

Texas Game and Fish

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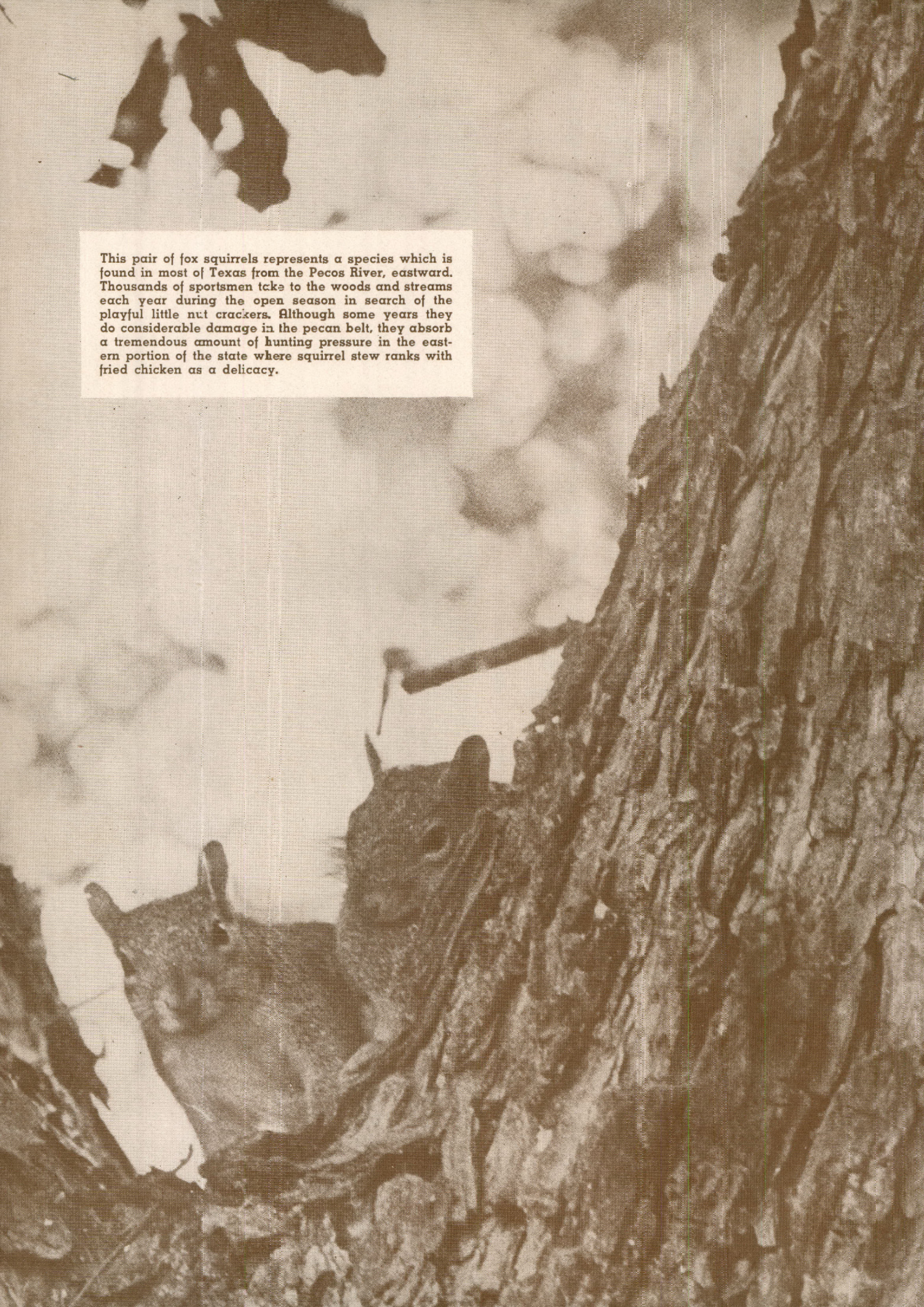
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TEXAS GAME AND FISH

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This pair of fox squirrels represents a species which is found in most of Texas from the Pecos River, eastward. Thousands of sportsmen take to the woods and streams each year during the open season in search of the playful little nut crackers. Although some years they do considerable damage in the pecan belt, they absorb a tremendous amount of hunting pressure in the eastern portion of the state where squirrel stew ranks with fried chicken as a delicacy.

Texas Game and Fish

A MONTHLY MAGAZINE DEVOTED TO THE PROTECTION AND CONSERVATION OF OUR NATIVE GAME AND FISH; AND TO THE IMPROVEMENT OF HUNTING AND FISHING IN TEXAS.

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Texas Game and Fish

The Cover

As a freshwater game fish, the Bluegill is by far the best of all the true sunfishes. Larger than the others, it sometimes attains a length of from 12 to 22 inches and weighs as much as 3 pounds. It's flesh is firm, flaky and delicious. It bites on almost any kind of bait, but prefers worms, grasshoppers, and small minnows. Common names for it are blue sunfish, blue perch, bream, copper-nosed bream, and the dollardee. It is found in lakes, ponds, and rivers, but far prefers the environment afforded by a lake.

Mottled Duck

THE mottled duck, or mottled mallard as it is frequently called, is a species of duck that inhabits the coastal regions of Mexico, Texas, Louisiana, and Mississippi. Previous articles in *TEXAS GAME AND FISH* (July, 1949, and August, 1950) have given information on habits and life history of this interesting bird, and have raised the question, "Does the mottled duck migrate, and if so, where does it go?"

During the past three years, over three hundred mottled ducks, both

young and old, have been banded in an effort to answer that question.* Every known method for catching ducks has been used in capturing these birds in the wild for banding purposes. Some of them were caught in traps, others were caught by hand during the flightless molting period, but most of them were run down afoot and caught before they were old enough to fly.

Mottled ducks of all ages were banded wherever they were encountered. These places included areas in Aransas, Calhoun, Colorado, Fort Bend, and Brazoria Counties.

To date, forty-nine band returns of mottled ducks have been received, all from Texas. Furthermore, no bands have been reported south of Aransas Pass in Aransas County. This would seem to eliminate the possibility that mottled ducks fly south to Mexico in the late fall and early winter.

By GUS A. ENGELING

Twelve band returns have been received on ducks banded in Aransas County. Of these twelve, six were shot in Aransas County, two in Calhoun County, three in Fort Bend County, and one in Matagorda County. These data would indicate no movement on the part of six birds and a definite northeast movement in the case of the remaining six. This latter movement to the northeast was probably caused by an extreme drouth which began in Aransas County in 1949 and is still in progress. The birds apparently were forced to move in search of areas where food and fresh water conditions were more favorable.

Only one band return has been received from ducks banded near Powderhorn Lake in Calhoun County. This bird was shot near Texas City in Galveston County, a distance of a little more than one hundred miles to the northeast.

A total of fifteen bands was re-



A brood of nine mottled ducks, four weeks of age, being banded at a stock tank.

* FA Project 29-R.

Movements in Texas

ported from mottled ducks banded in Brazoria County. Eleven of these were taken from birds shot in Brazoria County and one each from birds shot in Jefferson, Colorado, Harris, and Galveston Counties. The coastal marshes of Brazoria County are highly favored by the mottled duck at all seasons of the year, and it is

Wildlife Biologist

not surprising to find that most returns for ducks banded there indicate practically no movement.

An entirely different picture is shown by returns from ducks banded in Fort Bend County. Of seventeen bands reported, three were from Fort Bend County, five from Brazoria County, three from Galveston County, two from Harris County, and one each from Matagorda, Wharton, Jefferson, and Chambers Counties. Here then is a pattern of movement to adjoining counties in every direction.

In the spring of the year, mottled ducks spread out from concentration areas in the rice fields and coastal marshes to the open prairies, such as those found in Fort Bend County, for their nesting activities. When these activities are over and the young are flying, there is a general movement of mottled ducks away from the open prairies to rice fields and marshes where food and molting cover are more abundant.

Only four band returns were received from mottled ducks banded in Colorado County. One each of these was reported from Colorado, Austin, Wharton, and Galveston Counties.

Several interesting sidelights should be mentioned in connection with the mottled duck banding work. Three of the bands reported were taken from adult ducks that were banded during full molt. Two of these molting birds were banded in the salt marshes near Freeport in August, 1949, and August, 1950, and both were shot in the same general area the following hunting season. The other molting bird was

banded on the Aransas Refuge in Aransas County in July, 1950, and shot near Port Lavaca in Calhoun County in November of the same year.

A hunter in Fort Bend County shot a pair of mottled ducks on January 4, 1950, and to his surprise found bands on both birds. In checking our banding records, we found that this drake and hen had been trapped and banded near Rockport on January 21, 1949. These ducks evidently were paired when they were trapped and were again paired in January of the following year when they were shot.



Mottled hen with her brood of eight young in a multiple entrance trap. The young ducks are about eight weeks old.

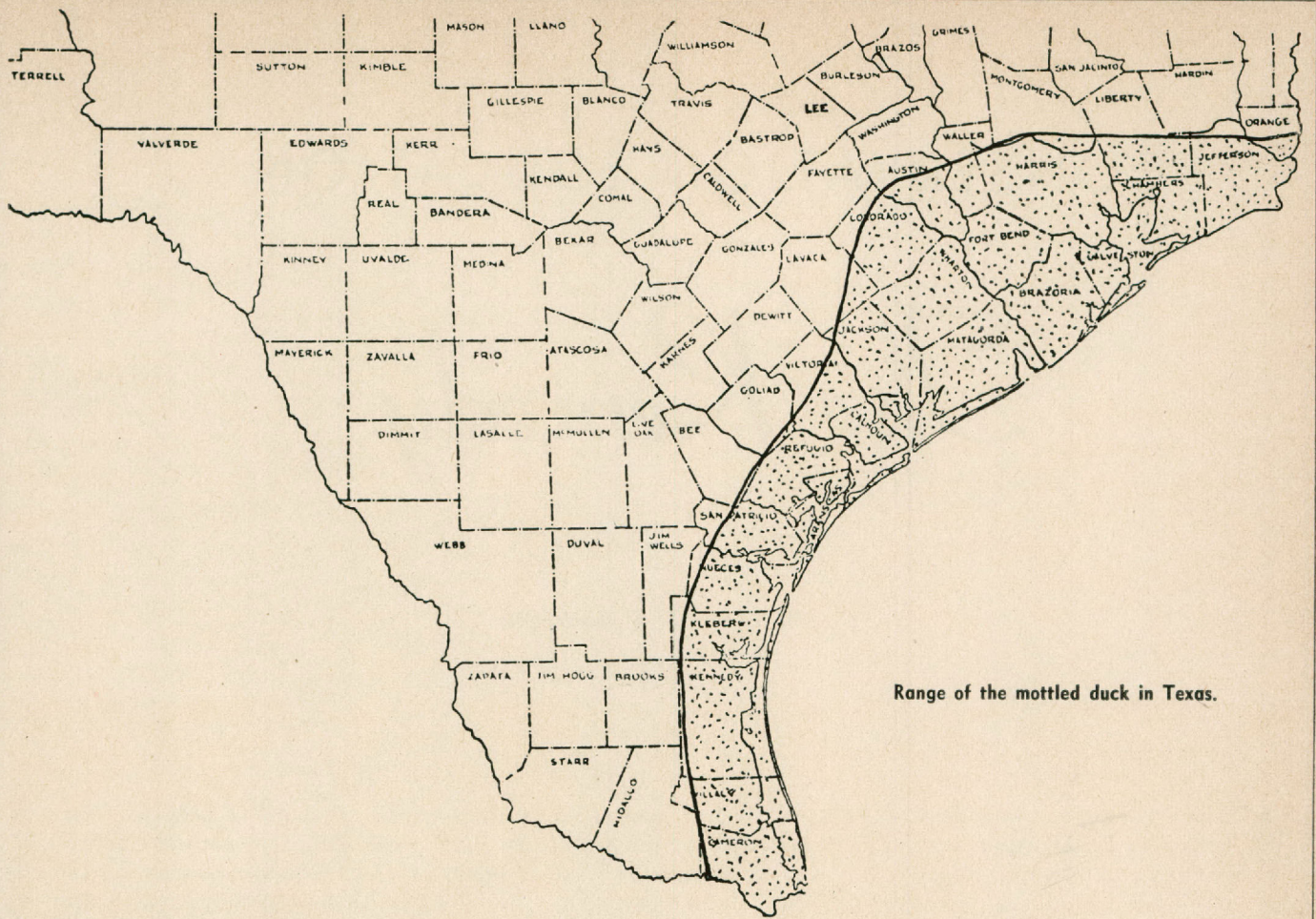
Another interesting record is that of an old hen caught in a wirebasket on her nest at hatching time on May 31, 1949, near Beasley, Texas. She was banded, marked with paint, and released with her brood of young ducks. It was hoped that her movements with her brood of young could be traced by the paint markings on her feathers, but she was not seen again during the 1949 nesting season. Recently, the band from this hen was sent to the Fish and Wildlife Service with the report that she was shot on November 3, 1950, not more than five miles from her 1949 nest site.

During the course of the mottled duck nesting study in 1949, a number of eggs were salvaged from broken up and flooded nests and incubated under chicken hens. Most of these eggs hatched and the ducklings were pen-reared to maturity. Several of these pen-reared birds were later banded and released. One such drake was banded and released near Beasley, Texas, on July 25, 1949, and was reported shot near Freeport on December, 22, 1949. This particular duck must have joined others in the wild and moved some sixty miles due south to the coastal marshes.

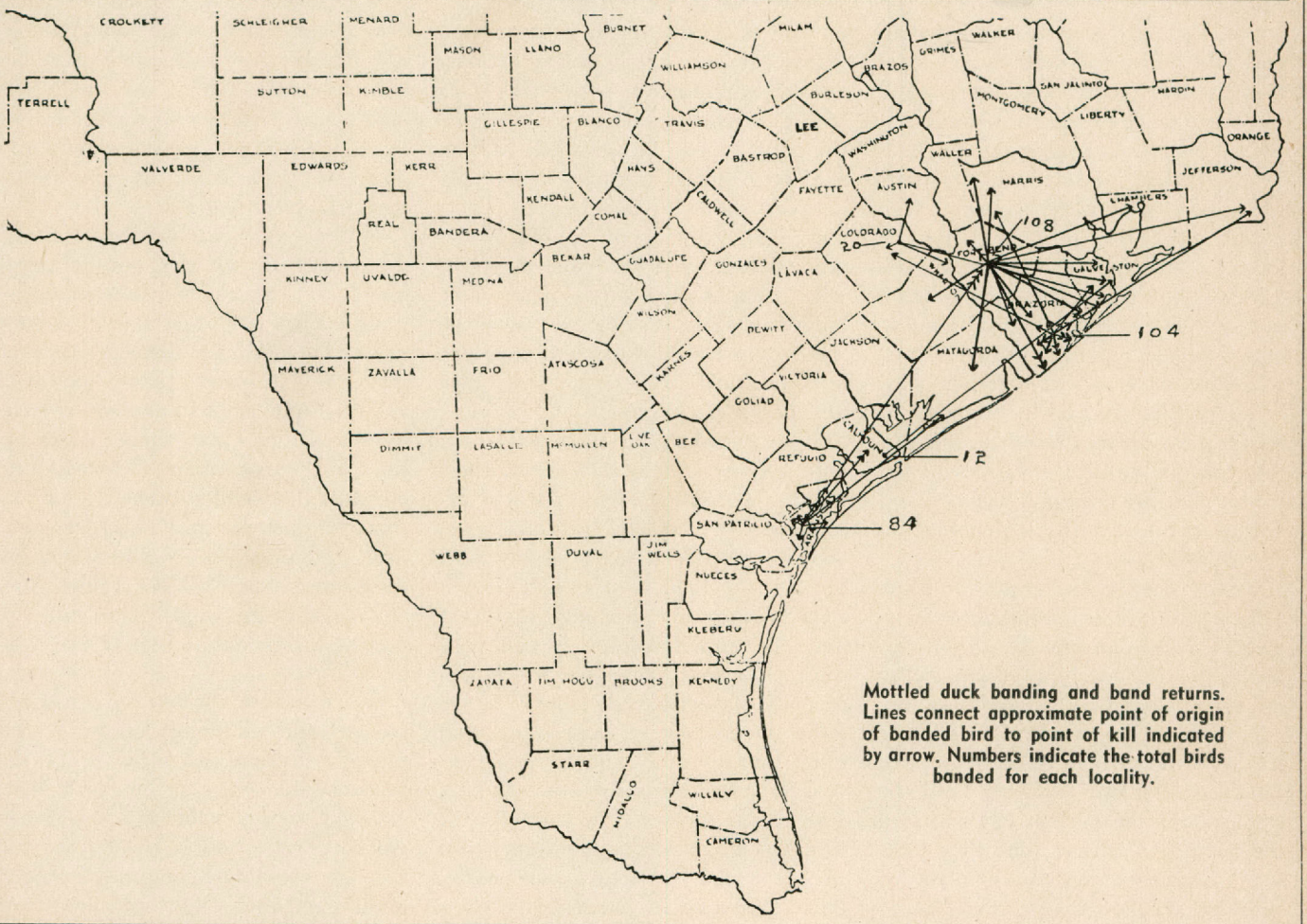
More bands from mottled ducks will probably be reported for several years to come, which may change the migration picture of this species to some extent, but I believe it is safe to say with the evidence at hand that mottled ducks move about over the coastal sections in search of areas to fit their needs at particular times. There is no definite migration as is true of the waterfowl that nest in the north and winter in the south. The mottled ducks we raise in Texas are the same mottled ducks for the most part that the sportsmen shoot in Texas.



This mottled drake is in molt, with the primary feathers just beginning to drop.



Range of the mottled duck in Texas.



Mottled duck banding and band returns. Lines connect approximate point of origin of banded bird to point of kill indicated by arrow. Numbers indicate the total birds banded for each locality.

CONSERVATION EDUCATION . . .

The Remedy

By EVERETT T. DAWSON

Supervisor, Conservation Education

WE have pointed out how the first settlers in Texas capitalized on the abundance of natural resources and developed one of the greatest states in the greatest nation in all the world. We have also observed that in building this great state our people have in their enthusiasm overlooked the importance of careful planning in the use of the natural resources. As a result we find ourselves at the half-way mark in the 20th century, face to face with the stern fact that the loss of fertility of our land, the lowering of the water table, the depletion of our forests, the shortage of some of our minerals, and the decline of our wildlife resources, together with droughts, floods and a tremendous loss and waste from recent wars, have reduced our natural resources to the extent that the economic welfare and social security of our people are threatened.

These conditions combine with other current living problems to focus on the future of the youth of this country a far-reaching responsibility no other American group has ever experienced. To meet this challenge the boys and girls in the schools need the facts. Not only do they need the truth about the various categories of the natural resources, but they need to employ some systematic plan for studying the proper use of these re-

sources. Such a plan could be properly called conservation education and if it actually met the need, it would be called the remedy.

Nearly all of the 170,000,000 acres of land in Texas are in possession of private owners. Soil, water, plants, animals and minerals are under direct control of the owners or operators of the land. Under the principle of free enterprise owners and operators of the land determine for the most part what uses shall be made of it, how many animals and what kind shall be kept, what crops shall be produced or what buildings shall be erected, or what roads constructed and most all other operations carried on outside of cities and public parks, etc.

Thus, we see that those who own and operate the land hold in their hands the control of the natural resources. One day the boys and girls who are now in school will own and operate the land. Theirs will be the responsibility for choosing what sort and how much wildlife it will produce; how many acres per range animal will be permitted; what shall be done toward soil erosion, forest and grass management, and to what extent the minerals will be mined; how many farm ponds will be stocked with fish, how many squirrels produced on the creek and how many quail on the fence rows and in the weed patches.

In studying a plan to effect the conservation of natural resources, let us look first at how man is related to the resources; then let us look to see how resources are related to each other; and then how all living things are interrelated and interdependent each upon the other; and finally let us see how society is responsible for teaching upcoming generations to understand the need for the wise use of the available resources.

A child early in life learns about the things it can see, touch, taste, smell, and hear. These are material things. They are objects that occupy space. These are the things of science, such as soil, water, plants, animals, minerals and the inexhaustibles, sunlight and air. These things make up the child's environment. They are important. The child must depend on them for sustenance. From these natural resources or combinations of them must come all the things that go to satisfy the wants of an individual insofar as material goods are concerned.

Soil is one of the basic natural resources and all living things of the universe depend upon it either directly or indirectly for life itself. Soil, however, is of no value to living things without water. Soil and water are not capable of maintaining life without plants; and soil, water and plants are



Mrs. Gale Price, secretary to Everett T. Dawson, distributes wildlife conservation material to a group of librarians.

not enough to sustain man without animals; and finally all of these combined cannot support life without minerals since all living tissue must have traces of minerals.

Grass grows in the soil when there is water available. The cow eats the grass and man eats the beef. The deer eats the liveoak browse that grows out of the soil with the aid of minerals, air, sunlight and water; then man eats the deer. The fish eats the minnow that lives on water plants that in turn depend on the soil. The mink eats the fish and produces fur for human clothing. The squirrel buries the pecan and thereby plants a tree that produces food for the wild turkey, squirrel and man, at the same time providing shelter for birds and other

animals. The tree decays and provides soil improvement for other plants. Thus we see all the natural resources are interrelated and interdependent. In like manner basically the human family depends upon all these natural resources or combinations of them in carrying on the simple daily life processes.

Taking into consideration these facts we may conclude that it is the responsibility of society to make it possible for the child to learn the facts about the things on which he or she

Editor's Note. This is the second of a series of articles on the basic needs for conservation of our wildlife and other natural resources.

must depend for life. It is the responsibility of society to teach the child the fundamentals about how natural resources are related, and how they may be properly used to improve the standard of living. It is the responsibility of society through the school to teach the upcoming generations wise use of the natural resources and assist the boys and girls in developing proper attitudes toward natural resources and aid them in the formulation of desirable habits in reference to their wise use. If we can agree that these things should be done, then we are agreed that *Conservation Education Is a Remedy* for our declining natural resources.

In the next issue will be "What is Being Done About Conservation Education?"

"The Tiger of the Air"

By EARL WALLACE

THROUGH the woodlands and over the meadows, this "tiger of the air" glides as silently as a shadow seeking those of its prey that move or sleep by night. Without warning and with a lightning-like swoop, a sleeping grouse or an unsuspecting rabbit is gathered up in great talons and unhesitatingly carried away.

Fiercely and without discretion, this marauder of the twilight and darkness hunts down its prey with persistence and success.

Without question or doubt, the great horned owl is destructive to useful species of wildlife, barnyard fowls and even small domestic animals. The poultry raiser classes him as a veritable menace; for once his raids are successful, nightly visits continue as long as a victim survives.

Nothing short of death will stop him. When there are many or much to kill, this bloodthirsty creature becomes fastidious and eats only the brains of his prey, leaving the rest of the body untouched. In attacks upon game farms, he has been known to kill as many as thirty quail in one night, once he gains access to a pen.

The bird is endowed with almost super strength and power and can kill a woodchuck, opossum, or skunk, and will easily fly with a full-grown rabbit. However, he usually eats what he wants where the kill is made and seldom carries the prey away unless there are young to feed or some other predator threatens to rob him of the prize.

Men of the north often tell of this fearless hunter swooping down upon them as they walk down woodland trails on winter evenings. It is doubtful that these are deliberate attacks, but rather a confusion of sight, the owl seeing only the head of the person and taking it for some small animal.

Like a cat with padded feet, the swoop of his great and silent wings usually marks the demise of some woodland creature that was too far from protective cover.

The lord high executioner of the bird world, however, meets an adversary in the weasel. These little animals perhaps possess more fighting capacity per ounce than any other dweller of the wild and they have been known to kill the great horned owl in flight high above the earth, after being gathered up by its invincible talons.

Through the day, this feathered assassin keeps concealed in the woods, particularly among the evergreens

and it is not until dusk that he ventures forth in quest of daring adventure.

At evening-tide, and not rarely through the day, the great voice of this owl dismally punctuates the silence of the woodlands with "to-who-ta-who-ta-who-who-who-who." The call is often answered by any other of its kind that is within hearing.

Unsocial and solitary, except at the nesting season, this menace, unlike some of its closest of kin, seems to be ostracised by every other member of the wild populations.

Like other members of this large family, the eyes of the great horned owl are immovably fixed in the sockets and it must turn its head to slightly shift its gaze. This gives rise to the saying that, by walking around an owl, you can cause him to twist his head off. This, however, is not true.

The nesting season of this bird is earlier than that of any other in its range. As early as February, two—sometimes three—almost spherical white eggs are laid in the old nest of an osprey, crow or hawk which has been reconditioned. There is evidence

that, after the first egg has been laid, several days elapse before the other is deposited, for often a nest is found to contain a partly fledged youngster and an unhatched egg. During the nesting season, both the male and female participate in incubation, and both continue their effort to supply food to the young, which consists of birds, small animals and fish.

Nests have been found to contain several pounds of food in excess to that required by the young, which is evidence of the skill of the parents in capturing prey.

Almost every sportsman has a born contempt for the great horned owl and holds him responsible for the scarcity of game. This accounts for the slaughter of many other useful owls mistaken for their head-hunting cousin.

Indefensible as he may be, insofar as virtues are concerned, this demon adds something to the great families of the wilderness. Its daring and relentless savagery can be compared to the Captain Kidds and daring blockade runners of history. This, at least gives the great horned owl the recognition of an outlaw's notoriety.—Kentucky Happy Hunting Ground.

The Great Horned Owl

Bubo Virginianus

Other Names: Hoot owl, cat owl, big hoot owl, horned owl.

Description: Length about 24 inches; spread of wings near to 5 feet, long ear tufts; upper part of entire body variegated brown, running into a tawny gray. The entire color scheme broken by lighter shades. Across the foreneck is a crescent-like area of dusky white, with entire under parts lighter than the upper. Bill dull slate black; iris yellow; claws horn color.

Range: All of eastern North America as far north as to the middle of Canada and as far west as Minnesota, Iowa and Texas. Some migration is prevalent in deep winter, as residents of the far north shift toward the south.



THE GREAT HORNED OWL

Wildlife Sanctuary

By BILL THOMPSON

Sports Editor, *The Paris News*

TIME and hunters' guns have removed from Lamar County the bountiful game it owned in the 1800's.

But Gambill's Wildlife Refuge, a 600-acre sanctuary near Paris, gives you a small picture of what the Red River Valley once was.

A small flock of deer scamper about in John Gambill's front yard. Back of his home is a small lake, and hundreds of wild geese frolick there each winter, safe from hunters' guns. There are fox, pheasant, peacock, geese, ducks, owls, raccoons, squirrels, monkeys, coon and a solitary prairie dog. Though captives they enjoy a peaceful existence at Gambill's.

Folks from 48 states and several foreign countries have signed the guest register at Gambill's Refuge since Mr. Gambill formed it some 20 years ago. At 79, he's not too old to tour them around his farm. He

still gathers enough strength to care for his animals and raises patches of grain to help feed them.

Gambill's Wildlife Preserve became a state game preserve in 1934. A game warden, Sam Turner, was so impressed with the conservation work being done at Gambill's farm that he suggested it be made a state game preserve. Texas Game, Fish and Oyster Commission granted the wish.

"You must have had a real reason for building this game preserve?" we questioned the old fellow one afternoon. "Yep!" he began, "but mostly because I just love wildlife." Mr. Gambill then told the story of his wildlife refuge.

John Gambill was farming 25 years ago on the same land that now is his wildlife refuge. He came home one

evening to find a half-dozen geese feeding in one of his pastures near the house. When his sons discovered the sight, he nearly had to sit on them to save the geese from being shot, but the flock remained unmolested for several days. Next winter, the flock came back and brought some friends.

As winters came and went, Mr. Gambill started throwing out feed to his guests. Folks in Paris started chipping in to help him buy feed. Geese began flocking to his farm to escape hunters' guns on two Paris city lakes.

Then Gambill's farm was made a state game preserve. A few crippled geese started staying all winter. They even hatched their young. Folks from Paris started coming out to the farm to see the geese. Out of pride, he built a nice tree-lined drive down to his house and erected a sign.



The forty-eight states and several foreign countries are represented on the guest book at the entrance to Gambill's Wildlife Preserve. Above John Gambill holds a register.

(All pictures courtesy *The Paris News*)

Today, Gambill's Wildlife Refuge is one of Lamar County's beauty spots. It's truly a picture of nature. Wild animals eat out of Mr. Gambill's hand. They feel safe under his care.

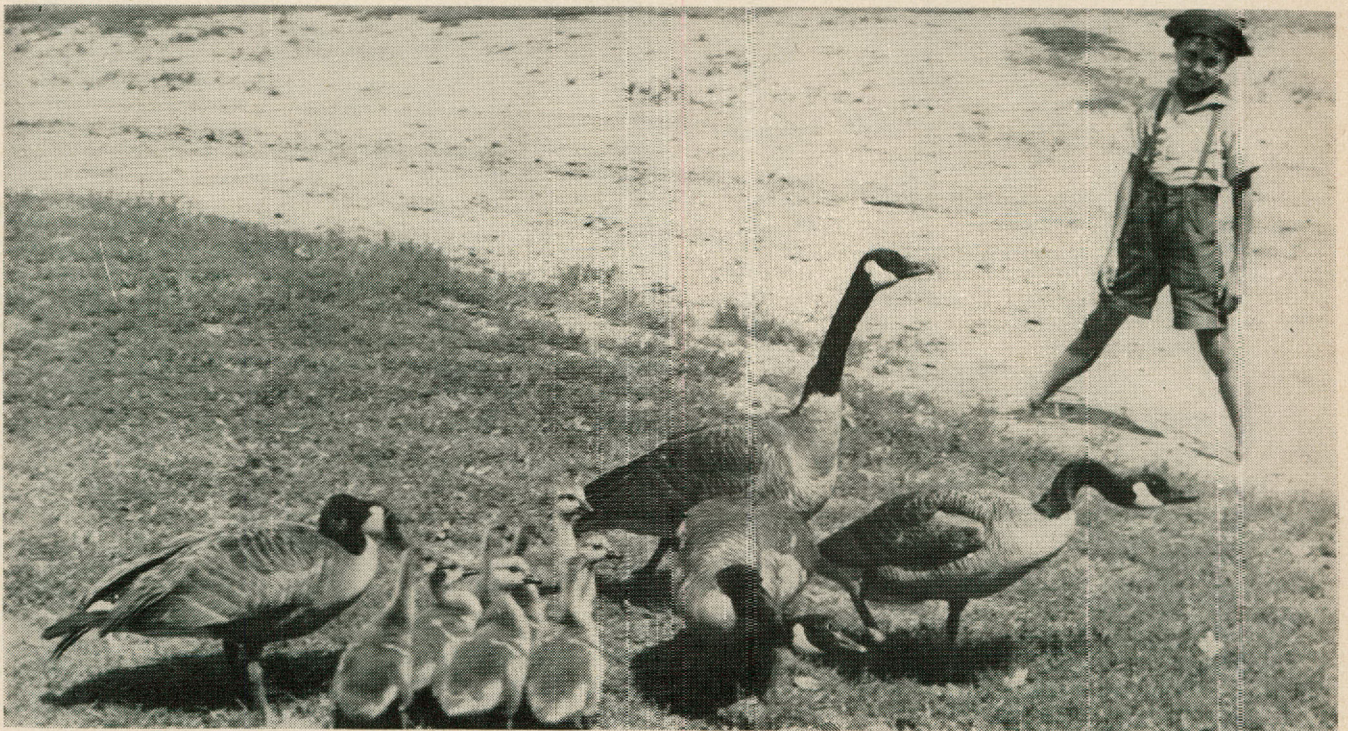
Paris watches with interest the happenings at Gambill's Refuge. They rejoice with each new baby at the sanctuary, mourn when there's a death among the animals.

There was Joe, the wayward monk, who escaped and was re-captured several times then finally died of pneumonia on one escapade. And Spunky, the crippled goose, was eaten by a hog.

Recent additions to the Gambill menagerie are a pet skunk, "Snowball," that has been relieved of his scent, and a West Texas prairie dog that's still a bit bashful. "Hooty," a blind owl, lives off the meat that his cage-mates feed him, beak-to-beak.

John Gambill is getting well along in years. But he needn't worry about his animals. Lamar Countians stand ready to build the refuge into a memorial in his honor when he can no longer look after his pets.

Gambill's Wildlife Refuge is truly an asset to the beauty of the Red River Valley. And as one of Mr. Gambill's old friends put it: "What we do for ourselves dies with us—what we do for our fellow man and community, lives forever."



What's Wrong With Wildlife Administration?

By

IRA N. GABRIELSON

President

Wildlife Management Institute

Washington, D. C.

THE query, "What is wrong with wildlife administration?" is usually aimed at State wildlife departments since, with the exception of migratory birds and a few special areas such as national parks, the states have the responsibility for the most important wildlife resources.

If State administration is examined in the light of the ideal activities needed to do an adequate job of protecting this resource, it must be admitted that the picture is not good. If it is examined in retrospect against the conditions that prevailed 20 or 30 years ago, it is obvious that definite progress has been made in many states and that administration generally will average considerably better than it did in those conservation dark ages.

Whether it is improving fast enough to keep pace with the increasing complexities of preserving wildlife in the face of a growing human population and a consequent increasing intensity of land use and a growing army of hunters and fishermen who desire, usually vociferously, to utilize the wildlife resources, is a moot question. If the standards of all State administrations could be raised to equal those of the half dozen states doing the best job, we would indeed have a potent force for improving the chances of maintaining wildlife populations. Those states with the poorest departments lack almost every needed authority, as well as adequate policies, information and programs. Some of the better ones lack few of the basic attributes but do lack adequate resources to do the major job in the face of increasing human pressure on wildlife.

What are the chief defects in current State game administrations? Politics would unquestionably head the list. While there has been some improvement, it is still regrettably true that in more than half the states the wildlife departments and funds are at the mercy of partisan and personal politics. In relatively few states is adequate protection provided for either the personnel or funds. A clear distinction should be made between the use of conservation funds and positions to pay personal political debts or to give partisan rewards to political workers, and the politics and controversies that may arise over conservation policies and programs themselves. As long as America has a democratic form of government, differences over the relative value of programs and ideas are bound to occur. There is, however, no excuse whatever to use conservation funds and departments for personal and partisan politics. That the people can defeat this use of conservation programs has been demonstrated in enough states to prove the case. Whenever the sportsmen and conservationists of any state get sufficiently aroused, conservation agencies can be placed above such use and kept there so long as public opinion demands it.

The wrong kind of politics has unquestionably been the cause of more waste of both funds and effort in conservation than any other single factor. It causes waste even when there is a desire not to waste by a constant shifting of programs and personnel before any effort that can affect living things can become really effective. Whenever a conservation department suddenly and without adequate reason changes direction or personnel or both, much of the previous effort has been lost. Regardless of the merit and character of the new men,

each has to learn the job over and become acquainted with the problems before efficient conduct of a statewide program can be effected. A good wildlife program requires continuity of effort and personnel to have a chance to succeed.

One of the further bad results of such a political system is that a comparatively small number of states and a few national conservation organizations have a tendency to corral the best men. The most successful states have a tendency to secure the best-trained and most experienced men and to keep them long enough to get new values from their services as their knowledge of local problems grows. It is true that there are good men in other states, but an examination will too often disclose that most of them fall into one of two categories. Either such employees have personal reasons or personal obligations, which usually are not connected with their jobs, that constrain them to remain, or they have not as yet attracted sufficient attention to be offered more attractive employment. As fast as good men develop, they are snapped up by agencies able to offer more attractive

Another great waste has come from sportsmen's pressure for artificial propagation and restocking program. Most checks made on the results of stocking efforts indicate such a low percentage of survival and such a low percentage of this game turning up in sportsmen's bags as to render the cost prohibitive. Even if a game bird stocking program were, for instance, almost 100 percent successful, the cost of stocking would be still so great in view of present license fees that it is an entirely uneconomic program and one that if carried to its logical extreme can only bankrupt conservation departments. There is a place for stocking programs, but propagated stocks should usually be released only to restock territory that has good range suitable for that species and which has no existing populations.

Predator control is another favorite phobia of sportsmen. Predator control is often necessary and desirable, but too many sportsmen's clubs react to all decreases in game populations by demanding state-wide bounties on predators, to be paid from conservation funds. Such an outlay *always* results in waste. It pays for the killing of ani-

Without Enforcement, Regulations Are Useless As a Method of Maintaining Wildlife Populations

employment conditions and greater opportunities to do a real job.

Sportsmen's pressure is almost surely the second most potent factor in poor game administration. Intelligent sportsmen have been responsible for most of the good administration there is today—and too often for much of the bad. Sportsmen's groups are too often ignorant, even if they are enthusiastic. They are frequently led by silver-tongued but leather-headed leaders who know little more of the needs of wildlife species than what may be learned from looking down a gun barrel or handling a fishing rod.

The most common form of this waste is sportsmen's pressure for greater and more liberal harvesting privileges than the condition of the stocks will allow. This frequently results in a relatively gameless or fishless territory for some years. On the other hand, sportsmen's prejudices against harvesting doe deer, for example, have been responsible for major catastrophies to deer herds; and their resistance to adequate kill of excessive pheasant populations has caused considerable tension between farmers and sportsmen. Too few sportsmen realize that it is good management to preserve all female stocks when it is necessary to build a game population but foolish to continue the practice when the stocks have reached the maximum carrying capacity of their ranges or when the stocks are so great that they arouse prejudice among agricultural groups.

Too much game in an agricultural country can be as troublesome to the sportsman's permanent interest as too little game. Too many grazing-browsing game animals, such as deer or elk cannot only cause conflict with other interests but destroy their own food plants and make it impossible to rebuild the herds for years following an eat-out and a starvation reduction of the herd.

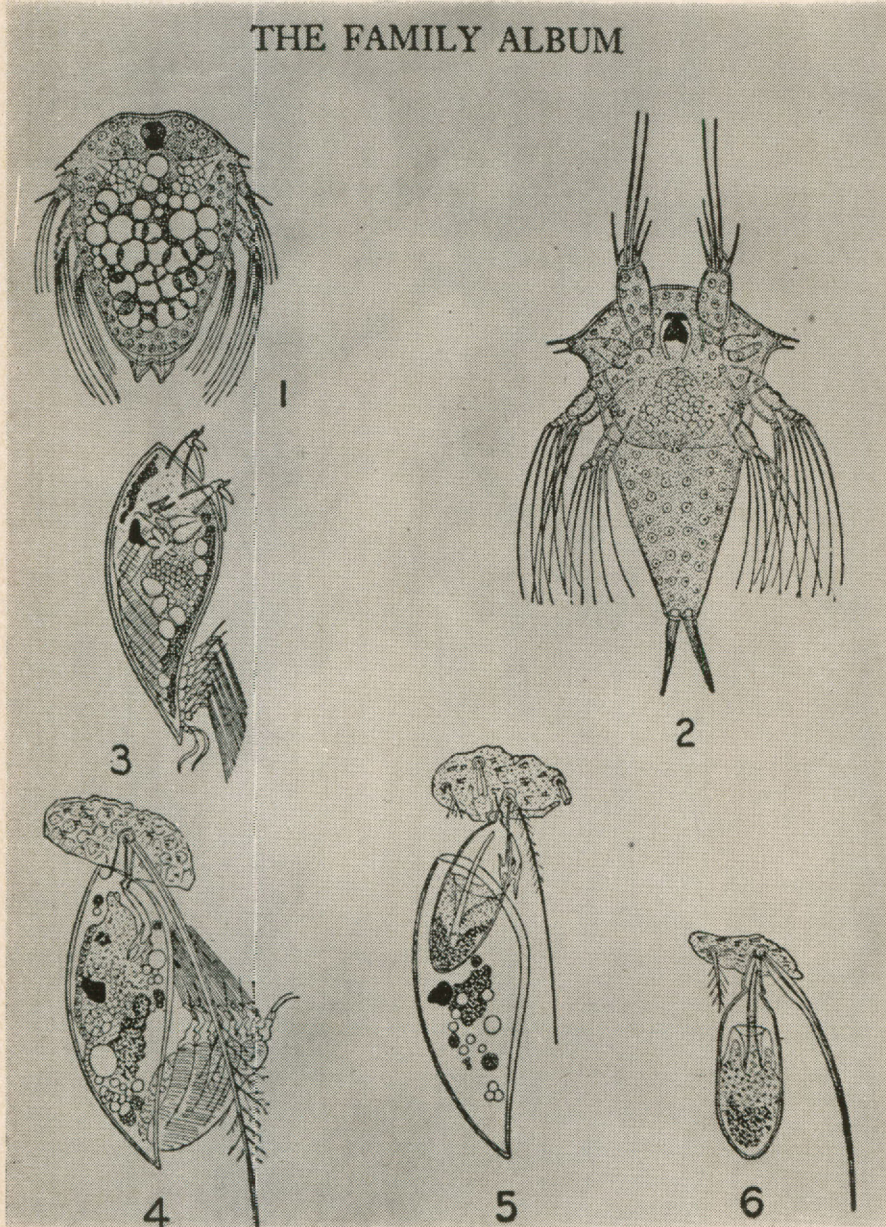
mals that would be killed anyway, either for fur or about farms, and, perhaps, more important, it does not center the control expenditures and efforts at the point where predators are a real factor in holding down the populations of more desirable species. These examples and similar ill-advised demands upon conservation funds have resulted in more waste of funds and effort, probably than any other single factor except the political one previously mentioned.

Lack of adequate authority to manage the wildlife harvest is another and perhaps the third most important factor in producing poor game administration. One by one, State legislatures have been convinced of the impossibility of managing the wildlife harvest by a law-making body which meets only every two years, and furthermore has a multitude of varied problems, most of which are considered much more pressing before it. No legislature is able to give any real consideration to more than the broad outline of a wildlife management program. Every state game department needs the authority to open and close seasons, to control bag limits, and to make such other regulations as are necessary to limit the harvest taken each year. The allowable safe harvest is bound to vary as a result of many factors and no rigid legislation can possibly meet the problems that come each season. Either the harvest will be too great, which will mean a poor crop for one or more succeeding years, or it will be less than might have been possible under flexible regulations. About half the state game departments still need some part of this adequate authority. A few have complete authority to make such regulations. There are others that do have adequate authority to do a reasonable job of harvesting their game crops but many of them are still hampered by local and often conflicting

● Continued on Page 31

Loxothylacus,

THE FAMILY ALBUM



Stages in the development of the parasitic rhizocephalid *sacculina carcini*. 1, nauplius newly hatched; 2, after the first molt; 3, free-swimming cypris stage; 4, cypris stage attached to a seta of the host crab; 5, larva still attached and in act of casting cypris shell; "dart" almost formed; 6, dart beginning to penetrate shell of host at base of a seta. All much enlarged. After Delage.

THE very lowest form of parasitism is reached by the Rhizocephala, a group of crustacean parasites allied to the barnacles. These animals have become so modified by their mode of life that, as adults, they are no longer recognizable as barnacles, or even as crustaceans. The clue to their relationships is found in their life history. The rhizocephalids prey on other crustaceans only, principally

By

EDWARD G. REINHARD

infesting the Decapoda (crabs, shrimp and their allies).

Cavolini, an Italian naturalist of the eighteenth century, who, in 1787, was the first to describe and figure one of these remarkable crab parasites, did not regard it as an animal at all. He thought the *Sacculina* attached to the underside of the abdomen of a crab was a sort of rupture or hernia, part of the crab itself. The larvae he found within this supposed pathological growth he believed to be minute water fleas that had crawled into the sac to feed on its contents.

Even today the uninitiated observer is apt to be puzzled by what appears to be a tumorous growth sometimes found fastened to the abdomen of a crab. Since it occupies a position corresponding to that of the "sponge" or egg mass carried by mature females, fishermen and others, if they wonder about it at all, often make the mistake of concluding that it is simply a mass of hardened "sponge."

An adult rhizocephalid, after all, is a mere thin-walled sac enclosing a

A PARASITE OF THE BLUE CRAB IN TEXAS

visceral mass made up chiefly of the reproductive organs, both male and female in the same individual. It shows no trace of segmentation, appendages, or sense organs. Even an alimentary tract is missing. Instead it possesses a threadlike root system which penetrates the interior of the host in all directions and absorbs nourishment from the body fluids of the crab. Between the visceral mass

Catholic University of America,

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and

Texas Game, Fish and Oyster Commission

and the walls of the sac is a spacious brood chamber in which the fertilized eggs are held until hatching occurs. An opening at the summit of the sac allows sea water to enter and leave the cavity for purposes of respiration and provides an avenue of escape for the larvae. At the base of the sac is a short stalk by which the animal is securely riveted to the body wall of the crab.

In the shallow bays of the Gulf of Mexico the edible blue crab, *Callinectes sapidus*, is frequently parasitized by a rhizocephalid of this type. Biologists of the Texas Game, Fish and Oyster Commission have noticed its prevalence in Aransas Bay, where in 1949 it afflicted 16 per cent of the blue crab population. In restricted localities, one such being the flats south of Mud Island, the incidence of parasitism may reach as high as 50 per cent during certain months of the year. This parasite has been identified as *Loxothylacus texanus*, a rather close relative of *Sacculina carcini*, the best known example of this group of organisms

and one that has engaged the attention of European zoologists for a great many years.

The first notice of this blue crab parasite in any published writing is found in a paper on "The genus *Callinectes*" issued in 1895 by Mary J. Rathbun of the U. S. National Museum. In discussing deformed specimens of these crabs she describes "a remarkable series of malformations of the abdomen" in the case of a number of specimens of *Callinectes sapidus* collected from Indianola, Texas. Three males, instead of having narrow abdomens had abdomens approaching that of a female in width and made up of seven distinct segments, as in the female, instead of five. A female of small size that should still have the triangular apron of the immature form was "in all respects like adult forms." One crab of this lot, she says, had "a foreign growth, probably *Peltogaster*," attached to one side of the third segment.

It is clear, in the light of our present day knowledge, that these malformations of the abdomen were due to the presence of the parasite now known as *Loxothylacus texanus*. This parasite produces striking modifications affecting the abdomen of the host, making males resemble females and causing immature females to acquire precociously the adult form. These modifications are produced even before the parasite becomes externally visible.

The "foreign growth" which Miss Rathbun noticed attached to the abdomen of one crab and which she called "Peltogaster" was undoubtedly the external sac of the animal that was eventually to become known as *Loxothylacus*. *Peltogaster*, like *Loxothylacus*, *Sacculina* and others is a genus of Rhizocephala but it infests only hermit crabs. However, at the

time when Miss Rathbun wrote her paper relatively little was known about these animals from the standpoint of classification.

Miss Rathbun does not state who collected the parasitized crabs from Indianola, Texas, but there can be no doubt that it was J. D. Mitchell of Victoria, Texas. Mitchell is mentioned in the same article as one of her correspondents who turned over to her his valuable observations on the habits of the blue crab. These extremely interesting notes of Mitchell giving an account of the shedding, courtship, growth, migrations etc., of the blue crab in Matagorda and adjacent bays are printed on pages 368 to 371 of her paper. Moreover, when we consult the original scientific description of the blue crab parasite as a new species in a publication by H. Boschma in 1933 we find that the type-specimens are listed as having been collected by J. D. Mitchell from Matagorda Bay, near Indianola, Texas, and that these specimens were from the collections of the U. S. National Museum.

A man who could write as pleasingly as Mitchell and one who was evidently gifted with keen powers of observation as a naturalist should be worth knowing more about. In his "Notes" which Miss Rathbun published, he says of himself: "Born on an isolated point on the Bay and inheriting the naturalist's instincts from my mother, I made this crab (*Callinectes sapidus*) one of my earliest playthings, and it has been an interesting study since."

To discover who J. D. Mitchell was, we consulted Samuel Wood Geiser's book "Naturalists of the Frontier" and found the following information:

"Mitchell, Joseph Daniel (1848-1922).—Mitchell, one of our first native Texan naturalists, was a gifted

amateur student of Texas mollusks, insects, and reptiles. He served as collaborator with the U. S. Bureau of Entomology, and published an extended memoir on the snakes of Texas in an early volume (1903) of the *Proceedings of the Texas Academy of Science*. Mitchell lived at Victoria, and his activity commenced about 1876-1878."

The specimens, then, that Mitchell collected in 1895 or earlier were stored in the U. S. National Museum. Eventually, Dr. H. Boschma, Director of the Rijksmuseum van Natuurlijke Historie, of Leiden, Holland, the foremost authority on the classification of these parasitic organisms, received these and other parasitized crabs from the National Museum for study. His report, issued in 1933, described this parasite of the blue crab as a species new to science and gave it the name *Loxothylacus texanus*.

Life Cycle

The life history of *Loxothylacus* has, as yet, not been studied in complete detail, but sufficient observations have been made to indicate that the pattern of development of this animal is almost exactly like that of the European *Sacculina carcini*. We owe the original account of the life history of *Sacculina* to the classic investigations of the great French biologist, Yves Delage. His extensive report, published in 1886, at first met with considerable skepticism and opposition from other biologists of the day. The account seemed entirely too fantastic. A number of workers since have confirmed his very careful observations and proved them correct in all essentials. Noteworthy among the latter group are the names of Geoffrey Smith (1906), J. H. Day (1935) and André Veillet (1945).

The eggs of *Loxothylacus* are released from the visceral mass into the mantle cavity by way of glandular ducts which coat them with a viscid secretion. There they are immediately fertilized by the sperm of the same parent which is emitted from the ducts of the testis at the time of ovulation. The fertilized eggs are held together in branching cylindrical bundles by means of the secretion with which they were previously coated. This provision, together with the presence of

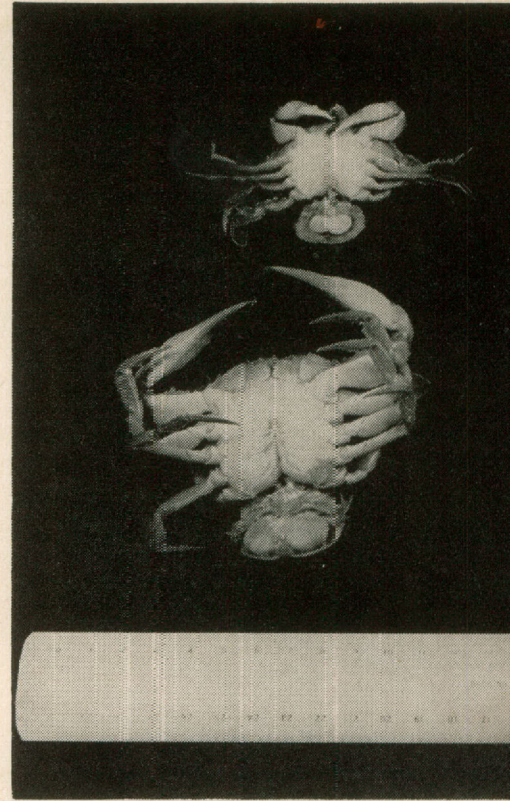
microscopic barbed spindles on the inner lining of the brood chamber, prevents the eggs from escaping through the mantle opening before incubation is complete.

Within a few weeks the developing embryos have reached the stage of nauplius larva and are ready to emerge from the brood pouch to begin their free-swimming period of existence. When the time for their release arrives, the parent forcibly ejects them by vigorous contractions of the walls of the brood pouch and in a matter of minutes the incubation chamber is emptied. The parent then molts and a day or two later the pouch is again filled with eggs and a new brood is ready to undergo development.

The larval parasite, when expelled from the shelter of the mother's mantle cavity, measures only about one-fourth of a millimeter in length. It has the appearance of a typical barnacle nauplius, except that it lacks an alimentary tract and cannot feed. Its body, however, is charged with fat globules which supply nourishment. The nauplius has three pairs of appendages which it uses for swimming and possesses a single eye near the anterior end.

During the next five to seven days the young parasite molts four times, progressively developing into a somewhat larger type of larva, known as a metanauplius, which differs little, except in size, from the first larval stage. The last molt, however, reveals a new type of larva spoken of as a cypris. The shape of the body is now profoundly changed and the little animal is enclosed in a bivalve shell. It has a pair of stout antennae with attachment processes at the tip and six pairs of swimming feet. The unpaired eye persists from the nauplius stage and again mouth and alimentary tract are lacking. Only in the absence of feeding organs is the cypris of rhizocephalids different from that of a normal free-living barnacle.

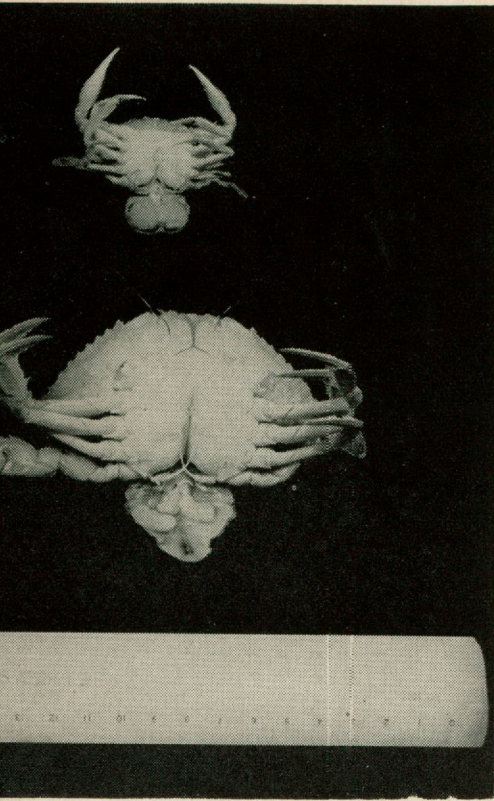
Now the parasite has reached the stage where it can seek its fortune.



Ventral view of *Callinectes sapidus* *Loxothylacus texanus* Boschma. (Upper right) A male with a single infestation. (Lower right) A male with

This it does by locating a suitable crab on which to settle. The crab, to be of a proper type for its attack, must ordinarily be of a particular species, of an early age, and freshly molted.

The cypris attaches during darkness. It fixes itself by means of one of its antennae to the base of a hair on the carapace or on the limbs of a small crab in the process of shedding and seems to select the feathery hairs rather than the stiff setae. At the base of the hair there is an articular membrane which is not calcified and the cuticle at this point is relatively easy to penetrate. As a rule, the cypris does not attach to the abdomen or its ap-



specimens parasitized by *Sacculina*,
 A female with a double infestation.
 (Lower left) A female with a single
 infestation. (Photograph by Guilbert.)

of the dart projecting into the fixed antenna. At this stage the bivalve shell of the cypris falls off and the sac that remains is spoken of as the "kentrogen" larva, a word which means "the piercing generation."

Now the actual inoculation begins. The dart pushes forward and penetrates the cuticle of the host. It is like a hypodermic needle and through its channel the cellular contents of the kentrogen flow into the body cavity of the crab.

This is the beginning of a new phase of development for *Sacculina* or *Loxothylacus*, the "interna" or endoparasitic stage, during which the rhizocephalid develops its absorptive root system together with the rudiments of the external sac that will eventually break through to the outside.

The mass of cells injected into the host by the kentrogen larva appears to be carried passively by the blood until it finally becomes attached to the exterior of the intestinal wall. A spongy tumorous growth develops and processes are sent out that form the roots. Within the tumor a thickening appears known as the "nucleus."

This compact region gives rise to the organs of the adult sac, but at this stage the sac is of microscopic dimensions. Meanwhile, the parasite moves backward along the intestine to the ventral region of the abdomen where emergence of the adult sac will take place. The time required by the parasite to complete these stages of development inside the crab is believed to be eight or nine months.

A blue crab that harbors the internal stage of the parasite can be detected from normal crabs by the altered form of its abdomen. Males and young immature females, when parasitized, both assume the broad abdomen characteristics of the adult female. When such a crab is examined, one can frequently detect on the un-

derside of the abdomen, a white protuberance lying beneath the cuticle of the third segment. This is the juvenile sac, developed from the "nucleus" of the tumor. Pressing against the exoskeleton of the host, it causes a degeneration of the muscle and hypodermal tissue until only a thin window of chitin remains. In a very short time the parasite will rupture this window and emerge on the external surface as a small white button or "bud."

The bud, when it first appears on the outside of the crab measures only about three millimeters in diameter. However, it contains all the organs of the adult sac except the mantle opening. This opening will not break through until the sac has reached a size of about six to eight millimeters.

About six weeks after emergence the sac has reached a stage of sexual maturity. It is now yellow in color due to the yolk present in the growing eggs. Discharge of these eggs from the ovary into the mantle cavity and simultaneous emission of sperm initiates the development of the first brood. When the embryos have reached the first larval stage they are spewed out of the brood chamber, the animal molts, and within two days a new brood of young is in process of incubation. As time passes, the sac becomes larger and the number of embryos per brood increases. A large sac of *Loxothylacus* will measure up to one inch in breadth.

Eventually the parasite grows old; the sac shrinks, becomes dark brown in color and drops off. Crabs that have lost their parasite retain a scar at the point where the sac withered away. Generally, after the death of the parasite, the internal roots slowly degenerate and after several months may disappear. The parasitized crab may recover from its affliction and resume a normal life. It is likely, however, that it will remain stunted and will never be able to carry on normal reproductive processes.

pendages, despite the fact that the adult parasite will later on emerge from that part of the crab's body.

Within a few minutes after securing successful attachment, the larva undergoes a remarkable metamorphosis. The whole of the thoracic region of the larva with its appendages and muscles is protruded outside the bivalve carapace and becomes detached from the rest of the cypris. The contents of the anterior region of the larva migrate to the rear and become enclosed in a cuticular sac, newly formed, which is connected only with the one antenna that is fixed to the host. Within this sac a tubular organ known as the "dart" arises, the point

Some Panhandle Firsts

FOR THE 1950-51

THE 1950-51 hunting season just past was the first under the new deal Panhandle sportsmen got when the 51st. Legislature passed Senate Bill No. 47. Under this bill, the Game, Fish and Oyster Commission was made responsible for regulating the harvest of game, fish and furbearers in the 28 Texas Panhandle counties. This is a sort of informal "State of the Nation" report on some events and "firsts" touched off by Senate Bill No. 47, during the first few months following its enactment.

The bill provided that existing laws and regulations be replaced with new ones September 1; the latter to be based on continuous study of the supply of wildlife, its range or habitat, and the influences affecting it. Thus, for the first season there was very little time available for the accumulation of data on which to recommend new regulations before the old regula-

tions expired. Fortunately, among the Panhandle Game wardens there were several veterans of long experience in that part of Texas. There was also a considerable fund of data resulting from the investigations of biologists. More fortunately, perhaps, the upland game picture was favorable; that favorite of sportsmen, the bobwhite had been on the increase for several years, and there were no critical situations calling for radical measures.

In the spring of 1950 biologists and wardens collaborated in preparation of a joint three-year program of survey and investigation; at the same time their collective knowledge of the Panhandle game picture was pooled for a set of recommendations to present to the Game Commission at its July meeting. Wardens and biologists took these recommendations to the public by holding advertised meetings at 22 Panhandle county seat

towns. The proposed regulations were read and a period followed during which members of the audience were free to offer criticism or suggestion.

Out of these meets, despite the fact that public participation was disappointingly low, came a streamlined set of regulations greatly simplified

By A. S. JACKSON

over previous ones, largely through omission of special county laws.*

By then it was July, and the Panhandle weather had undergone a reversal from drought to heavy rainfall. Generally speaking, rainy summers in the Panhandle and Lower Plains are favorable to quail reproduction. This time, however, rains were of flood proportions over considerable areas of good quail range, while destructive hailstorms visited others, notably in Childress, Hall, and Briscoe counties. Effects on quail of such conditions were not readily ascertained, and owing to the rank growth of cover, the size of the quail crop was still a question at the end of summer.

The research planned as basis for regulations recognizes the need for measurement of trends in game populations from year to year. Also, S.B. No. 47 gives the Commission authority to declare an emergency when a game species is found in danger of depletion through flood, hurricane, fire, or drouth. Even though there was no reason to believe that such an emergency existed in this case, figures were needed to serve as yardstick for comparison of future crops of bobwhites.

Accordingly, the first detailed in-

Federal Aid Project 45-R



In pre-season spot checks of the quail crop, this pasture held 12 coveys or 167 quail on 540 acres.

* See Texas Game and Fish, September 1950, *On the Legal Front*, p. 2.

Hunting Season

ventory of quail populations was made in the Panhandle in October. The writer and Game Supervisor J. H. Maggard employed bird dogs to make spot checks of quail populations along the Eastern side of the Panhandle from Lipscomb county on the north to Motley county on the South.

Wildlife Biologist

A four-wheel drive pick-up truck was used so that straight transect runs could be made regardless of rough terrain, and quail counted were recorded per measured mile and per hour. A special form was employed for recording data, including location, type of range, condition, and grade of quail range.

A total of thirty checks were made in the common types of quail range, sandhill, upland, prairie, (sagebrush and mesquite) creek and river bottom, Shinnery pasture, and farm shelterbelt. These types were checked in six counties, Lipscomb, Hemphill, Wheeler, Childress, Hall, and Motley. Transects were not less than .5 miles or more than 3 miles in length, except in a few cases where it was possible to census complete acreages for direct quail per acre comparisons.

The total mileage for thirty runs was 52.7, and the total time of counts was 47 hours. The latter figure includes time for complete census of known acreages when mileage was not kept. The resulting figures for quail numbers were indicative of good hunting ahead.

Ninety-three coveys were found in 52.7 miles, for an average of 1 covey per 1.7 miles. Remember this was straight across driving, not hunting the "hot" looking spots as a hunter would do. In 47 hours, including total census of a few areas, 118 coveys, totaling 1845 bobwhites, were counted. This was averaging finding 2.5 coveys, or 39 quail per hour. Quail were found on every occasion a check was made. Where total acreages were censused for a check, densities ran from 1 bird per 2 acres (Hemphill county, 232 acres) to 1 bird per 20 acres (Lipscomb County, 1280 acres). The latter was a level sagebrush plain censused for prairie chickens, and scarcely to be regarded as quail range. Nevertheless, a hunter by seeking out the few wild plum thickets, could have had very good hunting. The two-section pasture held 17 lesser prairie chickens.

From the above checks, the average density of bobwhites was believed to be about 1 quail per 5 acres in the better ranges of the Panhandle. Top grade range in a few cases was found later to hold exceeding a bird per acre when winter weather caused quail concentrations.

In the North Panhandle, particularly, there was a noticeably high percentage of late-hatched young birds with many broods obviously hatched in late August and September. Recommendations for regulations based on the hatch prior to July should be subjected to examination after October inventory of the quail population.

For the first time since 1946 an

open hunting season for deer and turkeys was announced for the north Panhandle counties. Since the deer and turkey range is limited in most cases to a narrow belt along the Canadian and Washita rivers and the lower part of their tributaries, it was felt that a regular season of approximately 6 weeks would prove too long. That much gunning pressure would prove too much for the patience of the landowners, if not result in overharvest of the deer and turkeys. The bag limit was set at one buck and two gobblers, and the season set for the period November 16-26, both dates included.

The season kill approximated 100 deer and 40 turkeys. Hemphill county led in the number bagged per county. The limited number of bucks for harvest was perhaps compensated for by the superior trophy value of these North Panhandle whitetails. At Canadian eleven bucks dressed clean for cold storage produced a total of 1266 pounds of dressed meat, an average of 124 pounds per deer. The smallest dressed out 82 pounds and the largest 140 pounds. Only the one fell below 100 pounds of dressed meat. Two bucks brought to Canadian for weighing undrawn weighed 200 and 204 pounds respectively. Both were 10 pointers, and of course above the average weight.

But the most important first in Panhandle Game management, and the one of undoubtedly the greatest interest to the most hunters, was the analysis of the "health" of the quail population made last season through the study of wings contributed by sportsmen during the open season. Every stockman recognizes the need for knowing the sex-ratio and age classes in his herd as fundamental to its management. The same information is essential to safe year-to-year management of "wild" stock, if the hunter (and the Game Department) is to stay solvent. The rancher customarily markets a number of head of livestock equal to his annual increase; successful game management means harvesting a sustained

Probably of the Greatest Interest to Hunters Is the
Analysis of the Quail Population



The mesquite brush ranges of the lower Panhandle provided very good quail hunting during the recent open season.

annual increase by means of regulated hunting.

Bobwhites hatched during the previous season can be distinguished from birds a year or more old by the color pattern of 10 small feathers at the base of the primary flight feathers. The molting pattern of the 10 outermost flight feathers constitute a calendar of the hatching date within a two weeks period, up to 150 days from hatching. Nearly all hunters know the bobwhite cock by the black and white markings on his head in contrast to the plain brown found on the head of the hen.

The percentage of young quail in the fall population, and the sex-ratios for both young and old quail present the best picture we have of what has happened to the population in the last 12 months. Even more important, it seems safe to say that such data over a series of years is going to permit a recognition of trends in bobwhite populations before they are otherwise apparent. Utilization of this technique without help from the hunter has previously required that the biologist trap his quail for examination, a time consuming and costly method, and one rarely yielding enough quail for dependable data. Collectively, the army of Texas quail hunters constitutes a medium for gathering information quite inaccessible otherwise. The bi-

ologist who collected even 100 quail per year for a food habits study would have to be very discreet.

Most readers of TEXAS GAME AND FISH are familiar with the publicity given wing "saving" by the Game, Fish and Cyster Commission last fall. Approximately 6,000 quail wings were mailed in by Texas hunters, of which 1663 came from the Panhandle counties. Accompanying the wings in most cases was a report on the number of hunters in the party, dogs used, conveys found and hours hunted. All this information will permit comparison of hunting conditions between localities and from year to year.

Full statistical treatment of the figures will not be presented here, since a joint report for Texas as a whole is in preparation. However—birds hatched in 1950 made up 79.2 percent of the 1663 bobwhites from the Panhandle kill. Among the young, 48.2 percent were males. Usually this would be about the proportion of females, and is not far from normal for any year's hatch. Among the adult birds, approximately 60 percent were males; starting out about 50-50, the hens apparently suffer greater losses connected with nesting and rearing of young. The effects of this (and a good hatch) was to result in an average of 14.2 young birds in the bag per each old hen!

Few counties were represented by

enough wings to allow reliable conclusions to be drawn from separate treatment of the data. Hemphill county hunters led in the number of wings, 494, contributed to this study. This is believed to be close to a minimum for reliable representation. That it is reliable is indicated by the proportions of young birds, 198 cocks and 206 hens (13 young were sent in without record of sex). In this series of wings, the percent of young was 84.4 and there were 17 young birds per each adult hen! Again the partial explanation is seen in the adult sex-ratio: 65.2 percent were males. Plainly raising a family is hazardous work for Mrs. Bobwhite.

To the reader meeting facts like these for the first time it should be explained that these findings are not freakish and not unusual; so far as we know from a considerable body of data from previous investigations in Texas, as well as from other states, they represent more or less what is normal for "a good quail crop." The above figures do have implications for the hunter and landowner which should be stressed. These implications have to do with the population turnover in bobwhite quail.

Plainly, if our fall populations normally consist of from 70 to 80 percent young quail of the preceding hatch, we are dependent on young quail for our hunting; the population turns over too rapidly to allow more than one year's good hunting from a given generation of bobwhites. If the hatch fails, the quail crop plummets, regardless of the number left over from the preceding season, or whether the population was hunted or not. When this happens, neither restocking the range or closing the season is going to have much influence. You cannot stockpile bobwhite.

Bobwhite quail wings will again be collected next season. It is hoped that more sportsmen will cooperate, so that each county of the Panhandle's quail range will be represented in the data as reliably as was Hemphill County this past hunting season. Meanwhile, a great deal of credit is deserved by those hunters who contributed to the Panhandle's first bobwhite inventory.

ON A bright Sunday recently, a number of people gathered together early in the morning at a quaint little settlement called Union Valley. Its quaintness could be attributed to the fact that it was one of Texas' "ghost towns" which in some past day with its school and store, once thriving, contributed materially to the atmosphere of the surrounding countryside.

Perhaps you wonder the reason for this gathering. The stage was being set for another of the San Antonio Bird Dog and Quail Club's annual shooting and field dog trials! With a brace of dogs being run over from three to six one-hour courses a day, this proved to be an exciting event. In a few minutes the judges, handlers, gallery, dogs, and "water wagon" were all assembled to head for the starting point. Wending their way along the dusty road, the group doubtless thought of other days in the past when they had experienced similar feelings, those mixed feelings of anticipation, refreshment, and a warm glow inside that came with that its-good-to-be-alive feeling.



at the

Union Valley

Field Trials

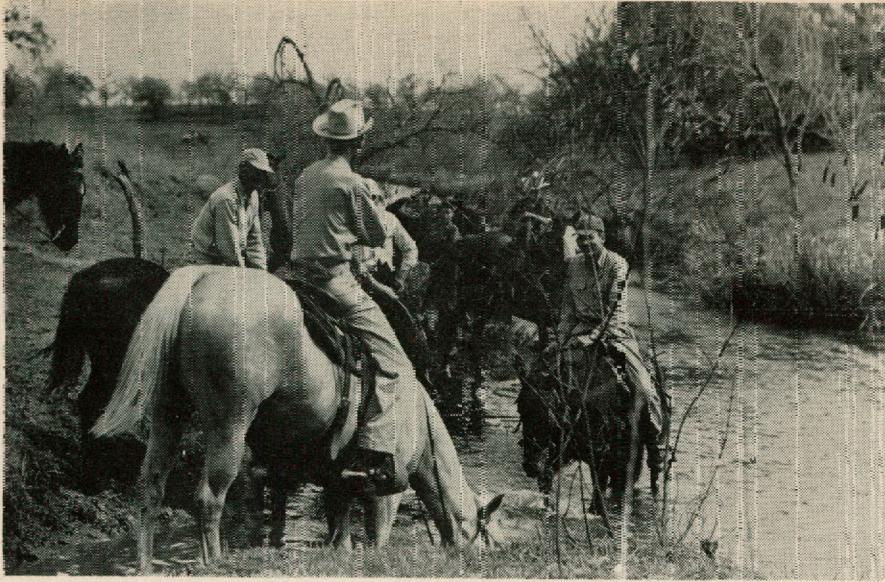
Before long, these thoughts were interrupted by arrival at the beginning of the first course and it was only a matter of minutes before the dogs were released and the merry chase began.



Working back and forth in front of the handlers and gallery, the dogs worked feverishly over the ground pointing and holding or flushing and going on . . . and the coveys of bobs were plentiful that day. When flushed they flew high over the heads of the on-lookers amid cries of "there they go!"

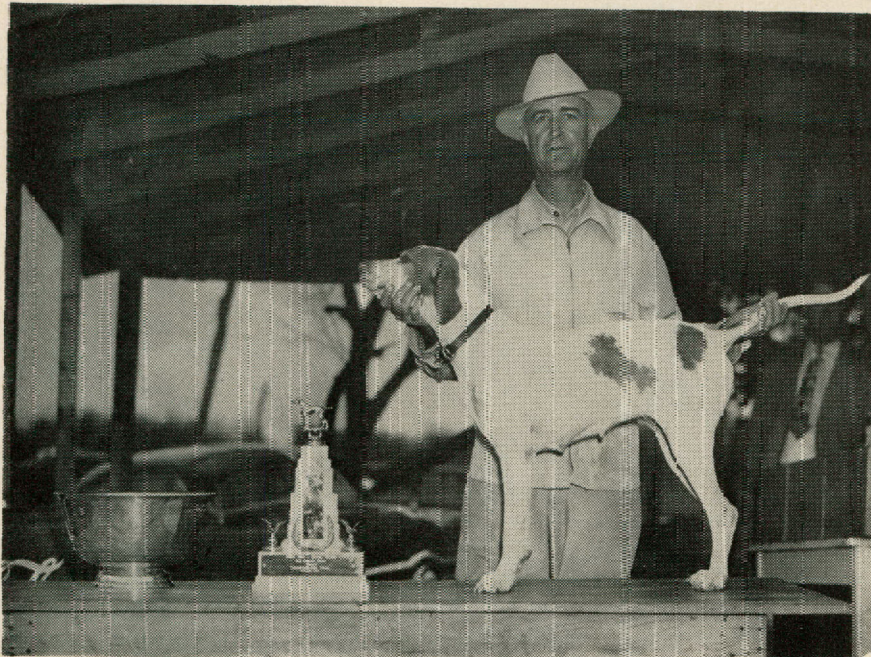
But the dogs frequently became hot, tired, and thirsty from their constant running as well they might on such a warm day, and were bathed and watered by the men riding in the jeep or "water wagon." Once refreshed though, they sprang up eagerly, again anxious to hunt and streaked away from the curious watchers in a never tiring effort to "hold 'em!"





Men too, and horses found pleasant refuge in a cool, inviting creek where the horses watered and the men shifted from one hard place in their saddle to another. Gratefully making the most of this chance to refresh themselves, some of the gallery lingered awhile beneath the overhanging limbs and vines.

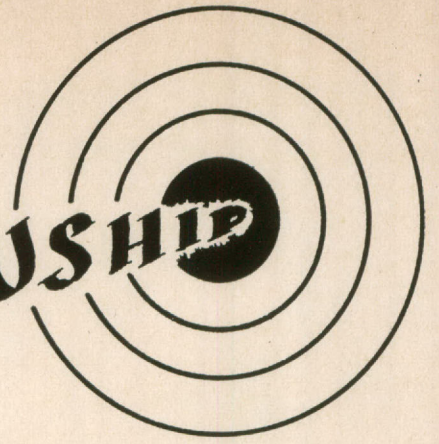
Catching up with the main body a little later they arrived perhaps just in time to see a handler release his dog from point after a successful "hold." The remainder of the course passed quickly and the race slowed in order to make the transition to another course. Two more courses were run by noon, and the wearied and hungry participants turned their mounts back toward the headquarters where a fine meal awaited them prepared by the local folks.



After lunch and congenial conversation, three more courses were run and the gallery witnessed much the same performance it had been their pleasure to watch earlier. After a truly full day, everyone agreed they were glad to be out of the saddle and on firm ground once more, though it was a safe bet that the majority would be back the next day for another event in this three-day meet. This year's winner of the shooting dog stakes was Heywood McDaniel, a long time member of the club and ardent enthusiast about bird dogs.

Three-Quarters of a
Century of Fine

MARKSMANSHIP



Although he shoots no more, Mr. Toepperwein is still active and has for a few interested Texas marksmen, a 2,500-acre ranch near Leon Springs where they may practice unhindered.

ADOLPH P. TOEPPERWEIN, aged 82, unchallenged holder of the greatest shooting record ever made at aerial targets, has retired after 50 years of professional exhibition shooting for Western-Winchester. In 76 years of shooting he never had a single shooting accident.

In company with his equally famous wife "Plinky" Toepperwein, who died in 1945, Toepperwein toured the country for half a century giving shooting exhibitions with rifles, shot-guns, pistols, and revolvers which were so popular that schools and colleges frequently closed down to give their students an opportunity to witness the marksmanship of the famous Texas Triggerman.

Tall, quiet, and unassuming, he was the idol of youngsters from coast to coast. Although no accurate records were kept, it is estimated that in his lifetime Toepperwein fired accurately three million rounds of ammunition.

Toepperwein's greatest feat was performed with a .22 caliber semi-automatic Winchester rifle Model 03 at the San Antonio Fair Grounds in 1906 when in ten days or 68½ hours of actual shooting time he broke 72,491 out of 72,500 aerial targets, beating the greatest previous record of 60,000 out of 60,650 targets made by Dr. W. F. Carver, marksman of Buffalo Bill's Wild West Show. No one since has ever attempted to try for

Toepperwein's record which will probably stand for all time.

Son of a Texan frontier gunsmith, Toepperwein was born in 1869 at Boerne, Texas. Before he was ten he became a marksman with a crossbow, a 14-gauge shotgun and a .22 caliber rifle. By the time he was 21, he had become a cartoonist for the San Antonio Daily Express and had become a local celebrity as a sharpshooter. After several years in big-time vaudeville performing a shooting act in B. F. Keith theatres, Toepperwein became chief exhibition shooter of the Winchester Repeating Arms Company of New Haven, Conn. In 1932 when Winchester was acquired by the Western Cartridge Company, Toepperwein continued as chief exhibition shooter for both Western and Winchester.

With his skill as a cartoonist Toepperwein originated the "bullet" drawing. In this feat he used his pet .22 caliber Winchester pump gun and approximately 300 bullets to produce a "picture" in about three minutes of rapid-fire marksmanship.

Toepperwein found his wife to be loading ammunition at Winchester. Elizabeth Servaty had never fired a gun until she met Toepperwein. Three weeks after he had begun her instruction in the use of a rifle, his wife had become so skillful that she was shooting chalk from between his fingers. This feat was later abandoned as a bad example to inexperienced shooters.

Under her husband's tutelage Mrs. Toepperwein became the greatest woman trapshooter of her time. Her greatest feat has never been equalled by either man or woman and consisted of breaking 1,952 out of 2,000 clay targets in 3 hours and 15 minutes of actual shooting time.

Mrs. Toepperwein was popularly known as "Plinky" from her habit of saying "Plink" when she pulled a trigger, and invented the word "Plinking" to describe the practice of shooting at random targets.

Toepperwein's last exhibitions with his wife were held during World War II in training camps in the South and Southwest.

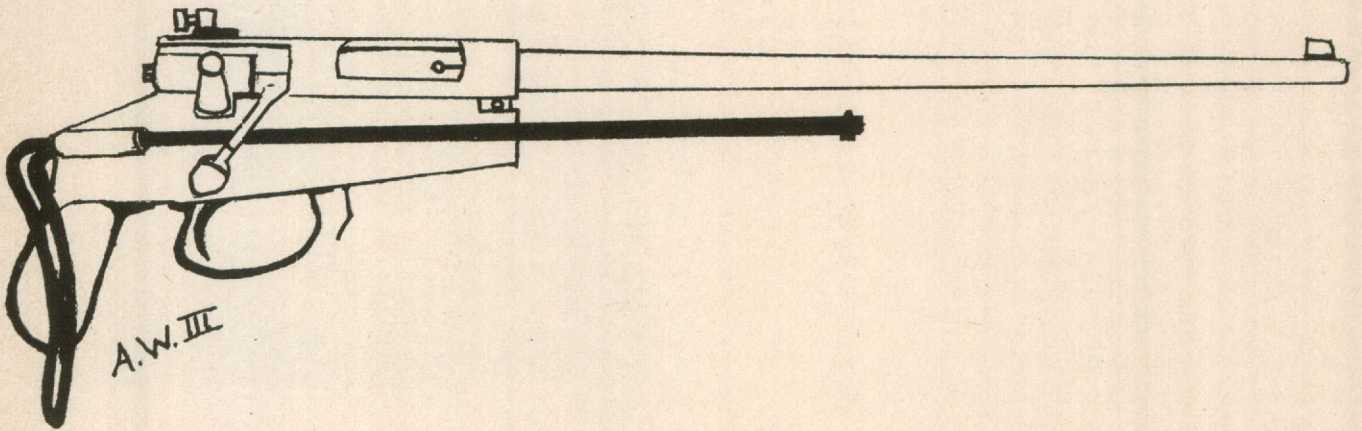
Toepperwein, in company with his equally famous wife, "Plinky," toured the country for half a century. Mrs. Toepperwein was the greatest woman trapshooter of her time.



Taken at the San Antonio Fair in 1906, this picture shows a small portion of the blocks which A. P. Toepperwein used to set the world's record in aerial target shooting. Young Toepperwein is seated atop the blocks.

A "New" in the Rifle World

By ADAM WILSON III



This sketch shows the general appearance of the new Survival Pack Rifle. It is chambered for the .22 Hornet cartridge.

"NOW, wouldn't that be sump-in'?" Those words I murmured to myself when I first received the news through the National Rifle Association of the Survival Pack Rifle which the Air Force recently put into use. Wouldn't it make a neat, compact little arm to tuck away in a range-rider's V-8, or to holster on a fence-rider's saddle—or, just to have around the house for general summer targets?

It is a Winchester Model 43 .22 caliber Hornet, modified to fit into the Air Force's survival kit for the purpose of serving surviving crew members after being forced down in any type of unknown terrain. Often during a single flight, our long-winded and far-reaching planes of today will carry men over remote sections of snow, sand, and jungle. A downed plane in any of that type of country—maybe a hundred miles, or more, from civilization—can mean that its

surviving occupants, or men who have parachuted down, may have to live off the land for days or weeks.

Ordnance experts of the Strategic Air Command saw the vital need for an accurate, compact and light rifle—not only for the purpose of providing food, but for personal protection. Consequently, the converted Model 43 was developed and has been included among the other essentials of existence in the flying survival pack.

Disassembled, the weapon fits snugly into a 15-inch by 2-inch package, and weighs a mere three and one-half pounds. When ready for action, with the sliding, heavy wire stock extended, it has an over-all length of thirty-three inches. The 45-grain Hornet bullet slips through a fourteen-inch detachable barrel.

When the Hornet missile, traveling at 2,650 feet per second, is delivered into a vital area, killing power is sufficient—even on large game animals.

I have dropped some heavy animals in their tracks with my Hornets—brain and spine shots being the rule. On small game the Hornet caliber performs very well, as it is accurate enough to clip off heads and not damage good meat. Naturally, the folding and sliding stock models of any firearm can not be held as true as the regular standard stock models, but I have found them surprisingly accurate at moderate ranges. At the testing grounds of the survival rifle, inexperienced men made four-inch groups at one hundred yards.

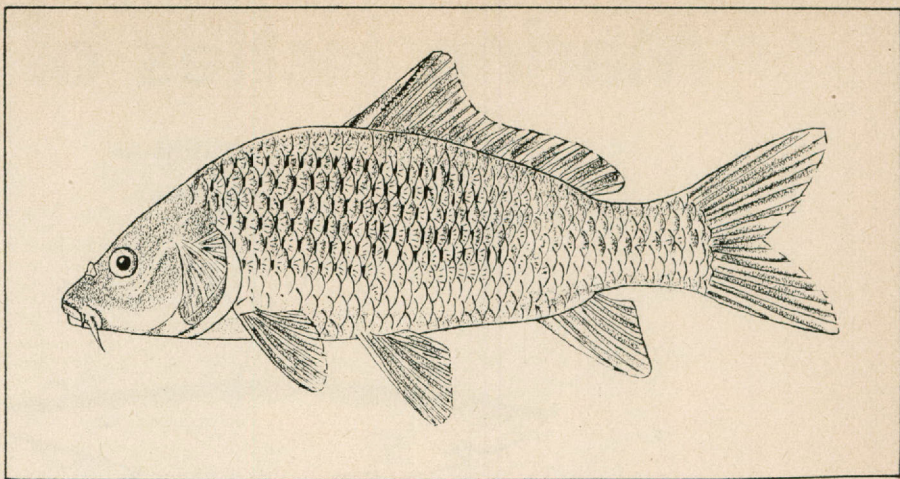
At the present time, of course, the SAC's little Hornet is the property of Uncle Sam, and it is not in reach of even our finger tips; but, it is interesting to all gunbugs to know that such a gadget exists—and, maybe there will be a time when we can have the privilege of playing around with one of them . . . at our leisure and on home ground, that is.

Fishes of Texas

European Carp

By MARION TOOLE

Chief Aquatic Biologist



THE European carp, *Cyprinus carpio* is one of the foremost examples of how the introduction of an exotic animal species can cause a tremendous amount of trouble to game and fisheries workers after their introduction. Many people are constantly asking this writer why this or that species of fish is not placed in some particular lake the person is interested in and the writer always remembers the carp and checks thoroughly into what might be expected from the introduction of a new species into a lake before making or rejecting such an introduction.

Although this fish is known in the United States as a European carp, the fish originally came from China since it was introduced into Europe from China in 1227. The first successful introduction of carp into the United States is credited to R. Hessel who brought 345 carp into this country in 1877 for the U. S. Fish Commission. After much drum beating about the desirability of carp, the fish was introduced into Texas in 1881. At that time the U. S. Fish Commission had 941 applications for carp from Texas and all the applications but nine were filled. This fish was so well thought of, the Legislature, in 1881, made an appropriation of \$5000 and started the first state fish hatchery at Barton Springs, located at Austin, which was devoted to the propagation of the European carp. By 1885, bitter opposition had built up against the carp and the commission was abolished in that year by the Legislature, thus closing down the carp hatchery.

Ever since that year the fisheries workers of Texas have been trying to

undo the harm that was formerly done and have found that the distribution of the carp was performed most efficiently.

It should not be necessary to describe a carp because most anglers are familiar with the fish but for those who aren't, a short description follows: In shape, the carp is very similar to that of the buffalo fishes previously described. They are olivaceous in color, the upper part dark and the lower sides and belly yellowish and slightly red. They have a pointed snout that ends in a bluntly pointed nose and rather small mouth. One characteristic that sets them apart from buffalo fishes is the two pairs of barbels found on their upper maxillary or lip. The longest barbels grow from the corners of their mouth. Three varieties of carp are found. Those with large scales are the most numerous, followed by some with only a few scales on each side that are called mirror carp. Occasionally, one without scales may be caught and this latter variety of carp is called a leather carp.

Most of the waters in Texas must be suitable for them because they are found throughout the greater part of the state.

Carp eat various types of food, subsisting mainly on aquatic plant life, such as algae and rooted plants and to a lesser extent on insect larvae, crustaceans, mollusks and other small aquatic animals.

Spawning usually occurs during April and May. They spawn in much the same manner as buffalo fishes, whose spawning habits were described in the October, 1950, issue of TEXAS

GAME AND FISH. Carp concentrate in shallow areas for spawning and deposit their eggs on underwater plants and brush. One of our hatchery superintendents reported that he ran into such a concentration of carp and was able to walk through the mass of fish without their paying any attention to him. He further stated that he could easily club the fish at that time.

Fisheries workers of the Tennessee Valley Authority once attempted to control carp by letting the carp spawn and then dropping the lake level so the eggs would become exposed and be destroyed. This plan, however, did not prove feasible due to the fact that the carp continued their spawning activities over too long a period of time. An attempt will be made this spring on some of our reservoirs where aquatic biologists are stationed to control carp by treating the spawning areas with a chemical while the spawning activities of the carp are in progress.

Carp are caught by nets and seines mainly, but they can be taken by hook and line, if dough balls are used. The writer recently heard that marshmallows have been found to be an excellent substitute for dough balls. In fishing with hook and line, it is necessary to fish so the bait will lay on the stream or lake bottom. When a carp is hooked, he will put up quite a battle and give the angler some thrills before being landed.

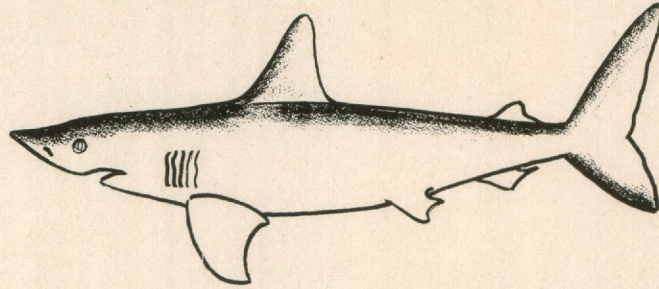
Economically, the carp is an undesirable fish for those persons desiring to maintain a good game fishing pop-

● Continued on Page 30

Marine Fishes of Texas

By J. L. BAUGHMAN

Chief Marine Biologist



The Blue Shark

THE great blue shark is a pelagic species, distributed throughout the temperate and tropical waters of the world.* In general, its range is similar to that of *Galeocerdo*. Vladykov (1935) reports it from the Nova Scotian banks; Bigelow and Schroeder (1927, 1940) regard it as fairly common in the Gulf of Maine. On the eastern side of the Atlantic it has been seen as far north as the Orkneys, and fishermen in the English channel consider it a nuisance, as it often destroys their nets in its efforts to reach the catch (Dunn, 1900). It is common in the Mediterranean; Fowler (1936) gives numerous West African occurrences, and Biden (1934) says that it reaches Mossel Bay, just east of the Cape of Good Hope. Blue sharks have been recorded several times from New Zealand (Philipps, 1927), while in Australia the species is considered dangerous to bathers, a fact mentioned both by MacCulloch (1926) and Cleland (1930). Numerous other records for eastern seas are also given by Fowler (1941).

Evidence of the presence of this shark in Texas waters is extremely doubtful. Fishermen at Freeport claim that they catch one occasionally, insisting that they are familiar with the shark from experience in other waters. The Mexican Servicio de Pesca lists the species from the waters of Tamau-

lipas, just south of the Texas border, with the remark that its chief utility is for the manufacture of fertilizer.

Living specimens are dark indigo-blue along the back, shading to a clear bright blue along the sides to snow-white below. They soon fade after death to a slaty or sooty gray.

Born at a length of 20 to 30 inches and maturing at about 7 to 8 feet, the blue shark grows commonly to 10 to 12 feet. While it is credited with reaching 15 to 20 feet, there is no positive proof of this. Because of their slender build recorded weights are only about 100 to 120 pounds at 7 feet to 8 feet and 150 to 200 pounds at 9 feet.

This is a pelagic shark, usually found at the surface. Well known to sperm-whalers, from their habit of gathering to gorge on the carcasses of whales, the food of this shark is predominantly fish, which are hunted more actively at night than during the day (Fowler, 1941). Dogfish, conger eels, and gurnards have all been taken from the stomach of one of these selachians, as have mackerel, garfish, and herring (Couch, 1877). Nichols and Murphy (1916) mention a booby (*Sula*) being eaten by another, and go on to state that it also consumes whelks, shell and all, as well as other mollusks. Data on a

Californian specimen are given by Kanakoff (1940).

Beebe (1934) caught a female off Bermuda which contained, on September 12, 25 embryos in each ovary. These were nearly fully developed and "would have been born before many weeks." In one ovary there were 13 males and 12 females. Inquiry as to the sex ratio of the other ovary was fruitless, notes on the subject having been misplaced.

Evidently such a number of embryos is not unusual. In *Field and Stream* for January, 1936, a photograph (p. 78) shows a female blue shark caught off Bermuda, which also contained 50 embryos, from 10 to 14 inches in length.

The flesh of these sharks is white and firm, and is used for food in some countries. Natives of the Philippines and other parts of the Orient eat it, and at one time it was an article of food among the poorer classes of Italy (Norman and Fraser, 1938). Occasionally a blue shark is sold as food in the California markets (Walford, 1935).

The skin is said to make excellent leather.

* This article is abridged from Baughman, J. L., and Stewart Springer, Biological and Economic Notes on the Sharks of the Gulf of Mexico. *Amer. Midl. Nat.*, July, 1950.

Letters

Dear Sirs:

Believing you would be interested as to the effects of this recent cold spell on birds and other wildlife, I am here giving you a report on my observations and experiences. After the blizzard hit this area, the ground as well as all vegetation was soon covered with ice. Lakes and many streams were frozen over, and it became necessary to feed not only our livestock but the birds and other wildlife as well. I had on hand a few sacks of corn chops and other ground feed, and I began spreading it where the birds could feed without being bothered by stock. Soon, many thousands of birds were swarming around the feed and even wild geese alighted in my deer lot where I have a few Canadians and a snow goose ranging with my deer.

While the 15 geese were circling, I gave them a few goose calls, with my honkers joining in. Soon, all were on the ground together. I hastened to get some feed, and when I entered the lot, I expected them to fly; however, my tame geese were saying something to the visitors. When I spread the feed on the ground, all the geese came marching toward me, and as I retreated, all began picking up the feed.

I have found many dead doves, robins, and other birds and tons of frozen speckled trout along the bays and nearby in the streams. Much loss of cattle is also reported. I have timber and good windbreaks in my pastures, and I fed alfalfa and dallis grass hay twice daily; therefore I suffered no loss.

I hope the sportsmen throughout the state complied with the request of our game department officials to help protect our game and bird life from starvation while Nature's feed basket was covered with ice.

F. H. HOBBS,
Pledger, Texas

(You not only had a highly satisfying personal experience, but you definitely contributed to the welfare of wildlife in your vicinity and set an example that others could well follow. THE EDITORS.)

Dear Sirs:

Let me congratulate you on the very fine and interesting sports magazine you are putting out. As I have hunted and fished in Texas since I was old enough to hold a rod or gun, your magazine really touches on old and familiar ground.

J. W. SIMONS, JR.,
2502 Stanford St.,
Houston 6, Texas

Dear Sirs:

I thought you might be interested in this picture of wild ducks I snapped during our recent cold spell.

ART KOWERT, Editor,
Fredericksburg Standard

(Thanks! It's amazing that these ducks were wise enough not to try to find open waters under such conditions. Maybe they had had the news that ice was on all the ponds all the way to the coast. THE EDITORS.)



Dear Sirs:

I have just recently seen a copy of the monthly magazine published by your department devoted to the protection and conservation of our native game and fish here in Texas.

I did not know that such a magazine was published in Texas; much less about Texas and its outdoor life.

Please inform me if this magazine is still available by the year.

CALVIN E. RIEDEL,
104 Medina,
Austin, Texas

(Yes; the rate is still \$1.00 per year, \$2.00 for 2 years, etc. TEXAS GAME AND FISH is not sold on the newsstand; therefore this may be one reason why you did not know that the Texas Game, Fish and Oyster Commission published a monthly conservation magazine. Since the magazine is state published, it is non-competitive and may be had only through subscriptions. THE EDITORS.)

Dear Mr. Dawson:

The sixth grade class of Pease School wants to thank you very much for taking us on a most interesting field trip at Friday Mountain Camp. You told us a great deal that we did not know. For example, you told us how important the five natural resources are.

We never did realize before how dependent we are on them. We also didn't know how low our water supply is and how shallow our topsoil is getting to be. You impressed upon us the importance of conservation and we owe our full gratitude to you for all of your help.

Sixth Grade Class,
By DAVID BARNETT,
JOHN FAINTER, and
BILLY DUFF.
Austin, Texas

(Pictures covering this field trip were published in the March issue of TEXAS GAME AND FISH along with the first of a series of articles on the basic needs for conservation of our wildlife and other natural resources. The author is Everett T. Dawson, Supervisor, Conservation Education, Texas Game, Fish and Oyster Commission. THE EDITORS.)

A B C'S FOR SPORTSMEN

IN a land founded upon the passionate desire for freedom, rules and regulations governing individual actions are always looked upon with askance, regardless of how necessary they may be for the general welfare. This is particularly true among a great many hunters and anglers, according to Henry P. Davis, public relations manager, Remington Arms Company, Inc.

"But," says Davis, "there is much more to sportsmanship than the mere practice of to-the-letter obedience to the game laws. A man may never violate a game law or break a club rule and still not be a real sportsman, for he may be refraining from doing these things because he has to, not because he wants to. Real sportsmanship cannot be defined or bounded by rules. It is imbedded in an inherent sense of fair play, which one may or may not possess. No rules can plant it in the inner man, but unless the sense of fair play is possessed and its dictates followed no man can rightfully wear the laurel of true sportsmanship.

"There are certain maxims, how-

ever, that are worthy of constant remembrance. Here they are:

Always practice safe gunhandling. Be considerate of the landowner.

You are his guest.

Conduct yourself as a SPORTSMAN should.

Don't be a game-hog.

Educate youth in the principles of sportsmanship.

Favor the fellow who is hunting with you.

Give wildlife a break. Work for its conservation.

Have the location of your hunting partner always in mind.

Influence others to hunt safely.

Join a sportsman's organization.

Keep that gun muzzle elevated.

Leave some game for seed-stock.

Make sure of your target before you shoot.

Never leave a cripple to go to waste.

Obey the game laws to the letter.

Put yourself in the other fellow's place. Treat him accordingly.

Quit harping about game shortages and do something about it.

Retrieve every piece of game you knock down.

Share your game bag with the farmer.

Take a boy, other than your own, hunting or fishing.

Unite your fellow sportsmen in a common effort to provide better hunting and fishing.

Value, and protect your privilege to own and bear firearms.

Work for all sound game management measures.

X may mark the spot if you mix gunpowder and alcohol.

Young America's future field sport depends on You.

Zeal in game restoration activities will pay big dividends.

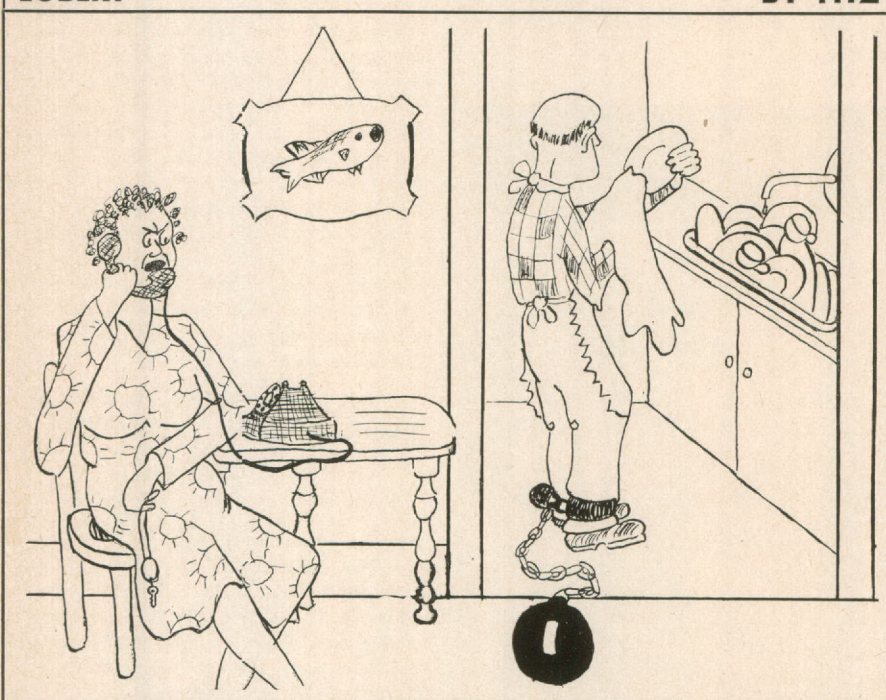
Fishes of Texas

• Continued from Page 27

ulation, but to the commercial fisherman, they are an important fish since most of our commercial fish catch is composed of carp. While carp are not considered on a par with buffalo fishes, they still are always marketable. The writer has eaten this fish and found it to be very good. Carp may be canned and when canned, proves to be on a par with the cheaper brands of salmon. In canning salmon, a one-half pound can is processed for eighty minutes at 240° F. (ten pounds of pressure) and a one-quarter pound can for seventy minutes. These processing figures should also be applicable for carp. The carp are also smoked and are said to excel smoked trout in quality.

EGBERT

BY FITZ



Egbert says to tell you he's all tied up today and can't go fishing.

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If you plan on draining or lowering your lake this winter—spring—or summer of 1951 to remove the undesirable fish such as carp, gar, suckers, spoonbill cat and buffalo—

Write or phone. We have the seines, nets and other equipment to do the job for you. We can go any place in Texas.

Louis W. Botary

BOX 133

Phone 2-6234

PALESTINE, TEXAS

laws that make a good job impossible, no matter how competent the staff.

There are many other factors that contribute to poor wildlife administration. Inadequate knowledge of game conditions is still one of the most common ones. There are still few states that have enough trained men on their staffs to gather the necessary information promptly, and promptness and accuracy of information are more necessary than ever before because of increasing hunting and fishing demand that comes from a constantly growing army of license buyers. Trained men are needed to determine the size of the wildlife crop each year, how much breeding stock is necessary to carry over in order to insure an adequate supply next year, and where and when the harvest can safely be made. There are few states that have completely adequate information on these factors and too many that still make regulations largely on the basis of political logrolling in legislatures or because of sportsmen's pressure on the administrators, who may have authority but no sound knowledge on which to base and defend their decisions. When the facts are available from which sound regulations can be made, it is necessary to have an adequate staff to enforce regulations.

Another potent factor in poor wildlife administration is lack of attention to essentials. For example, many state departments pay little attention to pollution of their waters. Some have no authority to force pollution abatement. As a result, too much time and effort—not to mention money—are spent in raising fish to dump into waters where they cannot survive, and in arguing with sportsmen's groups over the size limits and bag limits, and too little in providing water in which fish can live and grow. The same is true of many game problems. Too few states are engaged in large-scale habitat protection and restoration programs. It is increasingly common knowledge that habitat improvement and habitat protection are in the long run the best possible means yet discovered to produce game year after year.

The majority of the states have paid too little attention to education of the public. While the administrators may know their basic problems, few of them have adequate information staffs or adequate ways of placing wildlife information before the public. Too much of the overall educational effort is devoted to those who are already informed and too little in getting information to those who need to be informed. This criticism is more or less true of practically every conservation organization. Many departments are developing increasingly good information programs for sportsmen's groups, but few have made any sustained effort to get their problems before the much greater number of nonlicense buyers. Few are making specific efforts to reach the people on the land, or the children in the schools, although both groups are vitally important in any sane program of maintaining the wildlife resource.

When the basic factors that govern the production of wildlife in this country are considered, there is not too much cause for optimism. There is a constantly growing population on this continent. This is not true in all com-

munities since there are areas where human population is receding, but for the continent as a whole, more and more people will inevitably require more intensive use of land for human activities. This means a constantly decreasing habitat capable of producing wildlife. There is also a constantly increasing number of people who want to participate in the wildlife-resource harvest. So the problem becomes constantly more acute. A wildlife administrator does not have a happy lot. Even though he doubles the production of game in a given area, it avails little if the number of hunters doubles at the same time. There are no more pieces of game per individual than before and, consequently, there is no visible evidence of results of his work.

There is only one present answer to this problem and that is for interested sportsmen to become so thoroughly organized that they can force the removal of these handicaps to the best possible utilization of our wildlife resources. It has been demonstrated over and over again that conservation forces, when aroused, can take personal and partisan politics out of conservation organization. Politics can be kept out so long as a vigilant public opinion is present. But one thing is certain. Those politicians who like to pay their political debts with someone else's money are at it 24 hours a day. They will be chiseling in again as soon as vigilance is relaxed, no matter how perfect the legal setup may be.

There have been many instances where well-staffed and adequately informed conservation departments have rallied sufficient sportsmen and conservation support to resist the pressures for unsound measures brought by less informed hunting and fishing groups. This is a function that only intelligent sportsmen's organizations can perform, but one that is vitally necessary if public hunting and fishing is to continue. Sportsmen's groups, sufficiently aroused, have demonstrated that they can secure sound legislation on which a good program can be built. If, as sometimes happens, the politicians are able to block them for a time, there are ways to beat them.

Sportsmen's groups can do the greatest service to their own interests and to the interests of America by insisting that their state conservation department be free from partisan and personal political interference, that it have adequate authority, that it resist ignorant pressures from hunting and fishing groups, that it have an adequate law enforcement staff, adequate personnel to make accurate inventory of game stocks each season and trained research men to work on its problems, that it have a sound educational program, and that it devote its funds to sound basic work to produce more fish and wildlife.

Too much personal prejudice has entered into the conservation picture in the past. The things that are needed in the state departments are a sound program, good personnel and solid public support. If it were possible to have an organization with these qualities in each of the 48 states, we would have a greater impetus for better hunting and fishing and greater insurance for the future of wildlife than any conservation step ever taken.

Reprinted, Courtesy SPORTS AFIELD Magazine.



BOOKS

WILDLIFE MANAGEMENT, by Ira N. Gabrielson, 274 xii pages. Illustrated with 41 half-tones. Published by the Macmillan Company, 60 Fifth Avenue, New York City 11, New York; 1950. Price \$4.50.

Because it places on permanent record the philosophies and ideas of the man who, as much as any other, has been responsible for raising the new science of wildlife management from uncoordinated, incoherent infancy to its present maturity, this book is destined to be ranked among the classics in the literature of the field. In his characteristic hard-hitting style, familiar to those who have read his former books and articles, Dr. Gabrielson, president of the Wildlife Management Institute, dissects the problems confronting sportsmen and game administrators with the calm and confident skill of an experienced surgeon.

Throughout this volume there is evident a strong thread of thought that frequently has been overlooked by less realistic appraisers of the wildlife picture as it exists today and as it has existed in days past. That is, that human activity and human needs for food, shelter, material goods and living space directly affect, for good or bad, the quality and quantity of wildlife that the continent produces. Man, in short has become the most potent ecological force next to climate in America. Fish and game, however, as natural products of soil and water, may be encouraged by deliberate action and sound administration to produce an annual surplus crop that may safely be harvested by hunters and anglers without damage to the resource.

In the pages of this book, Dr.

Gabrielson gives his suggestions as to how this may be accomplished. To meet the demands of an expanding number of hunters and fishermen for more fish and more wildlife, sportsmen and game administrators must work more closely together in the coming years. Antiquated concepts, which have their sole justification in that they are "popular," must be dropped by the wayside and replaced by more modern, scientifically sound ideas.

The final chapter poses the sixty-four dollar question that haunts the thoughts of many sportsmen and wildlife administrators as they look into the future: Can public hunting and fishing be maintained? Dr. Gabriel-

son's answer to this is, "Yes," followed by a series of strongly emphasized qualifications based largely upon the future attitude of the American sporting public. Public field sports, as we have known them in the past, can be maintained for many years more if the sportsmen insist that state wildlife programs be headed by capable trained men rather than political amateurs; if sportsmen's organizations forget their efforts to dictate the annual hunting and fishing regulations; if they curb outdoor lawlessness and improve the standards of conduct in their ranks; and if they develop widespread constructive self-help programs.

This volume rounds out a trilogy by the author covering the entire field of wildlife management and administration. Sportsmen, educators, wildlife biologists, and others who have "Wildlife Refuges" and "Wildlife Conservation," or who plan to get them, will want this book to round out the set. Those who do not have the previous volumes, however, are assured that this volume is quite capable of standing by itself.

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Wildlife and the Land

As an amateur conservationist, if there be such a classification, it occurs to us that the most practical wildlife management is accomplished through good land use. We see all about us a myriad of careless and thoroughly destructive practices designed, it would appear, to completely annihilate every vestige of beauty and pleasure that God has so amply provided for His children.

The aesthetic is not alone endangered, for unthinking people can innocently or with premeditation quickly and effectively destroy the very grass roots of our society. All of us are familiar in some part with these practices; pollution, illegal harvest of game, poor or wrong land use. The latter is a paramount factor in the outcome of this state's and this nation's future and if it continues as it has for so many years, we or more possibly our children will live to see the last of the very life we treasure so much wash and blow away with the soil.

The abundance of wildlife does not result from jurisdiction, sportsmen's gatherings, or bureaucratic dictates; it results from what we do with the land. The people cry YES! They want wildlife about them! They want it because it affords wholesome recreation for many, because it fills a definite gap in the balancing of the country's economy, and because it is the most satisfying medium of demonstrating good order in our house and is to all a heritage so valuable that it needs to be preserved along with the Constitution and our cherished freedoms.

Wildlife cannot be preserved unless man reconciles himself with it and finds a balanced way of life with it. Reconciliation comes in normal order when perfect balance is achieved. This means providing wildlife with a place to live, food to eat, and a secure, undisturbed life where normal procreation may continue.

By no means can all of this challenging job be done by refuges, parks, preserves, and other sanctuaries owned and operated by governmental agencies. These properties represent far too small an area. Neither can restocking and land management by biological technicians do the entire job, for the land must be ready for the species native to, or introduced upon it. The way to conservation is through good land management by whoever owns it.

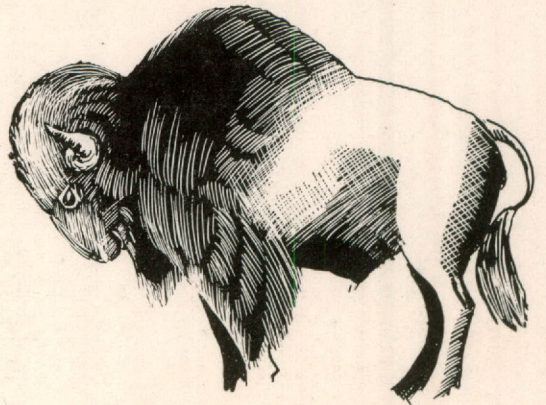
And this means everyone. Even without owning extensive land areas there are numerous ways of aiding this effort. They come to us almost daily in some form or another; it is up to us to recognize them and take advantage of them.

Join in this vital program that you may contribute to the future of the greater Texas—the greater America! We will thank you, your children will thank you, the wildlife will thank you, God will add His blessings, but above all you will thank yourself for yours will be a satisfying, soul enriching adventure in good living that cannot be matched elsewhere on earth!

—GENE PLUMMER

TEXAS' PAST

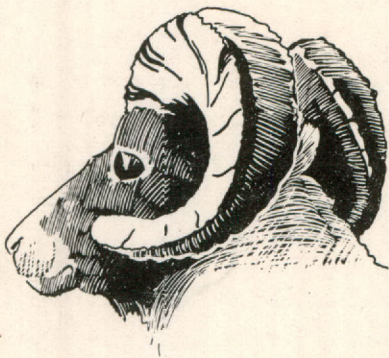
Big Game



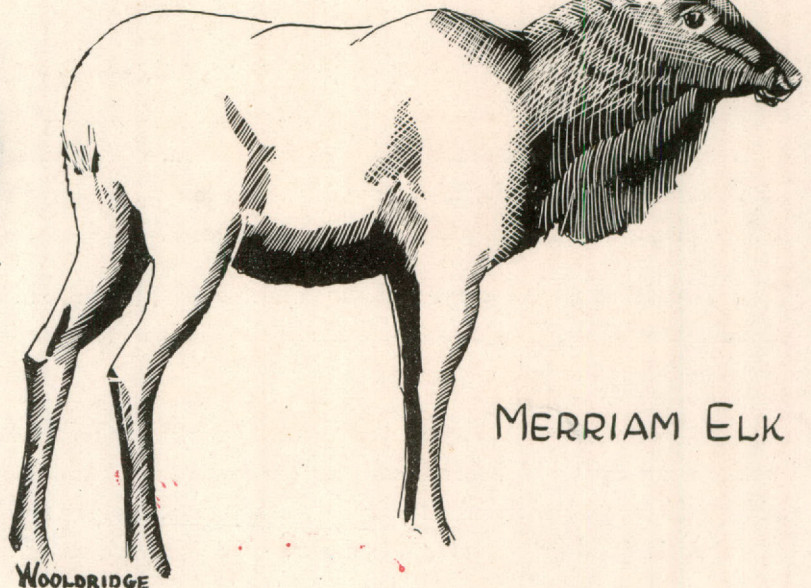
AMERICAN BISON



TEXAS GRIZZLY



TEXAS BIGHORN



MERRIAM ELK

WOOLDRIDGE