can be tied to the trailer.

If your boat is equipped with a canvas top which folds down in front of the windshield, make sure it is secured before trailering.

#### Watch the Stern When Pulling Away from Pier

Unlike an automobile, the back end of a boat responds first to the turn of the steering wheel. Keep this in mind when pulling away from a pier. If the boat is snugged against the pier and the steering wheel is turned too sharply, the stern can swing into or under the pier. Either push the boat away from the pier before accelerating or leave the pier at a slight angle until the boat is clear.



Hosts of fishermen from southwest Kansas find Hamilton County State Lake to their liking. Here is a typical weekend scene.

# Hamilton County State Lake

BY GEORGE VALYER *20th of a Series on the State Lakes of Kansas*

Nobody ever complains when it rains in western Kansas. That is not unless the rain comes in the middle of wheat harvest time. Even then, the squawks are not too loud or too long. Precipitation is always welcome in any area where the annual rainfall average is less than 20 inches per year.

None-the-less, I was unhappy with the weather the last time I was in the western part of the state because I had gone there specifically to take pictures of Hamilton County State Lake. The skies didn't exactly open up but there

was continual low cloudiness with drizzle and an occasional harder shower. It was quite cool for the latter part of May also and not at all the day the weather bureau had forecast it to be.

My companion, from Lakin on west, was Homer Burkhart, State Game Protector for Kearny and Hamilton counties, who had volunteered to go along on this expedition. At his suggestion, we took the precaution of equipping ourselves with a few minnows, just in case of an emergency. The emergency certainly arose. Here we

were at Hamilton County State Lake and there wasn't enough light to take any decent photographs. There was absolutely no other recourse but to start fishing and hope that the sun would break through.

Since we didn't want to get wet, we decided against standing out on the shore to plug for bass. Instead it was decided to hook on a minnow or two and still-fish while waiting in the protection of the car. Even this wasn't very satisfactory with the chill wind blowing in the open doors of the vehicle.

After a patient thirty minutes of

no action, Homer decided to check his bait while I tried to get a picture of him reeling in his line. Then it happened. Without warning the tip of my rod made a sudden dive and the reel click sang in a high-pitched whine. I had my hands full of photographic equipment and Homer had his hands full of his own fishing equipment. By the time I had replaced the camera in the car and scampered back to the rod, he had the situation well in hand. Homer had dropped his pole and come to the rescue to set the hook. Graciously he handed the rod over to me and I had the fun of landing a respectable channel catfish. Its sides were a light metallic color with the dark spots showing clear and bright.

Channels such as the one we had just taken are sometimes readily caught at this lake. Not considering the federal reservoirs, Hamilton County State Lake probably produces as many or more fish per acre of water than any other spot in Western Kansas. Besides channels, the waters contain largemouth bass, bluegill, crappie and bullheads. The lake received a supplemental stocking of yearling channels in 1962 and the return has been gratifying.

Many fishermen in the southwest part of the state are well aware of the fishing potential at this impoundment. On a spring or summer weekend, you can find them from as far away as 100 miles. On holiday weekends, the shores and every available picnic table are crowded. Tents and camp trailers from many states of the U. S. mark this lake as a stopping point for travelers.

Its proximity to U. S. 50 probably accounts for its popularity with out-of-state campers. Located just a mile and one-half north of the highway, it is easily accessible on a well maintained all-weather road. The most popular camping area is located below the dam where the facilities are best. Picnic tables, grills and sanitary facilities are located at this area which is accessible from the first gate you

come to when traveling north from the highway. Supplies of all kinds are available in Syracuse three miles east of the point where you leave U. S. 50.

Until recently, water was available from a spring located on the west shore near the north end of the lake. However, this spring has ceased to flow during the recent dry weather. With additional rainfall, perhaps it will again provide a source of drinking water for visitors.

Hamilton County State Lake was established in 1956 and contains 94 acres of water at normal level. Lake sites are not plentiful in the southwest part of Kansas and some which have been built there in the past have failed to maintain an adequate water level during dry conditions. The Fish and Game Commission chose wisely when it picked the location of this lake. Springs in the drainage area help maintain the lake level during times of little runoff water. The stream which feeds the lake is known as Cherry Creek. Although the lake is now about six feet below normal level, adequate rains in the watershed would soon bring it up to capacity.

In June of 1957, a rain of near cloudburst proportions fell in the

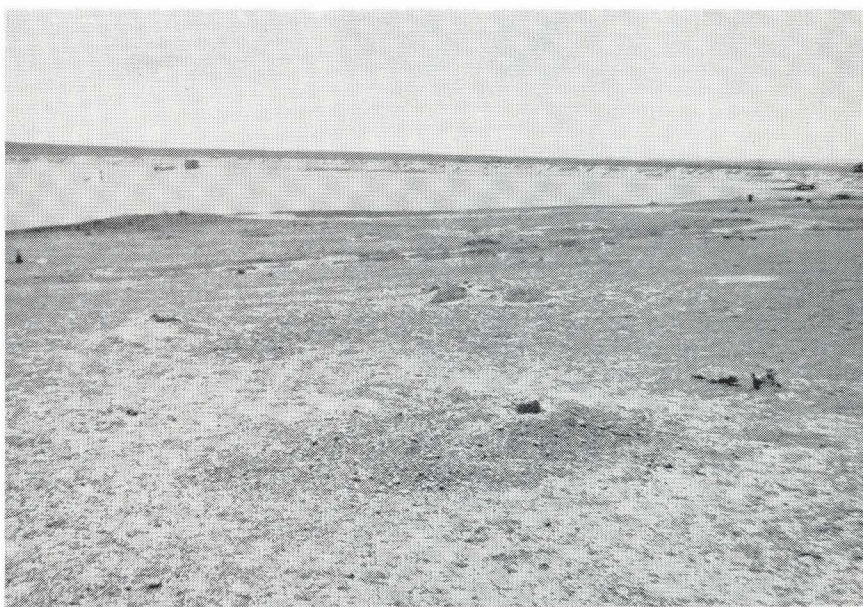
area and the lake was filled to overflowing in a few short hours. Since that time the impoundment has received very little runoff water.

The Hamilton County Sportsmen's Association was quite active in various improvements at the lake. As one of their projects, they removed some of the large dead trees from the lake the summer after construction. These were mostly large cottonwood logs which were washed into the lake by the high water. Additional work was done by this group in supplying a concrete boat launching ramp.

One of the more interesting features of the Hamilton County State Lake area is the abundance of wildlife to be found in and around the lake. The variety of shorebirds to be seen there is astounding for the size of the water. On my visit I saw at least three different species of gulls, one specie of terns, killdeers, bank swallows, sandpipers, and several others which were not close enough to identify. The lake was still hosting two or three small bunches of ducks, even though it was the middle of May.

On the western side of the main body of the lake is located a colony

*(Continued on page 19)*



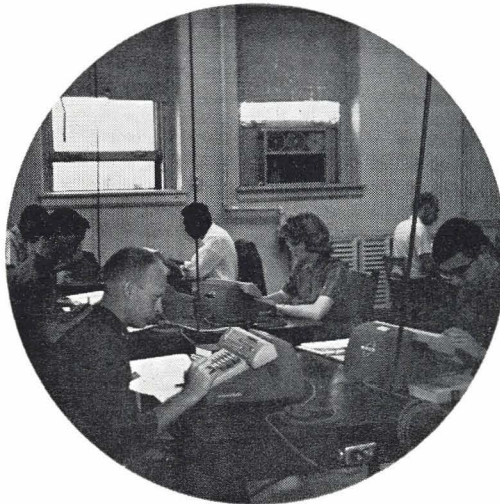
**This scene at Hamilton County State Lake shows a portion of the prairie dog town in the foreground. Many visitors enjoy watching the animals frolic in the sunshine.**

# Background of a biologist includes what?

By DR. R. J. ROBEL, Kansas State University, Manhattan, Kansas



IN COMPARATIVE ANATOMY CLASSES, FUNCTIONAL SYSTEMS OF VARIOUS TYPES OF VERTEBRATES ARE STUDIED.

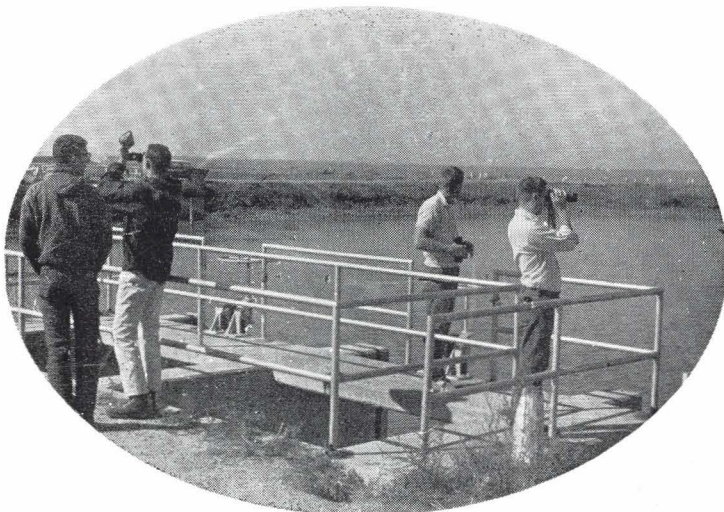


A KNOWLEDGE OF BUSINESS MACHINES IS IMPORTANT IN KEEPING RECORDS AND COMPILING STATISTICAL DATA.



WATER QUALITY AND SOIL ANALYSIS TESTS REQUIRE A BACKGROUND OF CHEMISTRY.

# **BIOLOGIST INCLUDES**



FIELD TRIPS TO MANAGEMENT AREAS ARE PART OF THE TRAINING.



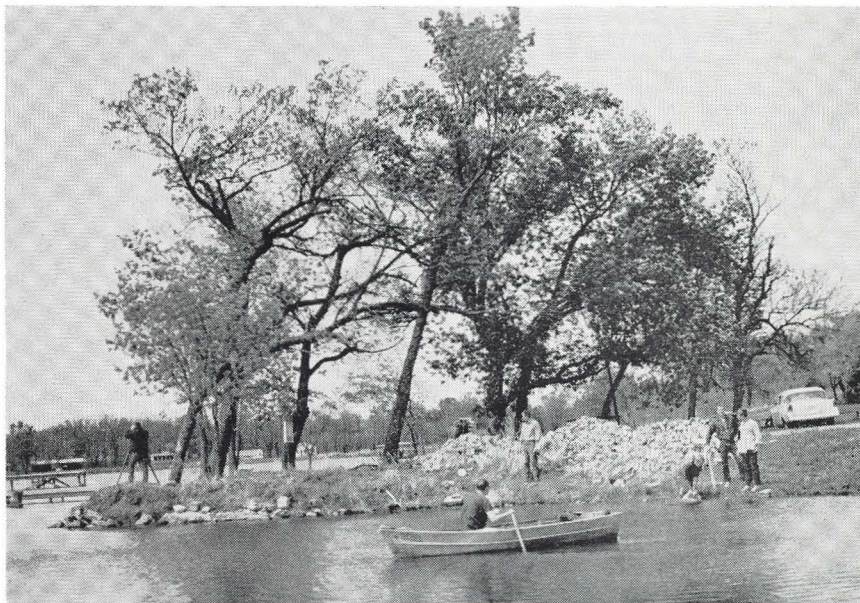
STUDENTS EXAMINE A FIELD OF DUCK MILLET FOR WATERFOWL.

Do you have an interest in hunting and fishing? Naturally the answer is yes, otherwise why would you be reading this publication? Oftentimes when a person has an interest in hunting and fishing he thinks he should pursue the wildlife or fisheries management field as a profession. There are other requirements for a good wildlife or fisheries biologist in addition to just a casual enjoyment of hunting and fishing. In this article I'm going to try to show what type of interest and aptitude is needed by a prospective wildlife or fisheries biologist.

The first thing a fisheries or wildlife biologist must have is a college education. You may ask why—all a biologist does is count game species and set hunting and fishing seasons. Counting game and setting seasons are but a minor part of his duties.

A college education is necessary to prepare him to deal with problems of fish and game management. Problems of fish and game management include not only wild animals and fishes, but also public relations and other society oriented conflicts. In college, basic English and speech courses are required of all students. This helps prepare the student to express himself both vocally and in writing. A technical writing class plus term papers which are required in most advanced courses play an integral role in training a person to write coherently and effectively. A speech course, be it under the title oral communications or spoken English, is essential for the professional wildlifer. Speaking engagements are routine in the schedule of a biologist. He must be able to meet with people and speak to them intelligently if he is to gain their confidence.

The work of a wildlife or fisheries biologist is extremely varied and complex. Censusing of game species involves more than just counting. Population sample, correction factors, population dynamics, correlation of regression, population growth curves, intrinsic rates



Boats are sometimes necessary on field exercises when water samples must be taken from different locations and at different depths.

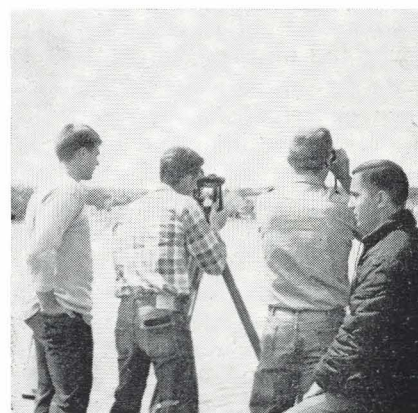
of growth, mortality rates, environmental resistance, and many more such terms become an important part of the biologist's working vocabulary. To determine the above, a sound foundation must be obtained in the field of mathematics. For this, the biologist is required to master such courses as college algebra, elements of statistics, and possibly biometrics.

In addition to mathematics, a fisheries or wildlife biologist must have a good foundation in the physical sciences; chemistry, physics, etc. A fisheries biologist probably works with water chemistry as much as he works with the fish themselves. The determination of different materials in the water; oxygen, carbon dioxide, calcium, phosphorus, nitrogen, and other elements plus pH, alkalinity, and other properties all are essential if one is to determine the suitability of an aquatic environment for fishes. Different fishes require different conditions, therefore, the above facts must be known for proper management of a fish population. Similar examples could be cited for the wildlife biologist. Because of these needs, a fisheries or wildlife student is required to com-

plete such courses as inorganic chemistry, organic chemistry, and physics.

Most of the preceding academic training is encountered during the college student's freshman and sophomore years. It's not until he completes these basic courses and begins his junior year that he is actually equipped to begin taking what one might consider the "wildlife" courses. In his junior and senior years, his study schedule includes such specialized courses as:

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Survey instruments are used at two points on the lake in the exercise and sightings are made at various intervals in determining surface area of the impoundment.

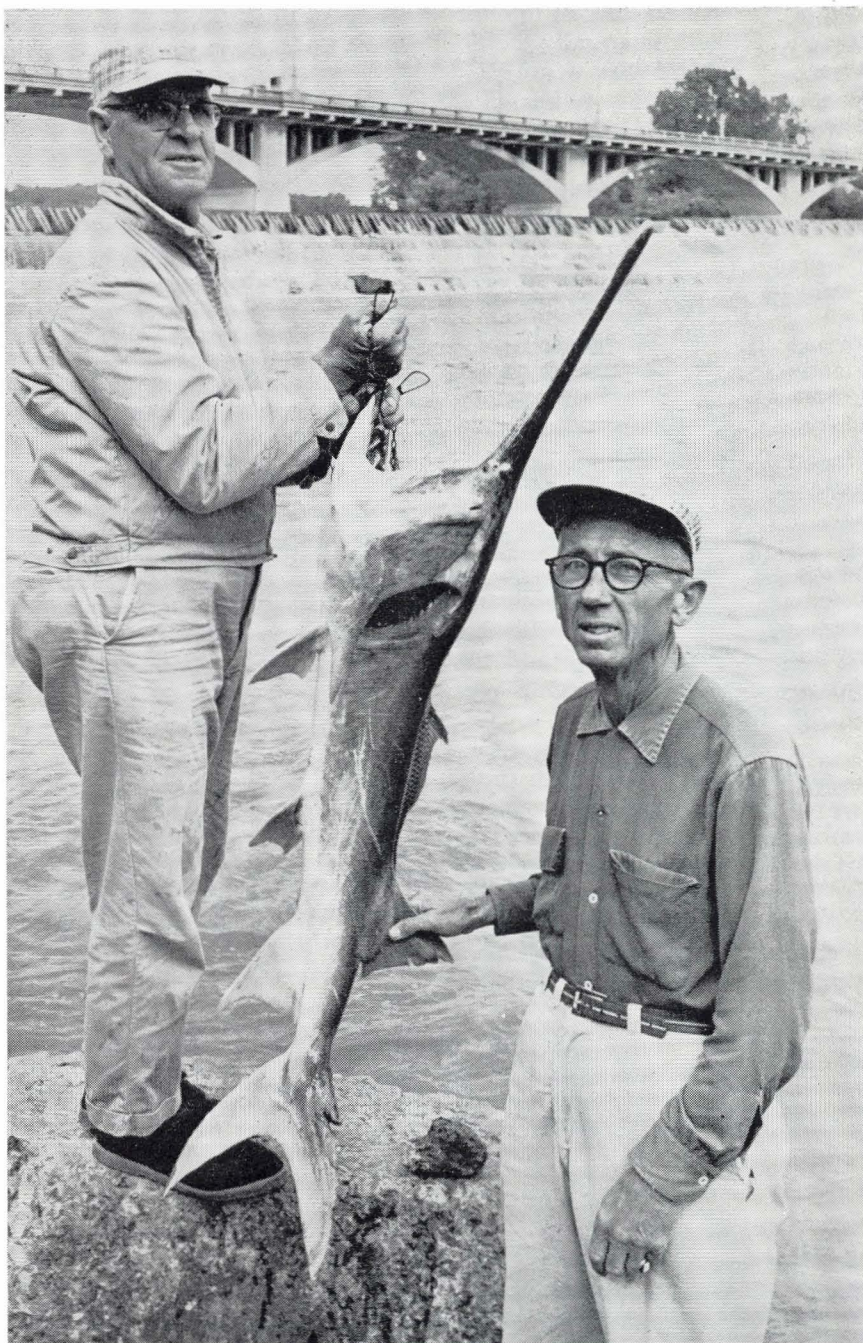
## Little Known About One Record Fish

Fishing in the Kaw River near Lawrence on September 19, 1962, John C. Huston of Lawrence landed a 26-pound, 6-foot 3-inch paddlefish and established a state record for that species. Since that time many questions have been asked by Kansas sportsmen concerning the paddlefish.

A recent article in the *SFI Bulletin*, a publication of the Sport Fishing Institute, answers many of the questions which have been received.

"The paddlefish is a little-known primitive freshwater fish occurring in the Mississippi River drainage that somehow has persisted into modern times along with the equally primitive sturgeon. It is a plankton-feeder which feeds by cruising with open mouth straining minute food organisms from the water by means of hundreds of closely-spaced fine gill rakers attached to each gill arch. It closes its mouth periodically to swallow and repeats the process. The long paddle-like snout is very sensitive, being highly enervated, and serves no known purpose.

Until 1960, the spawning of the paddlefish went undetected although many folk had tried to discover and observe the process. A few very small individuals had been collected some years earlier in various localities and likely situations but it awaited the keen eyes and fortuitous presence at the right time and place of Missouri Conservation Commission fishery biologist Charles A. Purkett, Jr., to solve this long-standing mystery. Purkett observed paddlefish spawning in swift water over gravel bars in Missouri's Osage River in mid-April, when the water temperature was about 61 degrees Fahrenheit. Spawning was characterized by repeated flurries of swimming activ-



John C. Huston holds aloft his record paddlefish as he stands near the spot where it was landed.

ity during which eggs and milt were released.

Whether these fishes were ever truly abundant before the advent of modern civilization is a good question. In any event they are not rare at present, and sustain fairly substantial sport and commercial fisheries at various locations throughout the range of the species from Louisiana and Texas

in the South to Minnesota and Wisconsin in the North. Their apparent rarity in parts of their range is often attributed at least partly to the presence of dams. However, it is notable that major fisheries have developed in association with such structures, especially the tailwater environments, in many places. Even so, major spawning areas observed by Purkett in the Osage River are

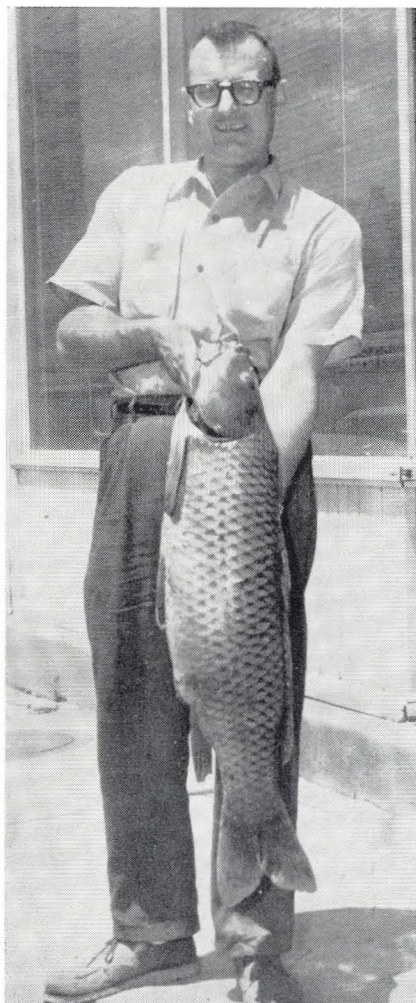


The state record flathead catfish, 70 pounds, is displayed by Wesley Whitworth of Erie. Still in its mouth is the hook with trotline staging attached. (Parsons Sun photo.)

threatened by dam construction. Obviously, much remains to be learned about the ecology of the paddlefish, especially in relation to artificial impoundments."

It is interesting to note that the stream called the Osage in Missouri is known as the Marais des Cygnes river in Kansas. In all probability, paddlefish occur in this watercourse in Kansas although they are infrequently caught. There is also one authenticated instance of a paddlefish being taken from the Walnut river, a tributary of the Arkansas, south of Augusta.

Not such an oddity were two other record breakers officially recognized this summer. On May 11, 1963, Wesley Whitworth of Erie



Twenty-four pounds of carp (plus nine ounces) is a handful for Harvey Haas of Junction City who set the new state record. This fish bested the previous record by over four pounds.

took a 70-pound flathead from his trotline in the Neosho river. A small bluegill was used for bait.

A new carp record was established on June 18 when Harvey W. Haas of Junction City took a 24-pound, 9-ounce specimen from Clark's creek near Skiddy. Haas landed the whopper on a spinning outfit with a 10-pound test line, using worms for bait.

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### *Boating Safety*

*Is Your*

*Responsibility*

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## Pre-Float Check

Before an airplane takes off, its pilot goes through a routine pre-flight check list to make sure everything is in order and functioning properly. Outboard boatmen should follow much the same procedure. Here's a pre-float check list designed especially for trailer boatmen:

Before you leave home:

1. Visually check trailer tires to see that they are properly inflated.
2. Make sure the hitch and safety chains are secured.
3. Be sure the trailer lights are connected and working.
4. Make sure the boat is tied down and resting on the trailer properly.
5. Check to make sure the drain plug is inserted in the boat.
6. Check your fuel supply. On long trailer trips, it's better to travel with the tanks empty and to take on fuel when you reach your destination.
7. Make sure you have all the equipment you will need. This includes required items as well as those you will use for fishing, water skiing, etc.
8. Have your boat registration papers with you or in the boat.

When you are ready to launch:

1. Check the drain plug again. This is easy to forget.
2. Remove the tie-downs before the trailer is backed into the water.
3. Attach a line to the boat before shoving it off the trailer.

When the boat is in the water:

1. Before starting the engine, check to make sure the fuel line is not kinked or being pinched.
2. Check the steering system.
3. Be sure running lights are working properly if you'll be boating after dark.

Although it looks like a long list, it doesn't take long to go through it. Experienced boatmen do it automatically and novice skippers can quickly learn the routine.

## Use Fresh Fuel

The highly combustible vapors present in gasoline—what the engineers call light ends—are lost when gas is stored for a long period. For this reason, the engineers recommend using only fresh fuel in your outboard motor. Trying to use fuel left in a tank over a period of several months can cause hard starting and fuel system fouling.

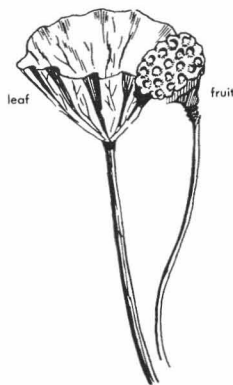
## Control of Undesirable Aquatic Vegetation

One of the most troublesome problems associated with Kansas farm ponds and small lakes seems to be that of controlling an overabundance of aquatic weeds. This problem is greatest in clear-water ponds and impoundments due to the fact that sunlight penetrates to much greater depths, thus enabling the growth of undesirable plant life. Seldom is there a vegetative problem in turbid ponds and, where present, it is confined to the extremely shallow areas.

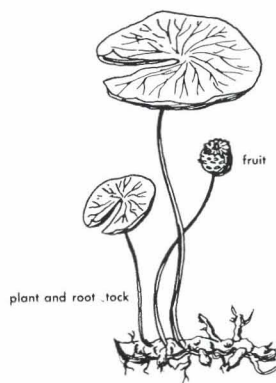
Aquatic weeds are undesirable for many reasons. One of the most common complaints is that they make fishing difficult by fouling lines and hiding baits. But, there are other disadvantages too. Water weeds consume fertility from the pond. This fertility could be better utilized in fish food production. Small fish take cover in weeds where predator fish cannot feed on them causing the pond to become overpopulated or out of balance. Also, weeds tend to make a pond unattractive. With all of these disadvantages, some means of control over aquatic vegetation is earnestly sought by many pond owners.

To fully understand the problem, certain facts should be kept in mind. Because all plant life is dependent on sunlight for growth, anything which will limit the amount of sunlight penetration into the water will certainly have a beneficial reaction, particularly on those plants which grow beneath the surface. Since sunlight can penetrate only so deep even in clear water, limitation of shallow water areas will also be beneficial. This can be accomplished during construction by deepening the waters adjacent to the shoreline.

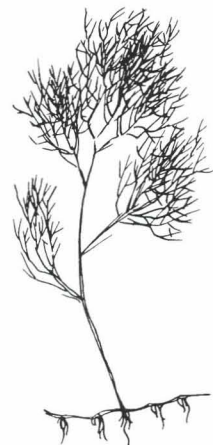
Aquatic weeds commonly found in Kansas can be grouped into three general classifications; floating, submergent and emergent. Although most submergent and floating weeds are generally referred to as "moss," the great number of varieties of these plants poses the real problem when considering



AMERICAN LOTUS (NELUMBO)  
EMERGENT  
FLOWER — YELLOW



WATER LILY (NYMPHAEA)  
EMERGENT  
FLOWER — WHITE



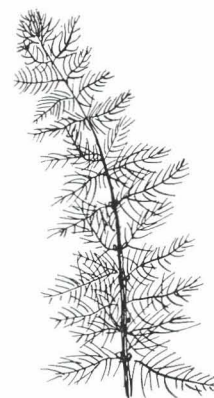
P. PECTINATUS  
SAGO PONDWEED



ARROWHEAD (SAGITTARIA)  
EMERGENT  
FLOWER — WHITE



COONTAIL (CERATOPHYLLUM)  
SUBMERGED



WATER MILFOIL  
(MYRIOPHYLLUM)  
SUBMERGED

(Drawings courtesy of Chemical Insecticide Corporation, Metuchen, New Jersey.)

measures for control. The most common floating plant are duckweed and the algae. Certain algae are beneficial for effective fish management but the filamentous type are undesirable and should be eliminated where possible. The emergent weeds include such varieties as American lotus, water lilies, cattails and arrowhead. These plants, although rooted on the bottom of the pond, send leaves and blossoms above the surface of the water. The submergent weeds which grow beneath the water surface and are rooted on the bottom

include such varieties as water milfoil, coontail, sago pondweed, bushy pondweed, horned pondweed, musk grass, and various fine leafed pondweeds.

Control measures for the various plant types have been the target for much experimentation by fishery biologists in an effort to devise systems and chemicals which will be effective. From these experiments have come some methods which have produced desirable results.

**PROPER CONSTRUCTION METHODS.** Whenever possible, consideration



should be given to the weed problem during construction of a pond or lake, especially in locations where the water may be expected to be clear. Construction should be planned so that a minimum amount of shallow water (less than two to three feet in depth) will be found around the banks of the impoundment. Where such flats exist, they may be shaved off by construction equipment in the building of the dam. Another important point involving construction is the installation of a water control structure so that the water level may be regulated when desired. This is very important in the proper management of the fish population as well as a means for water-level manipulation for weed control.

In ponds which have gone dry during drought periods, these modifications can sometimes be made before additional rainfall has refilled them with water. Power frezons can be used along the banks to sufficiently deepen these areas so that aquatic weed growth will be discouraged.

**WATER FERTILIZATION.** The spreading of commercial fertilizers on the surface of a pond or lake is generally effective in preventing the establishment of water weeds. The fertilizer encourages the growth of microscopic plant and animal life which, when they have reached sufficient numbers, tend to shade the bottom of the pond. This method is best used before the establishment of an excessive weed growth. This also encourages growth of small fish since they feed on the small animal and plant life which is produced. Due to the variance in water quality, specific recommendations as to type and amount of fertilizer will not be attempted. To determine the locally recommended amounts, contact should be made with either the County Agent's office or the Kansas Forestry, Fish and Game Commission. Fertilization should be commenced prior to the growing season and be continued through the summer and early fall. It should be pointed out that it is not

practical to attempt fertilization in ponds which have an appreciable overflow.

**MECHANICAL REMOVAL.** Various mechanical means have been successful in controlling emergent type aquatic weeds. Such methods must be begun early in the spring and continued as new growth appears. Four or five cuttings may be required during the first year and subsequent cuttings will probably be necessary for several years if the program is to be effective. Several underwater mowing machines are commercially available for mounting on boats. The initial cost of such machines may be high when compared to other methods.

Submergent vegetation may also be cleared from small areas of a pond or lake by using a cable or several strands of barbed wire. The wire is looped out into the water and tractors are used on either end to drag the vegetation to shore. This method is usually ineffective for any permanent benefit; the most that may be expected is to temporarily clear a small area of the pond for increased fishing ease.

**EXPOSING THE POND BOTTOM.** Where a water control structure is incorporated into the dam, a draw-down of water level is possible, thus exposing the vegetation in the shallow areas. This draw-down is most effective in the early winter when freezing and thawing will help to kill the roots. It has been determined that at least two or three years will be needed to experience effective control by this method. Some of the disadvantages in this method include the possible lack of rainfall to refill the pond to normal level and the possibility of a winter kill of fish in the reduced depth of the pond.

**CHEMICAL TREATMENT.** Chemical treatment has been used successfully to help eliminate most aquatic weed species. However, no one chemical has been developed which is effective against all water weeds. Several chemicals are available for the various types and careful identification of the plant is advisable before investing in any control

chemicals. Chemical control is probably the most effective and economical as well as being the most practical for most ponds and small lakes.

The most important consideration to be given to chemical control is to follow the manufacturer's recommendations carefully. An excessive application can cause a fish kill through toxicity. Also, if a pond is almost completely choked with weeds, killing them all at one time might cause an oxygen depletion resulting in a fish kill. Decomposing vegetation rapidly absorbs oxygen from the water.

Calculation of the volume of water or area to be treated can be accomplished by several methods. Help will usually be available from your local S. C. S. office or you can use simple arithmetic with the following formulae:

$$1 \text{ acre} = 210 \text{ feet} \times 210 \text{ feet} = 43,560 \text{ square feet.}$$

$$1 \text{ acre foot} = 1 \text{ surface acre } 1 \text{ foot deep} = 43,560 \text{ cubic feet.}$$

$$1 \text{ cubic foot} = 7\frac{1}{2} \text{ gallons.}$$

Chemicals are generally used in proportions of so many parts per million or so many pounds per surface acre. Parts per million can be calculated by using the above table.

Most chemicals used in water weed control come in either a dry pellet form or a precalculated liquid mixture. The dry pellets are broadcast on the surface and sink to the bottom where they dissolve at a given rate. Liquid chemicals are either sprayed on the surface or allowed to mix in the water by letting them run directly into the propeller wash of an outboard motor.

In the case of emergent plants (those which protrude above the water) a fine spray of 2,4-D should be applied directly to the exposed portions or 2,4-D pellets should be broadcast evenly over the area to be treated. Normal dosages would be 40 to 50 gallons per acre of 0.5 percent solution for the liquid and approximately 100 lbs. per acre of 20 percent active ingredient pellets.

For submergent weeds (those

*(Continued on page 18)*

growing entirely below the surface) several chemicals may be used. Sodium arsenite, endothal and 2, 4-D are recommended. Sodium arsenite should be applied at the rate of four to five parts per million or three gallons per acre foot of forty percent solution containing four pounds of arsenic trioxide per gallon of mixture. This is applied by controlled gravity flow into the prop wash of an outboard motor. Where an outboard cannot be used, dilution with water and spraying at the same rate per acre foot will accomplish the desired result. Endothal should be used at the rate of two to three parts per million or three gallons of solution per acre foot. Application should be made in the same manner as the sodium arsenite.

For submerged weeds, 2,4-D pellets should be used rather than the spray. Rate of application is 100 pounds of 20 percent pellets per surface acre.

The control of filamentous algae is accomplished best by treatment with copper sulfate. One of the easiest ways to treat with this chemical is to place the powder in a burlap sack and tow it behind a boat. 2.7 pounds per acre foot of water should give adequate control. A solution can be made and sprayed on the water using the same proportions.

Duckweed, another floating aquatic plant, can be killed by spraying with liquid 2,4-D, endothal or fuel oil. Only the affected area should be sprayed; open water should be left alone. Endothal is used at the rate of five gallons per surface acre. Number 2 grade fuel oil is also effective when sprayed directly on the floating masses of duckweed. One to two gallons per surface acre is the recommended dosage. 2,4-D should be used at the same rate as for submergent vegetation but using fuel oil as the carrying agent.

**CAUTION**—Some of these chemicals are quite toxic to *man* and *livestock*. Read the labels carefully and follow all precautionary instructions.

## The Wiggle Wows 'em

The proper wiggle in the right places never fails to attract an admiring glance. And fish, like fishermen, are just naturally inclined to take a second look.

Fish have a big disadvantage, however, for when they fall to an enticing movement it's usually fatal. And, the calculated, seductive motion of an artificial lure is its most important attribute.

While the insides of tackle boxes generally glitter like a Christmas tree with plugs of every hue and pattern, fish don't seem to be too concerned with the colorful garnishments. They fall, instead, to a lure's movements.

Although most artificials are designed with a built-in action, the method of fishing them can create an infinite number of different movements. And the persistence to exploit this phase is an important quality in any fisherman. Some days a floating plug should be merely twitched gently as it lies on the surface; other days fish hit the same plug only when it is moved fast with a lot of commotion. It's the action that counts.

Pay less attention to the colors. Concentrate on handling your rod correctly, varying the retrieve and allowing the lure to display its repertoire of tricks. Remember: it's the wiggle that wows 'em.

## Movie on Right to Bear Arms

A *reminder*: Sports clubs may obtain on loan a 16mm movie, "The Right to Keep and Bear Arms," in color with sound, from the National Rifle Association. Craig Stevens, TV's Peter Gunn, lends his talents to a film that effectively traces the development of and growing interest in the shooting sports. Audiences are shown how the man with a rifle (the Kentucky rifle is featured) pushed back the wilderness and helped to fashion our great American heritage. The films are available from the NRA, 1600 Rhode Island Avenue Northwest, Washington 6, D. C.

## Biologist Includes

(Continued from page 13)



Students are checking survey instruments used in determining surface area and establishing depth contours on a field exercise.

ecology (study of organisms and their environment), ichthyology (study of fishes), herpetology (study of amphibians and reptiles), wildlife conservation, fisheries and wildlife management (tools and techniques used in the management of fish and wildlife populations), ornithology (study of birds), limnology (study of fresh water environments), plant and animal physiology (internal workings of organisms), and other advanced material. These specialized courses are successfully completed only by the serious minded and industrious students. Additional training, especially needed to augment the research phase of fisheries and wildlife management, is often required at the graduate level.

Today's biologists are highly trained and specialized men. The fish and game agencies, both State and Federal, are attempting to maintain their present high professional standards. Because of this, they are not hiring average students; they want the best trained men they can acquire. Employers are placing increased emphasis on grades. Academic performance is one measure of initiative, intelligence, interest, and aptitude.

The preceding discussion treats mainly the academic background requirements of the fisheries and wildlife biologist. In addition to academic training, a biologist must be dedicated to work with fish and wildlife, and with people. His personality and moral character must be such that he is considered an asset to a community. He must have reserves of stamina and energy to endure long hours of work. Often he has to be in the field no matter what the weather conditions might be. Summing up all of the preceding, you can see that just a casual interest in hunting and fishing is not enough background for the person who seeks to become a fisheries or wildlife biologist.

If you or one of your acquaintances is considering entering the field of fisheries or wildlife management, weigh some to the ideas in this article. If you meet the qualifications, have the interest, aptitude, personality, and intelligence, by all means pursue the career with determination. Fisheries and wildlife work is an extremely satisfying and rewarding profession for those who are so inclined.

### Hamilton County Lake

(Continued from page 11)

of prairie dogs. These cute animals are fascinating to observe and provide an attraction which alone brings visitors to the site. Sudden noises or movements may startle the animals into disappearing below ground but they soon reappear if quiet prevails. Usually associated with prairie dog towns are burrowing owls and you can see these interesting creatures there too.

Burrowing owls do not actually dig holes in the ground for their nest. They simply use abandoned prairie dog holes. The best time to view these birds is late in the evening or early in the morning. During sunny days, they spend the most of their time below ground.

Rattlesnakes are also occasionally found at Hamilton County State Lake. The rocks which form the spillway at either end of the dam are prime habitat for these reptiles and children should be cautioned to stay away from these rock piles during the warm months of the year.

It would be foolish to recommend that anyone living in the eastern part of Kansas should plan a fishing trip to this far western state lake. There are a host of good lakes within much closer driving distance. However, if a person lives in southwest Kansas or happens to be in that vicinity, Hamilton County State Lake is a good place to cool down a case of fishing fever. Try it and see.

## Quiz for All Outboard Buffs

Most boatmen make it a point to start the season with their equipment in topnotch condition. Too few of them, however, take the time to brush up on their boating savvy, which is just as important.

To test your knowledge, here's a short quiz that covers several aspects of recreational boating. Give it a try. If you don't do as well as you should, spend a few hours now getting boned up on boating. It will pay off during the rest of the season as well as in future years. The correct answers are found at the end of the quiz.

1. A steady but slowly rising barometer usually indicates: (a) settled weather; (b) unsettled weather; (c) thundershowers.
2. If your outboard motor idles roughly, first check: (a) propeller; (b) spark plugs; (c) shock absorbers.
3. To anchor properly in moderate weather, the ratio of length of line to depth of water should be: (a) 1:1; (b) 3:1; (c) 6:1.
4. A boat designed to run on top of the water rather than through it has a: (a) planing hull; (b) displacement hull.
5. When making a landing or picking up a mooring, use the wind or current to advantage by approaching: (a) into it; (b) with it.
6. The determining factor in select-



**Play it safe.** Authorities recommend removing a portable fuel tank from the boat while it is being filled. This will prevent fuel from spilling in the boat and eliminate the job of wiping it up.

ing a propeller should be: (a) speed; (b) power; (c) the rpm of the engine.

7. Standard red and green running lights are designed with the red light on the (a) port side; (b) starboard side.

8. A corroded marine battery is best cleaned with a mild solution of water and: (a) baking powder; (b) boric acid; (c) baking soda.

9. Black and white vertically striped buoys indicate: (a) mid-channel; (b) obstructions; (c) right side of channel.

10. A tachometer is used to measure: (a) boat speed; (b) engine rpm; (c) water depth.

Correct answers are: 1. (a); 2. (b); 3. (c); 4. (a); 5. (a); 6. (c); 7. (a); 8. (c); 9. (a); 10. (b).

### Outboard Should Not Be Run Out of Water

Some outboard boatmen make it a practice to start their motors after they have been removed from the water. The idea is to expel any water that may be left in the cooling system. Although the theory is sound, this practice should be avoided. In most cases, the water will drain out by itself and, except in freezing weather, the small amount that may be left will not hurt anything.

Running an outboard motor out of water for even a short time can cause overheating and will invite water pump damage. If you want to make sure all of the water is out before putting the motor away for an extended period, disconnect the spark plugs and give the starter rope a few easy pulls.

# Smoked Channel Catfish

By OTTO W. TIEMEIR  
Kansas State University  
Manhattan, Kansas

Have you tasted smoked channel catfish? I have eaten smoked salmon, whitefish, and carp and thoroughly enjoyed them. While conducting experiments on supplemental feeding of channel catfish, it occurred to me that it might be interesting to smoke some of these fish to determine the desirability of processing them in this manner. I asked a number of people if they had eaten smoked channel catfish and a few said they had but they could not tell me how the smoking should be done.

After further inquiries and smoking experiments with several groups of channels, it was determined that these fish could be processed to produce a dark golden brown product that was delicious to eat. I thought more people might be interested to know of our experiences and the information we have obtained.

Fish are not only smoked to contribute a pleasant taste to the fish but also as a means of preserving the flesh. The fish should be ready to eat when they are taken from the smokehouse.

The three main sources of information were Mr. Leland Diehl of Diehl's Market in Valley Falls, Dr. R. L. Fredrich of near Manhattan and Melvin Waters and D. J. Bond from the Bureau of Commercial Fisheries, U. S. Fish and Wildlife Service at Pascagoula, Miss.

Waters and Bond have assembled plans for constructing a smokehouse (Figs. 1 and 2) from \$45 worth of materials. It took unskilled labor 16 hours to construct the smokehouse. Approximately 150 pounds of fish could be smoked in one operation.

Doctor Fredrich built a smokehouse from an old refrigerator (Fig. 3). A firebox 16 x 16 x 24 inches

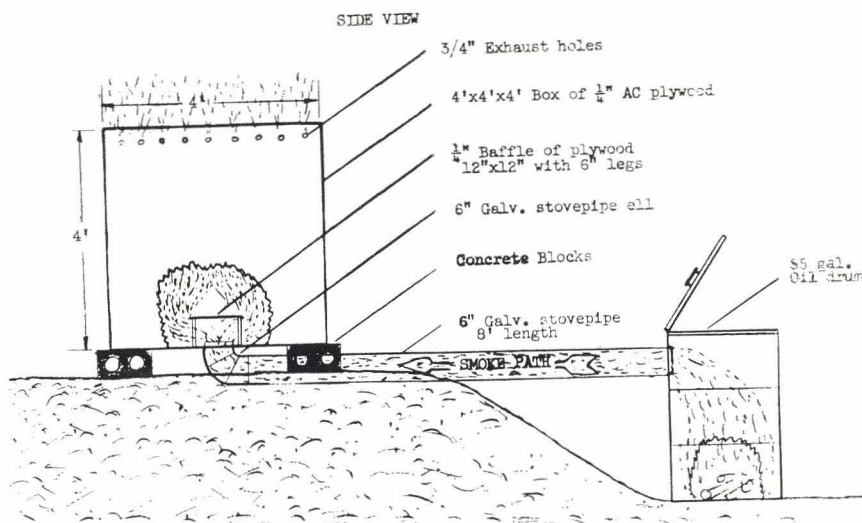


Fig. 1. Side view of fire drum and smokehouse (Waters and Bond).

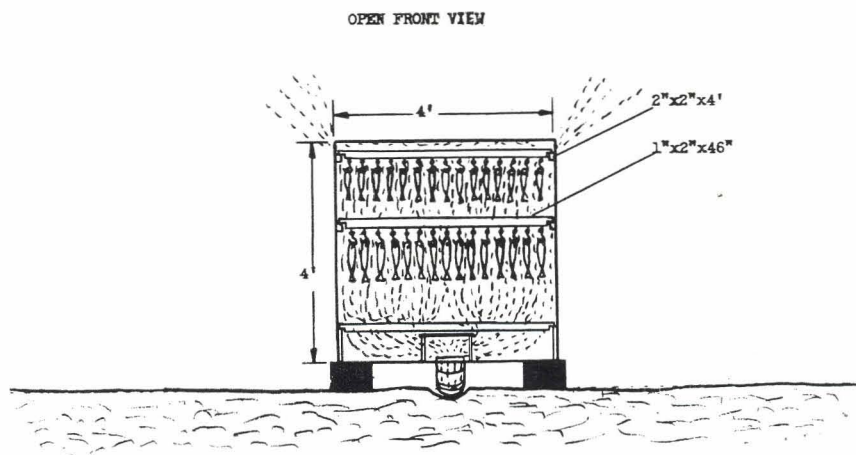


Fig. 2. Open front view showing suspension of fish (Waters and Bond).

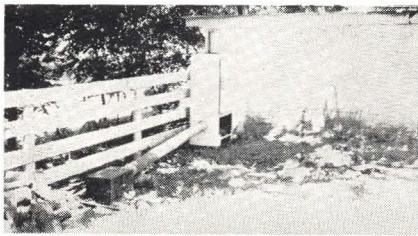
built from sheet metal was connected to the base of the refrigerator by a six-inch tube 12 feet long. The length of this tube determines the temperature of the smoke when it reaches the refrigerator. A pipe with a damper at the top aids in regulating the temperature and amount of smoke.

Cost of materials and labor was less than \$50. The Fredrich family has become so interested in smoked meats that they have smoked chicken, turkey, cottontail rabbits, quail, hamburgers, beef, spareribs and other meats besides channels.

Two to three dozen channels can be processed at one time in their apparatus.

Mr. Diehl's smokehouse is the one he uses for smoking hams and sausages in conjunction with his meat market. Many fish can be prepared in one operation with his facilities.

Waters and Bond prepared mullet by scaling and cutting them into butterfly fillets with the heads left intact. These were then placed in 10 percent salt brine at room temperature for one hour. The mullet were drained long enough to be



**Fig. 3. Fredrich's converted refrigerator, showing fire box and tubes to and from the smokehouse.**

dry to the touch, after which they were hooked through the eye by the "S" hooks and attached to the racks in the smokehouse.

In his first trials, Doctor Fredrich skinned the channel catfish before smoking but decided it was too difficult to handle them in this condition. He found that it was better to kill the fish, place them in hot water for a few seconds and then scrape the skin until all the mucous had been removed. The head and viscera were removed and the fish thoroughly washed. When the fish were dry, they were rubbed with salt and seasoning and placed on 1/4-inch hail screen trays in the converted refrigerator.

The fish that Mr. Diehl smoked were killed, dipped in hot water, scraped, and the gills and viscera removed. The head was not removed in order that it could be used to suspend the fish on "S" hooks in the smokehouse. Mr. Diehl placed the fish in sugar cure brine at about 38 degrees Fahrenheit for three days.

Waters and Bond have recommended that small mullet be smoked at temperatures from 130 degrees to 180 degrees Fahrenheit for about 12 hours. More recently they have found that an excellent product can be produced by smoking mullet at 200 to 250 degrees Fahrenheit for a shorter period and suggest that this temperature may be suitable for channel catfish. Excessively high temperatures may result in drying, toughness and extreme loss of weight.

After the fish have been in brine for three days, Mr. Diehl smokes them slowly at about 30 degrees Fahrenheit for about two days. To complete the smoking process, he

smokes them for about 12 hours at 60 degrees Fahrenheit.

Doctor Fredrich smokes fish that weigh up to two pounds when alive for 8 to 10 hours. Larger fish should be smoked longer or split before processing. The fish should be processed until the flesh is dry and flakes off in pieces from the bones and the smoke flavor is suitable to taste. If the flesh is not cooked sufficiently, it is possible to further process the fish in an oven at 175 to 200 degrees Fahrenheit until the desired state is obtained. Doctor Fredrich often puts barbecue sauce on spareribs and hamburgers after they have been smoked (Figs. 4 and 5).

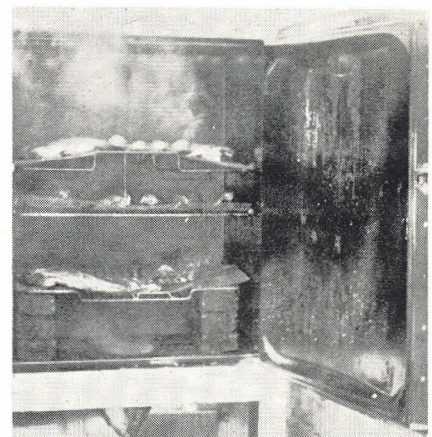
Mr. Diehl and Doctor Fredrich prefer to use shagbark hickory wood in their processing. Waters and Bond suggest that pecan, various oaks and cherry woods are also suitable. A low smoldering fire is better than a blazing one that produces too much heat. Doctor Fredrich can smoke a batch of fish with four pieces of hickory three to four inches in diameter and 14 to 16 inches long.

After processing, the fish should be stored in a cool dry place to prevent growth of mildew. We have stored some of these fish for three months in our refrigerator, well wrapped, without any deterioration.

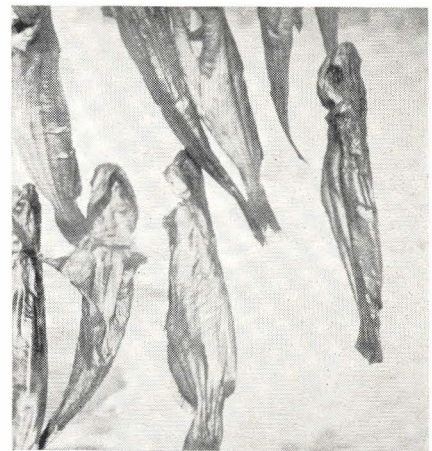
Smoking channel catfish is simple, inexpensive, and, I am certain, can produce a product that will tickle your palate. Use your own experiences to modify these methods to suit your taste. I'll be interested in your results.

**About the Cover**

Again we express our thanks to Joyce Hartmann for the cover picture of this magazine. Joyce also did the cover for the Winter 1963 issue of *KANSAS FISH AND GAME*. Her husband, Bob Hartmann is a fishery biologist in the southeast region of Kansas. Together they do much to enhance the magazine. Bob has an article in this issue concerning fishing which you will enjoy.



**Fig. 4. Fredrich's smokehouse in operation. Fish on upper shelves and ribs on lower shelf.**



**Fig. 5. The finished product.**

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I certify that the statements made by me above are correct and complete.

JOHN D. POLSON.

## Choose the Right Equipment For Boating Fun and Safety

Boating equipment and accessories can be separated into three basic categories—items that are required, recommended and desired. The list of items actually required by the Coast Guard for outboard boats under 16 feet is short. It consists of only running lights and a lifesaving device for each person aboard. But, as the size of the boat increases, so does the list of required equipment. The wise boatman, however, will take it upon himself to add several other pieces of equipment even though they are not required by law.

On the "recommended list" are such things as an anchor, plenty of good line, a paddle if the boat does not have oars, a horn or other type of warning device, a few flares and a bilge pump or bailing device of some sort. Other recommended equipment includes a boat hook, fenders, flashlight, first-aid kit, extra propeller and basic toolkit.

Almost as important as having the equipment aboard is having it ready to use. This means having a place for everything and keeping everything in its place. Many outboard boats are built with shelves under the foredeck. This provides an excellent spot for storing equipment. It's even more useful if a shallow box is built and placed on the shelf where it can be used somewhat like a drawer. The box should be sectioned off to keep the equipment separated.

Another good way to keep equipment dry and handy is to mount it to the inner sides of the boat. Paddles, boat hooks, bilge pumps and other rather long and narrow items can be held in place with spring broom holders.

Getting back to the equipment itself, there are also many items on the "desired list." These are primarily accessories—things that are not really needed but make boating more fun. Number one on this list

is a marine speedometer. It's only human nature to want to know how fast one is going, whether it be on land or water. A speedometer will give this information at a glance. They are also handy when passing through restricted speed zones and to give the operator some idea as to how the engine is performing.

A marine compass is a good and inexpensive item for those who do their boating on large or strange waterways. Illuminated models are recommended for boating at night.

The list of accessories is almost

endless. Depth finders, ship-to-shore radios, tachometers, barometers and clocks are a few examples. Choosing accessories properly takes some careful consideration. Before buying, decide which items will give you the most enjoyment and be most valuable in your own type of boating.

### Check Fuel System

If your outboard motor refuses to start or conks out while it is running, first check the fuel system. Make sure there is fuel in the tank and that the fuel line is properly connected. Check for a kinked or pinched fuel line. In most cases, the trouble can be traced to one of these sources.



Choosing the proper equipment for both fun and safety will make your boating more enjoyable. The equipment shown here includes Coast Guard approved life jackets and cushions, anchor with plenty of line, fire extinguisher, first-aid kit, horn, extra propeller, fenders and extra line. On the paddle are extra cotter pins, drive pins and propeller nut. At the bottom is a bilge pump, basic tools and an outboard owner's manual.

### Shotgun Plug

Federal law requires that in the hunting of migratory birds, sportsmen do not use a shotgun that has a greater magazine capacity than three shells. To comply with the law, some sportsmen use a *magazine plug*. This is a wooden plug or dowel that is placed inside the magazine of a slide action shotgun and restricts the capacity of the magazine to the required limit. (If three shells can be inserted into the magazine, a fourth round can be placed in the chamber, making the gun illegal.)

### Shotgun Range

The maximum *shotgun range* (in yards) is determined to a great extent by the diameter of shot (the pellets in a shotshell). A commonly accepted rule of thumb is: diameter multiplied by 2,200 equals maximum shotgun yardage— $D \times 2,200 = YDS$ . After having been culled and graded, shot are designated according to diameter size. A simple key is used to do this, arbitrarily based on a constant of 17. Hence, its number subtracted from 17 always will give the shot's diameter. For example No. 6 shot

is .11 inches in diameter ( $6 - 17 = 11$ ); No. 8 is .09 inches in diameter ( $8 - 17 = 9$ ) and No. 9 in .08 inches. Now that we have determined the foregoing diameters, we can use the rule of thumb and find that No. 6 shot has a maximum shotgun range of 242 yards, No. 8, 198 yards and No. 9, 176 yards.

### Head Space

The dimension in a gun or rifle that determines whether the cartridge is tightly breeched up in the chamber when the breech, breech block or breech bolt is shut is called the *head space*. Or, it is the distance in the chamber between the face of the breech bolt and the face of the cartridge. A minor variation in the cartridge can be compensated for by this clearance, which is usually is under three one-thousandth (.003) of an inch. When head space is too little, the breech will not close on the cartridge. When there is too much head space, it not only will cause misfires, but will create a hazardous condition. Too much head space indicates excessive wear on the bolt-locking lugs and their protective wells.

### Sighting In

A bullet's trajectory is determined to some extent by the weather since any great change in temperature will affect the zero of a gun. For example, a hunter using a gun that was sighted-in during the summer may find to his dismay that in winter he is several inches under his target. A bullet fired in the dead of winter will vary that much from one fired in the summer. In summary: a cartridge in warm weather obviously has a higher temperature and this makes it perform at peak power. Cold cartridges in a cold chamber will perform at slightly less than peak power, causing a slight drop in trajectory. *The Rule:* Alter your sights each time you change climates.

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### Get Landowner's

### Permission Before

### Hunting or Fishing

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## Choose Your Shot

The degree of choke is measured by the percentage of pellets in a shot charge that scores within a 30-inch circle at 40 yards. This means that with a **FULL CHOKE** a shooter can expect about 65 to 75 percent of the pellets to fall within his target area. This choke is recommended for wild fowl shooting. Ducks over decoys are bagged with shot sizes 4, 5, or 6, and geese are brought home with 2's. Trap-shooting calls for 7½'s or 8's. With a **MODIFIED CHOKE**, a ½ choke, a shooter can look for 45 to 55 percent of the pellets to fall within his target area. This choke is recommended for upland game. Snipe, woodcock and rail are grounded with 8's or 9's. Quail and dove

hunting and trap shooting are best done with 7½'s or 8's. Pheasants, prairie chicks, grouse, rabbit and squirrel call for 4's, 5's, or 6's; turkey and large furred animals are downed with BB's, 2's and 4's. With an **IMPROVED CYLINDER**, a ¼ choke, a shooter can expect about 35 to 45 percent of the pellets to zero in on his target. This is used for quail, pheasant and thick brush game with 6's or 7½'s. With a **CYLINDER BORE**, no choke, a shooter receives a 25 to 35 percent pellet pattern. This is used especially in riot guns and for small game that is hunted at very close distances in very thick cover. Shot sizes vary from 7½ up to the buck—gives shooters a pellet pattern of about 25 to 35 percent. This is only used for skeet with No. 9 shot.

### "No Comment" by FBI On Anti-Gun Proposal

In the February 15, 1963, issue of *Conservation News*, an article, "Hunters Must Begin to Police Themselves" indicated that the FBI supported a proposal to compel sportsmen to register rifles and shotguns. Following this article, the *News* brings to our attention a statement that was made recently by J. Edgar Hoover, FBI director: "I am sure you would want to know that no such recommendation has even been made by a representative of the FBI. Registration of firearms, of course, is a legislative matter, and it has always been our policy, as an investigating agency, not to comment concerning such questions."

# SUNRISE-SUNSET TABLE (C. S. T.)

Wichita								Dodge City									
DAY	September		October		November		December		DAY	September		October		November		December	
	SR	SS	SR	SS	SR	SS	SR	SS		SR	SS	SR	SS	SR	SS	SR	SS
1	5:58	6:59	6:24	6:13	6:54	5:31	7:25	5:11	1	6:09	7:10	6:35	6:23	7:05	5:42	7:36	5:21
2	5:59	6:58	6:25	6:11	6:55	5:30	7:25	5:11	2	6:10	7:08	6:36	6:22	7:06	5:41	7:37	5:21
3	6:00	6:56	6:26	6:10	6:56	5:29	7:26	5:11	3	6:11	7:07	6:37	6:20	7:07	5:40	7:38	5:21
4	6:02	6:54	6:27	6:08	6:57	5:28	7:27	5:11	4	6:12	7:05	6:38	6:19	7:08	5:38	7:39	5:21
5	6:02	6:53	6:27	6:07	6:58	5:27	7:29	5:10	5	6:13	7:04	6:39	6:17	7:09	5:37	7:40	5:21
6	6:03	6:51	6:29	6:05	6:59	5:26	7:30	5:10	6	6:14	7:02	6:40	6:16	7:10	5:36	7:41	5:21
7	6:04	6:50	6:30	6:03	7:00	5:25	7:31	5:10	7	6:15	7:01	6:40	6:14	7:11	5:36	7:42	5:21
8	6:05	6:48	6:31	6:02	7:01	5:24	7:32	5:10	8	6:15	6:59	6:41	6:13	7:12	5:35	7:43	5:21
9	6:05	6:47	6:31	6:01	7:02	5:23	7:32	5:10	9	6:16	6:58	6:42	6:12	7:13	5:34	7:43	5:21
10	6:07	6:45	6:33	5:59	7:03	5:22	7:33	5:11	10	6:17	6:56	6:43	6:10	7:14	5:33	7:44	5:21
11	6:07	6:43	6:33	5:58	7:04	5:22	7:33	5:11	11	6:18	6:54	6:44	6:09	7:15	5:32	7:45	5:21
12	6:08	6:42	6:35	5:56	7:05	5:21	7:35	5:11	12	6:19	6:53	6:45	6:07	7:17	5:31	7:46	5:21
13	6:08	6:41	6:36	5:55	7:06	5:20	7:36	5:11	13	6:20	6:51	6:46	6:06	7:18	5:30	7:46	5:22
14	6:10	6:39	6:36	5:53	7:07	5:19	7:36	5:11	14	6:20	6:50	6:47	6:04	7:19	5:30	7:47	5:22
15	6:11	6:37	6:37	5:52	7:08	5:19	7:37	5:12	15	6:21	6:48	6:48	6:03	7:20	5:29	7:48	5:22
16	6:12	6:36	6:37	5:51	7:09	5:18	7:38	5:12	16	6:22	6:47	6:49	6:02	7:21	5:28	7:49	5:22
17	6:12	6:34	6:39	5:49	7:10	5:17	7:38	5:12	17	6:23	6:45	6:50	6:00	7:22	5:27	7:49	5:23
18	6:13	6:33	6:40	5:48	7:12	5:16	7:39	5:13	18	6:24	6:44	6:51	5:59	7:23	5:27	7:50	5:23
19	6:14	6:31	6:41	5:47	7:13	5:16	7:39	5:13	19	6:25	6:42	6:52	5:58	7:24	5:26	7:50	5:23
20	6:15	6:30	6:42	5:45	7:15	5:15	7:39	5:13	20	6:26	6:40	6:53	5:56	7:25	5:26	7:51	5:24
21	6:16	6:28	6:43	5:44	7:15	5:15	7:40	5:14	21	6:26	6:39	6:54	5:55	7:26	5:25	7:52	5:24
22	6:16	6:27	6:44	5:43	7:17	5:14	7:40	5:14	22	6:27	6:37	6:55	5:54	7:27	5:25	7:52	5:25
23	6:17	6:25	6:45	5:41	7:17	5:14	7:41	5:15	23	6:28	6:36	6:56	5:52	7:28	5:24	7:52	5:25
24	6:18	6:23	6:46	5:40	7:19	5:13	7:41	5:15	24	6:29	6:34	6:57	5:51	7:29	5:24	7:53	5:26
25	6:19	6:22	6:47	5:39	7:19	5:13	7:42	5:16	25	6:30	6:33	6:58	5:50	7:30	5:23	7:53	5:27
26	6:20	6:20	6:48	5:38	7:21	5:12	7:42	5:17	26	6:31	6:31	6:49	5:49	7:31	5:23	7:54	5:27
27	6:21	6:19	6:49	5:37	7:22	5:12	7:42	5:17	27	6:32	6:30	7:00	5:47	7:32	5:22	7:54	5:28
28	6:22	6:17	6:50	5:35	7:22	5:12	7:43	5:18	28	6:32	6:28	7:01	5:46	7:33	5:22	7:54	5:29
29	6:22	6:16	6:51	5:34	7:23	5:11	7:44	5:19	29	6:33	6:27	7:02	5:45	7:34	5:22	7:55	5:29
30	6:23	6:14	6:52	5:33	7:24	5:11	7:44	5:19	30	6:34	6:25	7:03	5:44	7:35	5:22	7:55	5:30
31			6:52	5:32			7:44	5:20	31			7:04	5:43			7:55	5:31

(For each 15 miles WEST, add one minute; for each 15 miles EAST, subtract one minute.)

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