

Texas Game and Fish

JULY

1950

TEN CENTS



Price

PICTURE OF THE MONTH



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 is published monthly by the Texas Game, Fish and Oyster Commission. Subscription price \$1.00 per year. Single copies 10 cents each.

TEXAS GAME AND FISH regrets that it cannot continue subscriptions beyond date of expiration. Checks and money orders should be made payable to STATE GAME, FISH and OYSTER COMMISSION. Editorial and Advertising offices, Walton Building, Austin, Texas. Entered as second-class matter May 19, 1943, at the postoffice at Austin, Texas, under the Act of March 3, 1879.

Postmaster: If undeliverable, please notify TEXAS GAME AND FISH on form 3578-P at the Walton Building, Austin, Texas.

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COVER—By Orville O. Rice

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ROBERT G. MAUERMANN
Editor



The Cover

This month's cover is an exciting action picture of another favorite salt water game fish of the Texas Coast, the weakfish, or as it is more commonly known to Texas fishermen, the speckled trout. Fisheries authorities at a recent conference, after comparing all the common names by which this species is known, decided to adopt spotted squeteague as the official name. So fishermen your speckled trout are no longer speckled trout but squeteagues. Try that one on your old fishing partner.

THE STORY OF AN EGG

The simple hatching of an egg in a Texas coastal marsh has brought fresh hope to the entire field of wildlife management. The birth of the first Whooping Crane ever observed by man is history, but the excitement lingers endlessly for wildlife biologists. The fact that Rusty, the Whooper that hatched, disappeared mysteriously a few days later detracts mighty little from the momentous conquest which electrified scientists as well as the proud residents of the Lone Star State.

What happened to Rusty in the end is something for Nature to reveal if it will. Meanwhile, scientists seize the hatching as substantial new hope in the grim struggle to restore at least a segment of once abundant animal species. Rusty's untimely end, if anything, helps magnify the perils of progress and to attract fresh support for the program ahead.

The persistence of game management authorities leading up to this successful incubation typifies the tenacity with which scientists have clung to their objective and certainly justifies the effort and the expense involved. The results inspire wildlife biologists everywhere, particularly in Texas, and thus will have a far-reaching effect on the relentless drive forward in the vital program of wildlife restoration.

The fact that bringing back what man permitted to disappear from the fields and forests and marshes is a long and costly undertaking has proved no deterrent to the scientists assigned to this work. The rally by the Whooping Cranes is an example. These giant birds were thought to be extinct back in 1894. They had disappeared from their haunts primarily because no provision had been made at that time to offset the destruction of their breeding areas and the devastating shotgun blasts of waterfowl hunters who bagged the majestic Whoopers both for food and for

trophies. For example, Robert P. Allen, research associate of the National Audubon Society, in tracing the near-demise of the great birds, has compiled records of 400 actual killings of Whooping Cranes, mainly from old time hunters.

The first glow of hope for the Whooping Cranes came in 1936 when fourteen of them were seen on the Blackjack Peninsula on the Texas Gulf coast. The Department of the Interior, acting on the advice of the nation's wildlife specialists, later acquired the peninsula. This 47,000 acre tract now is known as the Aransas Federal Wildlife Refuge. It has been established and maintained for the benefit of both native and migratory species but for the primary benefit of the Whooping Cranes. Authorities consider it not an extravagant project since techniques are expected to be developed that will have a vital bearing on the entire wildlife management program.

Many mysteries incident to the life of the Whooping Cranes, as well as to the other precious species, remain unsolved. But the tireless field men already are capitalizing on the fresh inspiration and momentum obtained from the successful hatching in the

quiet Texas marsh. Furthermore, it will mean tremendous spearheads to clear the way for even more substantial gains. Countless thousands who may see these graceful giants of the sky fly to and from their summer nesting grounds presumed to be in northern Canada will be alerted. The authorities, by the relentless research already made and by the widespread contacts established, feel hopeful. For example, the painstaking survey of the Nebraska river areas where the Whoopers have been known to halt on their trips to and from the northland is counted on to avert recurrence of the tragedies in that area. There was acquired most of the data about the case histories of the 400 individual cranes known to have been shot by hunters around the turn of the century when the Whoopers were almost wiped out.

Now, the heartened scouts have figured it down to a fine margin. Robert Allen, of the Audubon Society, says the latest study shows the Whooping Cranes are losing at the rate of 3.6 a year against a gain of 4.2 per cent, on the basis of the current 37 Whoopers. Four young birds came to the Aransas Refuge wintering grounds last fall. Allen expects that at least four and maybe five will return this fall.

The exact starting point in their intriguing flight to the southland has never been known. Allen says the northbound birds simply disappear after stopping over briefly in Nebraska. It is believed they nest in north-central Alberta, Saskatchewan and Manitoba. Before civilization began changing the landscape and destroying wildlife habitats, Whooping Cranes formerly nested in the northern interior of the United States from northwestern Illinois, northern Iowa, southern and western Minnesota, the Dakotas and eastern and northern Montana and on into the far north. The last authentic record of their breed-



"Mac," the sole surviving member of a Louisiana colony of the rare Whooping Cranes, is shown in his burlap bag "straight-jacket" which was used to transport him to the Aransas National Wildlife Refuge near Austwell, Texas. (U. S. Fish and Wildlife Service Photo.)



These are two of the stars in the historic Aransas Wildlife Refuge drama. The mother, Jo, begins collecting material to build up a nest, preparatory to setting on what apparently was the first Whooping Crane egg ever hatched in captivity. (U. S. Fish and Wildlife Service Photo.)

ing in the United States was obtained in Iowa in 1894. The last reliable record of its breeding in Canada was in Saskatchewan in 1922. The migrating route southward is believed to include central North and South Dakota, Nebraska, Kansas, Oklahoma and eastern Texas. This tracing is based mainly on the regularity of visits in the spring and fall at the "Big Bend" of the River Platte in Central Nebraska. No information about sighting the birds in Kansas and Oklahoma has been reported in the last thirty years.

About 125 years ago, the giant birds existed in tremendous numbers in the interior of North America. One authority who saw a Whooping Crane migration along the Mississippi river in 1811, wrote: "The whole continent seemed as if giving up its quota of the species to swell the mighty host. The clamor of these numerous legions passing along high in the air seemed almost deafening . . . and as the vocal call continued nearly throughout the whole night without intermission, some idea may be formed of the immensity of the numbers now assembled on their annual journey to the regions of the

South."

The Whooping Crane stands over four feet tall and has a wingspread of approximately seven feet. The adult is pure white except for the black wingtips, black legs and black feet. It has a yellow bill and a red featherless head, chiefly the crown and cheeks. The plumage of the immature birds is whitish, blotched sometimes quite heavily, with rust color. The Whooping Crane flies with its neck stretched straight forward as all cranes do, but it cannot be confused with the Sandhill Crane because the species has no white in its plumage. When seen high in the air, or on the ground at great distances, the Whooping Crane may resemble certain other large white birds. Furthermore, the shape of the Whooping Crane when standing and flying is similar to that of the American Egret. The Whooping Crane, which is so named because of its distinctive calls, has an extremely long tracea, or wind-pipe, which is partly coiled up and encased in the breast bone and which if stretched out is nearly as long as the bird itself. The call notes arise within the lung-end

of the tracea. As they pass through the long neck by way of the tracea, they are tremendously amplified by resonance. The powerful cries can be heard three miles off on windless days when sound carries well.

The dance of the Whooping Crane is as distinctive as is their roted call. One description, by Lois Felcer in the Corpus Christi Caller Times, of the first courtship dance staged by Crip and Jo, father and mother of the Whooper born at the Aransas Refuge, was: "As they came close, Crip made the first movement of the dance—a hopping motion to the right with one wing half-raised. Jo touched the water's surface. Crip responded with bouncing, bobbing movements of his long legs. First one leg and then the other took his weight and he appeared to move his feet in much the same maneuvers as in a waltz. Now Jo, still half facing him, began to turn with her wing moving in a slow fan and her legs matching her partner's maneuvers. As she completed her turn away from him, both wings went up and she gave a slight bow.

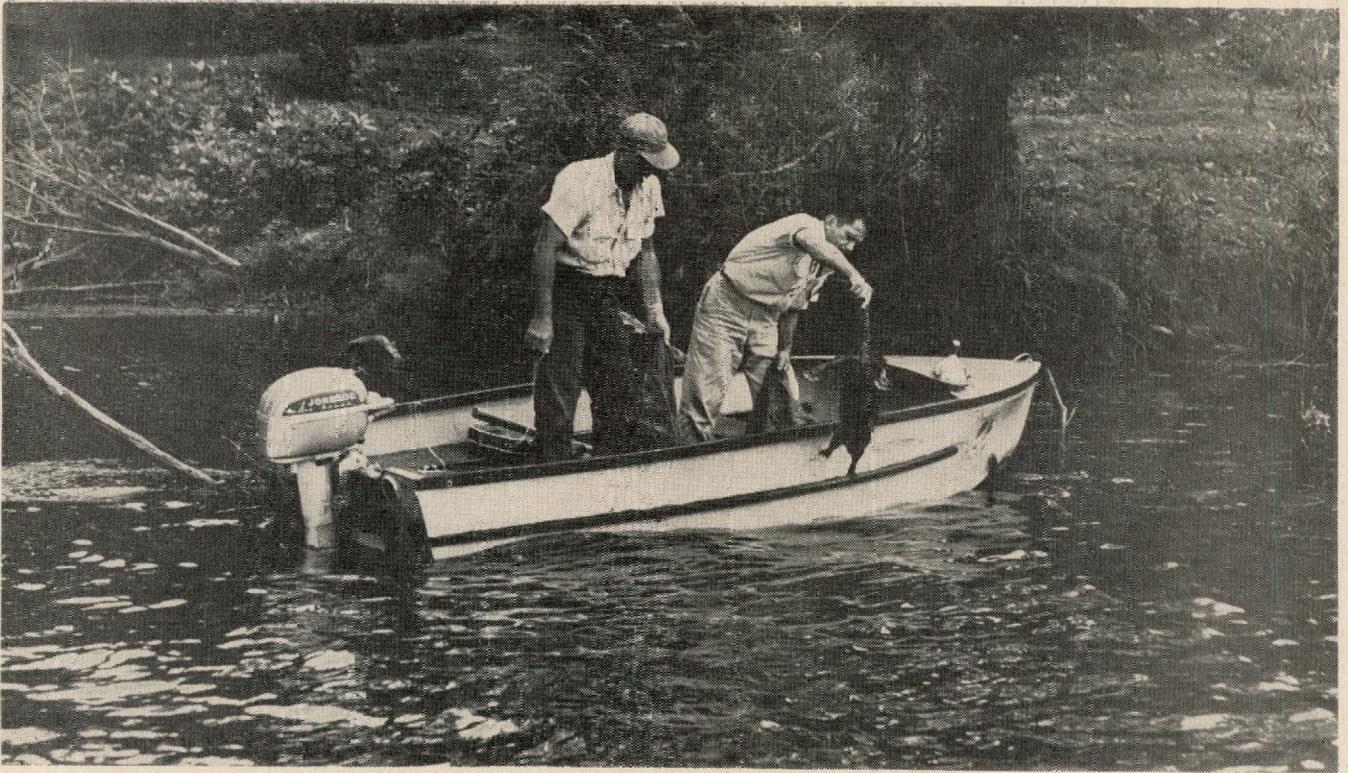
● Continued on Page 27

Weed Cutters Deluxe

In an experimental project, the Game, Fish and Oyster Commission released thirty nutria in Lake Austin. The small, fur-bearing animals are known for their vegetarian diet which reportedly qualifies them as weed cutters deluxe. The nutria which originated in South America have been extensively used in Louisiana from where the Texas shipment came. Game Department biologists will keep a close check on the animals to determine whether it is desirable to permit their development on a state-wide scale.

Willie Parker, of the Game Department staff, who trucked the nutria from Louisiana to Austin, is shown at the left, placing one of the animals in a sack held by one of the others several miles north of Robinson's place.





Game Warden Ben Gaddy (left above) and Willie Farker, of the Commission staff, handled the routine when 30 nutria were placed in Lake Austin. Parker, (left below) is shown handing one in a burlap sack to Gaddy.



SAND, SHELL, AND GRAVEL

By H. E. FAUBION

Assistant Executive Secretary

Texas is one of the richest states in the nation in natural resources, and we have just scratched the surface. The sand, shell and gravel business is not entirely in its infancy, but over a period of years, after a long and hard pull, the industry has moved up alongside some of the major industries of the state.

Texans are unaware of the regulations governing the taking of sand, shell, and gravel from public waters. Some do not yet realize that all the islands, reefs, bars, lakes and bays are under the jurisdiction of the state within tidewater limits from the most interior point seaward, co-extensive with state jurisdiction (three marine leagues or ten and one-half miles).

Within the interior of the state, such of the fresh water islands, lakes, rivers, creeks, and bayous as are not embraced in any survey of private land are under the jurisdiction and control of the state, insofar as the re-

moval of the sand and gravel is concerned.

All marl and sand of commercial value, and all shell, mudshell and sand deposited in the areas mentioned above, are under the management and control of the Game, Fish and Oyster Commission.

The law further provides that the Commission has full power and authority over the sale of sand, shell, and gravel taken from the areas described above under such rules and regulations as may be promulgated by the Commission.

Provision is made by law for the Commission to make refunds to the State Highway Department, counties, and municipalities on all sand, shell and gravel used on state highways, public roads and streets.

Sand, shell, and gravel may not be removed from the public waters of the state for any purpose by any person, firm or corporation until an applica-

tion has been filed with the Game, Fish and Oyster Commission and a permit has been issued authorizing the applicant to operate in said waters. A bond must be filed with each permit. The amount of the bond is determined by the total number of yards of sand, shell, or gravel to be removed monthly by the permit holder. The sale price, as authorized by the Commission, is seven cents per cubic yard for sand and mudshell and eight cents per cubic yard for gravel.

Monthly reports must be made to the Commission and a remittance must accompany each report to cover any removals made during the previous month. All sales must be made on a production basis as removals are made monthly from bay bottoms and river beds.

There is some confusion as to the definition of a public stream. The law provides that "all streams so far as they retain an average width of thirty feet from the mouth up shall be considered navigable streams within the meaning hereof, and they shall not be crossed by the lines of any survey."

If a riparian owner refuses to permit the holder of a sand, shell and gravel permit ingress and egress privileges to excavate sand, shell or gravel, condemnation proceedings may be instituted in the name of the state by the county attorney. These matters, however, are usually worked out on an equitable basis by the land owner and the permit holder.

Failure of a permit holder to comply with regulations set out in his permit issued by the Game, Fish and Oyster Commission is grounds for the cancellation of the permit. It is a violation of law for any person, firm, or corporation to remove any



Gravel operations on the Colorado River near Austin, Texas, in Travis County.

sand or gravel from the public streams of the state or to remove any shell from the bays without first having secured a permit to operate from the Game, Fish and Oyster Commission.

Following are the navigable fresh waters of the State: Angelina River, Aransas Creek, Atascosa River, Ayish Bayou, Bastrop Bayou, Brazos River, Buffalo Bayou, Canadian River, Cedar Lake Bayou, Cibola Creek, Clear Fork, Celita Creek, Colorado River, Cypress Creek, Devil's River, Dove Creek, Frio River, Guadalupe River, Hellbrandt Bayou, Lavaca River, Leon River, Leona River, Little River, Llano River, Medina River, Middle Concho River, Mission River, Navasota River, Navidad River, Neches River, North Concho River, Nueces River, Peach Creek, Pease River, Pecan Bayou, Pecos River, Pedernales River, Pine Island Bayou, Red River, Rio Grande River, Sabine River, San Bernard River, San Jacinto River, San Marcos River, San Saba River, South Concho River, Spring Creek, Sulphur River, Taylor's Bayou, Trinity River, Village Creek, West Fork and Wichita River.

The Commission has no control over sand and gravel removed from upland pits on private property. This is quite an industry within itself in some parts of the state and in many cases a source of revenue to the land owner.

In order to give further protection to oysters and public oyster beds and fish, the regulations promulgated by the Commission, among other restrictions, provide that no shell may be dredged in the bays within a radius of 1,500 feet of a commercial oyster reef. Mud and silt from power dredges in close proximity to an oyster reef or fish inhabiting areas may destroy the oysters and cause the fish to migrate. Proposed dredging locations are inspected by representatives of the department and after permits are issued for a given area, they are patrolled by coastal wardens.

The continued increase in the volume of sand, shell and gravel sales from year to year by the Commission is an indication that building is keeping pace with a growing population and with rapidly expanding industrial development. Texas sand goes into the manufacture of glass, sewer pipes, etc., as well as into the building of roads, streets and buildings, and mudshell into the manufacture of cement and many other useful commodities in daily use by industry.

The above right photo shows gravel stored along the river in preparation for shipment. The equipment shown in the lower right photo is used in loading gravel for shipment.

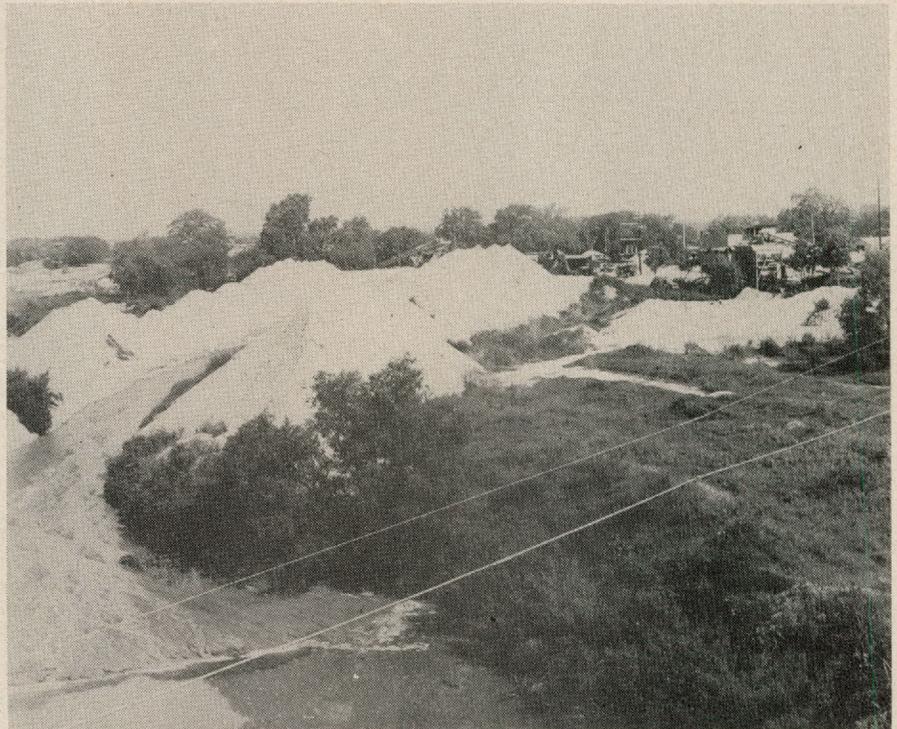
Game Birds Have Varied Life Spans After Banding

Records recently compiled by the United States Fish and Wildlife Service show that two game birds, bagged in Texas last fall, had varying life spans after they were banded.

A drake gadwall duck shot 20 miles west of Roma in Starr County on November 5 had been banded at Whitewater Lake, Manitoba, and released in Turtle Mountains, Manitoba, August 15, 1949.

A whitewing dove killed earlier in the season was banded south of Mission by Dr. George Saunders in July of the Fish and Wildlife Survey in July of 1940. Thus the bird had withstood the fire of gunners for nine years.

The data on these two extreme cases was supplied the game department by Charles G. Jones, Game Warden Supervisor stationed at Weslaco.



Adventures With



ROY BEDICHEK

WHILE observing a small creature, probably a warbler, early in the afternoon last April 25, I had my binoculars focused on a small bush when suddenly there alighted upon it three other birds—a male and female Painted Bunting and a male Blue Grosbeak.

All were in brilliant mating plumage—the male bunting indigo-blue and golden-green above with fiery red breast and underparts, its mate drab in comparison but still attractive in olive-green to greenish-yellow attire, and the Grosbeak all blue except for its chestnut-colored wingbars. After a long look I gave the binoculars to my wife. Nature provides few such striking pictures, and they should be shared.

We returned home more satisfied

than ever in our roles of greenhorn naturalists. We have been birding for two years and can identify only about sixty of the hundreds of birds that live around us. Can you do as well? If you can't but would like to, then join us as we tell about getting started at this fascinating pastime.

In these pages last month we advised beginning birders to first do two things—talk birds with a person who knows but doesn't claim to be an expert; and then buy a pair of good binoculars.

Assuming you have bored all your birding and non-birding friends with plans of what you are up to, and assuming that with your binoculars you have learned to distinguish between a flying Sparrow Hawk and a C-54 of the United States Air Force, the time has come for your first field trip with an experienced birder.

How to arrange a field trip? This is how we do it:

Many times, during the summer of 1948, we met Dr. Thomas P. Harrison, Jr. and Roy Bedichek after work hours at Barton Springs, our favorite swimming hole west of Austin, and talked birds. But we did not have the nerve to ask to be taken afield. So the year passed and so did half of 1949 before either invited us to join him on a bird walk—and the first to ask us was Dr. Harrison.

Dr. Harrison, a member of the English faculty of the University of Texas, and Mr. Bedichek, noted author of "Adventures With a Texas Naturalist," are men of different types—the first a restrained, kindly scholar of the old school, the second free as the wind in his far-ranging, stimulating conversation.

It was 6 a. m. on June 16, 1949, that we faced the test. During breakfast at Dr. Harrison's we attempted a little bird conversation, but after the second cup of coffee the good professor rescued us from our floundering by announcing it was time to go. We headed for Taylor's slough, a spot on Lake Austin known as a pretty good hole for white bass.

You ought to keep a list of every bird you see on every trip. No matter how commonplace the bird may be to you, write down its name the minute you see it. At the top of the list give the date, the place or places visited, and the hour the trip started and ended. (The experts include other information, such as wind direction and other weather data). File the lists. They will be useful in later years as a source of pleasure if not for scientific information. Dr. Harrison put us

on to the value of records, with the result that what otherwise would have been scattered and meaningless observations have gradually taken on at least the form of a system. But back to our trip.

I had never seen a Painted Bunting at that time and was eager to spot one. My wife had seen one on the coast earlier. If you are dead set on seeing a certain bird practically everything on wings will seem to you to be that particular creature. Others, therefore, are warned to do what I did not do—verify with your brains as well as your eyes. A bird fluttered above the trees as we neared the slough and to me it was a Painted Bunting. My more realistic companions, however, ruled that it was a male Summer Tanager.

My notes show that our next contributions to ornithological science were positive identifications of the Bluejays, Mockingbirds, Cardinals, English Sparrows, Mourning Doves, a Kingfisher, a Sparrow Hawk, a Turkey Vulture, and a male Red-wing Blackbird. Meanwhile Dr. Harrison was spotting both with his binoculars and his ears a multitude of species that to us were total strangers—the Yellow-billed Cuckoo, Carolina Chickadee, White-eyed Vireo, Canyon Wren, Bewick's Wren, Killdeer, Carolina Wren and Yellow-breasted Chat.

As he named off the strangers one by one our conversation diminished from cries of enthusiasm to a series of sounds best described in the singular as "Uh-huh." How could any one man know so many birds? We were whipped, and upon returning home gave considerable thought to junking the whole bird business in favor of canasta.

Six days later, however, we heard at Barton Springs a bird song that seemed familiar. We put our binoculars on the bird and identified it from our guide book as a Yellow-billed Cuckoo. We had heard the song without being able to see the singer in the thick trees while out with Dr. Harrison. So we had learned something on the trip, after all. Our enthusiasm for birding returned. And we never had really bought that canasta set anyway.

Being at least one bird further along, we now started looking forward in earnest to a bird walk with that grand man of the plains, prairies, and mountains, Roy Bedichek. But "Beddi"

By Fred D. Thompson

Two Naturalists

was busy writing his second book, "The Karankaway Country." Daily he arose at 5:30 a. m., started agonizing over sentences at 6, knocked off at noon for lunch and a nap and then fled to Barton's in mid-afternoon to escape Austin's summer heat. He birded only on Sunday mornings, generally with a companion. That much could be said with certainty. What wasn't certain was whether we could be considered fit birding companions. It wasn't that Mr. Bedichek was anti-social, for he isn't. But he is discriminating, and like all naturalists seems to hold with the cowboy philosopher Andy Adams, who after years of surveying the jackasseries of mankind concluded that "Horses make good company." However that may be, the invitation was extended on a Saturday afternoon late last summer. He said he would meet me at my home at 5:30 the next morning. This was said by the shaggy-browed sage in a tone that meant he would not be there at 5:29 a. m. or at 5:31 a. m. but precisely at 5:30 a. m.—and at that precise moment he knocked on my door.

A bird walk with Roy Bedichek is a spiritual adventure anchored to reason by a strong sense of humor. He can start talking about a bird, a tree, or a wild flower with the profundity of a cathedral organ and wind up with an anecdote that would have made Mark Train snicker. A bird walk with Mr. Bedichek also is a thing that makes young men old. I was a vigorous youngster of 43 on the day of our trip. When it ended shortly after noon we had loped over six miles of rolling mesquite country in the edge of Bastrop County. My ankles were swollen, my legs felt as heavy as oak logs, and I was puffing. On the contrary, Mr. Bedichek, who at 72 is neither young nor old but ageless, came in with clear eyes, breathing steadily and maintaining the long, even strides of a buck sergeant long-ing for promotion.

We had chosen the Bastrop County area in the hope of seeing a Verdin, a small elusive gray and white bird with a bright yellow head. He had seen it often in this locality. But it was a dull, mostly cloudy day and we saw no Verdins and only a few other species—a Crow, Mourning Dove, Carolina Chickadee, Spotted Sandpiper, Killdeer, Phoebe, Cardinal, Black Vulture, Carolina Wren, and finally a large white bird we spotted in a stock

tank and which Mr. Bedichek identified as a Little Blue Heron. I wanted to know why it was white and not blue as its name indicated it should be. The explanation: the bird was in an immature stage of development; later its feathers would become slaty-blue. Of course there were exceptions: some Little Blue Herons remain white throughout their lives.

They tell me after fifteen or twenty years, birding gets pretty simple.

We had been in the habit of walking as noiselessly as possible in tennis shoes or waders, hoping we wouldn't scare the birds away. That's how the books say to do it. There is a time for that kind of sleuthing, but Mr. Bedichek proved this was not it. He stormed into the woods in leather shoes and heavy leggings, kicking at rocks like a small boy, rattling limbs of dead trees and bushes, talking in a normal voice instead of whispering, and seeming to dare a bird to show itself or be heard. But this clatter paid off. The birds began to fly as we approached, usually alighting nearby. When they did settle down we closed in silently for a binocular kill.

If birding was dull that day, Nature had other attractions free to those who knew how to enjoy them. There were wild flowers. But Mr. Bedichek doesn't call them that. To him they are flowers, and the qualifying "wild" is a word applied by man in his arrogant assumption that what is grown in the hothouse is superior to that provided by Nature. A "Wild Verbena" to him simply does not exist. It is a Verbena.

Every birder takes with him into field a guide book to facilitate identification. Mr. Bedichek in addition takes along a guide book to the flowers. The book, incidentally, bears a title the silvery-haired naturalist must consider pointless if not downright irreverent—"Texas Wild Flowers," by Ellen D. Shulz. As he walks along in search of birds his eyes are also busy elsewhere, and if he sees a plant unfamiliar to him he takes time off to "run the key" until it is identified. If he can't figure it out in the field he takes the flower home for further study. Sometimes after a bird walk his jacket pockets are stuffed with plants.

"Running the key" was a new phrase to me, as I didn't study botany in college and had done no reading on the subject. It is a means of identifying any plant by going down a list of characteristics that can be eliminated or applied one by one until you know exactly what you are looking at. Like

birding, it is difficult at first. But the study of birds and flowers go so well together it should be taken up by all bird students. If nothing else it is a satisfying way to kill time when the birds are not flying. As curiosity develops, some birders will want to dig deeper into the broad relationship of trees, shrubs, and flowers to the bird life around them.

The trips with Dr. Harrison and Mr. Bedichek proved what we knew all along but had lost sight of in the whirl of wings—that people who know birds, like all other big people, don't grow horns. With their help, the help of others and a lot of prowling in the woods, my wife and I could now identify, for sure, a total of twenty-nine species of birds of the Austin region. That's not many but we felt pretty good about it. Then in April of this year we visited Mrs. Connie Hagar.

Her story is such a rich one it deserves full treatment, and it will appear in an early issue of this magazine. She lives at Rockport where she presides over one of the most amazing bird festivals in the world, one that she herself discovered fifteen years ago because she had eyes to see and a mind that appreciated the meaning of wave after wave of strange birds traveling to and from the far corners of the earth, stopping off at Rockport to rest and feed, to occasionally be shot at, and to be seen and studied by the more civilized. Yes, we went to visit Mrs. Hagar, feeling pretty good about knowing twenty-nine species of birds.

She showed us over 100 species and subspecies, all new to us, in one afternoon.



DR. T. P. HARRISON, JR.

Second in the series on the study of songbirds with binoculars.

FISHES OF TEXAS

The Bowfin

BY MARION TOOLE
Chief Aquatic Biologist

The bowfin, like the gar, is a fish generally hated and despised by the angler, although most anglers will agree that when one is hooked it's like having scaled dynamite on the end of their lines. While the bowfin is dissimilar to the gar in appearance, its general characteristics and history are quite similar.

As was pointed out in the preceding article on gars, during these past geological periods, conditions were evidently adverse for fishes because many of the primitive species have cellular air bladders that enable them either to breathe air for oxygen or to extract their oxygen from the water in which they swim. The ability to use the air bladder for an auxiliary breathing apparatus is extremely beneficial to a bowfin, since water conditions occasionally become unfit for supporting most kinds of fishes. Thanks to their special equipment, bowfins survive while other fishes are dying.

Rachel L. Carson (1943) says, "It is claimed that after the Louisiana fields have dried out enough for cultivation to begin, live bowfin are sometimes turned up by the plow." If this is true, then there is no doubt as to why bowfins predominate over other fishes in the waters in which the bowfins occur. Of course, other factors, the method of rearing their young and their predatory habits, also help them to win the battle of survival over the other fishes.

The bowfin, *amia calva* (Linnaeus), like other fishes, has a different common name in each different section of the United States. In Texas these fish are known as "grinzel" which was derived from the word "grindle" that is used in the central Mississippi valley. In Virginia it is known as a "John A. Grindle." Most people living along the White river in Arkansas know the fish by the name of "cypress trout" and "prairie bass." In the Great Lake region and the upper Mississippi valley they are "dog-fish," "bowfin," "mud-fish," and "mud-jack," while in Louisiana, they are chaupique.

As can be seen from the locations given with the various common names, this species of fish is found through many sections of the United States. In Texas, bowfins occur mainly in the eastern part of the state and along our coastal region. Their Texas range

usually stops with the Brazos river and doesn't extend west of the Brazos, but a fish, strange to the natives of Bastrop was caught from the Colorado river there and sent to the writer for identification. This fish proved to be a large female bowfin or grindle that evidently moved from the Brazos to the Colorado river by swimming a short way through the intercoastal canal.

Bowfins are usually found in large sluggish rivers and streams, bayous, sloughs, lakes, and ponds. The Texas waters, in which these fish occur, are usually slightly acid. Turbidity of the water apparently doesn't affect the fish, as they thrive in either muddy or clear water.

The bowfin is an easy fish to identify. The long dorsal fin along its back is different from the dorsal fin of nearly all other fresh water fish. This fin also has two longitudinal bands of darker color running its entire length. Bowfins have pairs of very short nasal barbels that make them look as if they are wearing small mustaches. These fish have secondary sexual characteristics that distinguish the male from the female. At the top of the base of the caudal or tail fin the male has a dark black spot bordered with yellow to bright orange. This spot is not apparent on the female. The body color of these fish is dark olive above that gradually lightens on the sides and below. The pectoral, ventral and anal fins are grassy green on the males. The females have drab fins.

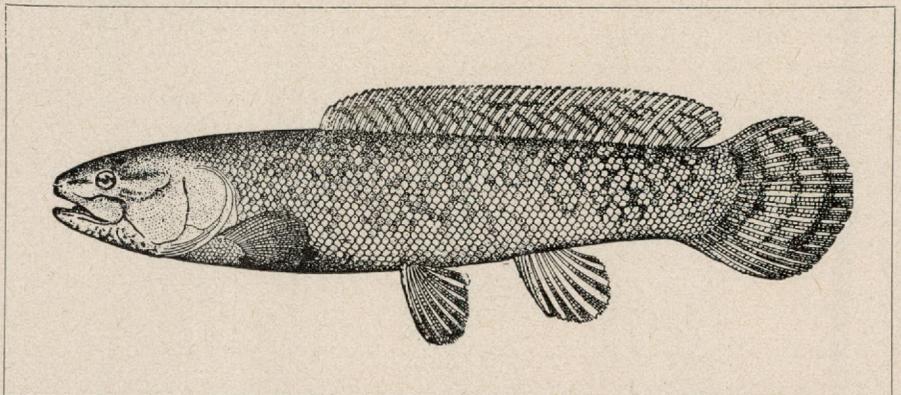
The breeding season of the bowfin ranges from the first part of April until about the middle part of July. The breeding habits are similar to that

of the black bass. The male makes a nest in the reed or cat-tail bed by biting and breaking off the vegetation until a depression is formed with sand, gravel or roots exposed suitable for receiving the eggs. The eggs hatch in ten days or less, depending on the water temperature. Of course the warmer the water the quicker the hatch. The male guards the young until they are ready to start swimming. Thereafter, the male accompanies the young and protects them until they gain a size of about four inches. The writer has heard of anglers accidentally rowing or paddling through a school of young bowfin with the result that the male viciously attacked and struck the oar or paddle repeatedly.

Although bowfin are far above the other fishes in affording protection to their young against predation, they in turn are one of the leading predators toward other fishes. Bowfin have sharp teeth that they put to vicious use against any fish, crayfish, etc., that they encounter. The writer has observed these fish feeding in a large aquarium, and they fall upon their food like a pack of hungry wolves. In captivity, they wouldn't eat fishes, living only on crayfish and beef heart, but in nature, a large portion of their diet is fish. Insects and mollusks are also consumed by the bowfin. Minnows and the young of other fishes, especially rough fishes, seem to be the size of fishes eaten.

These fish can be caught on frogs, shrimp, crayfish, and minnows when fishing with an ordinary pole and line. Many have been caught on artificial lures, especially spoons. Once a bowfin is hooked the angler always has a terrific struggle on hand because these fish are full of fight and are tenacious enough to keep fighting after most fish would have long given up.

As to their edibility, they are very inferior when eaten fresh; they are said to taste like cotton filled with paste. Yet some experts say that they are delicious when smoked with green hickory smoke. It might be well worth a try.



Texas Sports Shows



Sports-conscious Texans were attracted during the off-season to the indoor panorama of the great outdoors. The collective medium was a series of sports shows at key Texas cities—Houston, San Antonio, Fort Worth, and Dallas. Above, Game Warden Harley Berg discusses the nutria, one of the many animals exhibited by the Game, Fish and Oyster Commission at the various sports shows.



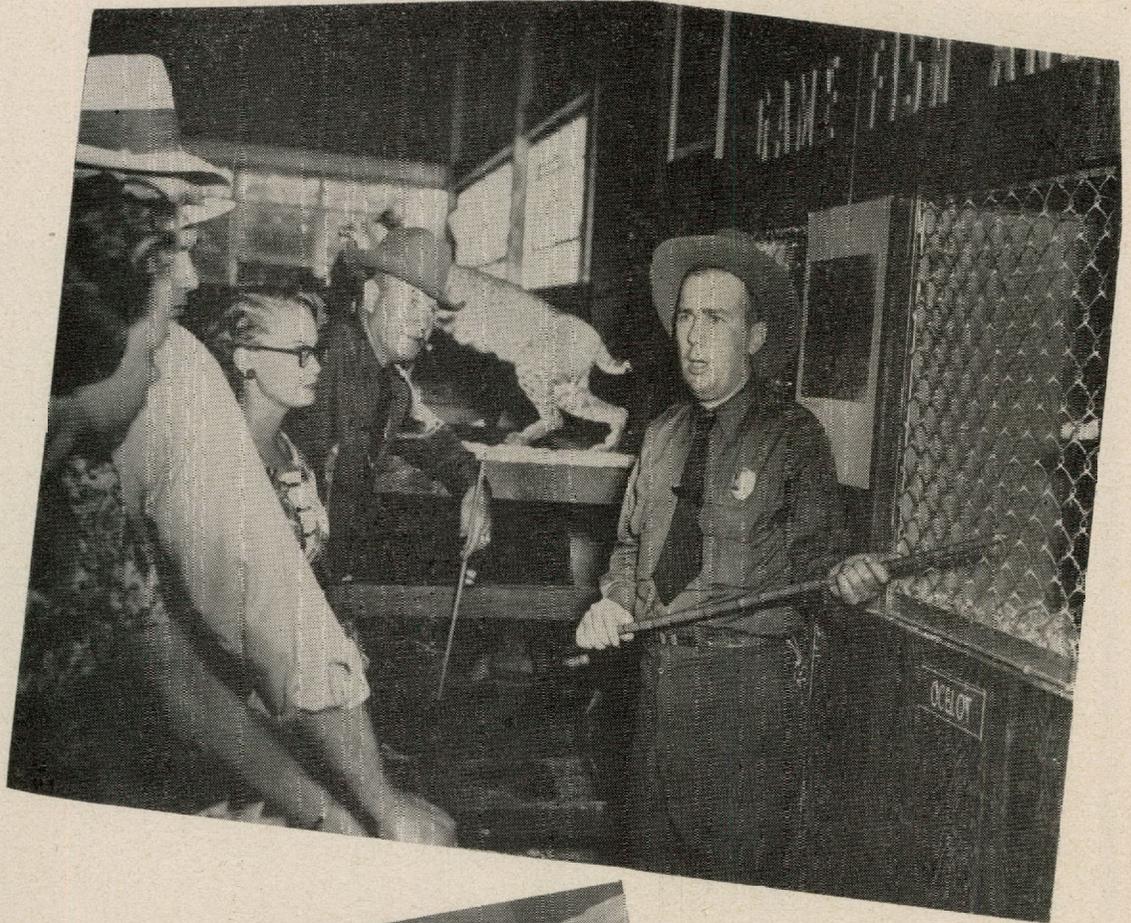
Subscriptions to TEXAS GAME AND FISH were sold at these shows. To the left, Helen Earle Black, of the Game Department staff, and Maxine Cross, wife of Game Warden Bob Cross, are busy "selling" a prospective subscriber. Below, Game Warden Martin Peterson describes the magazine to other interested persons while Miss Black completes a sale.



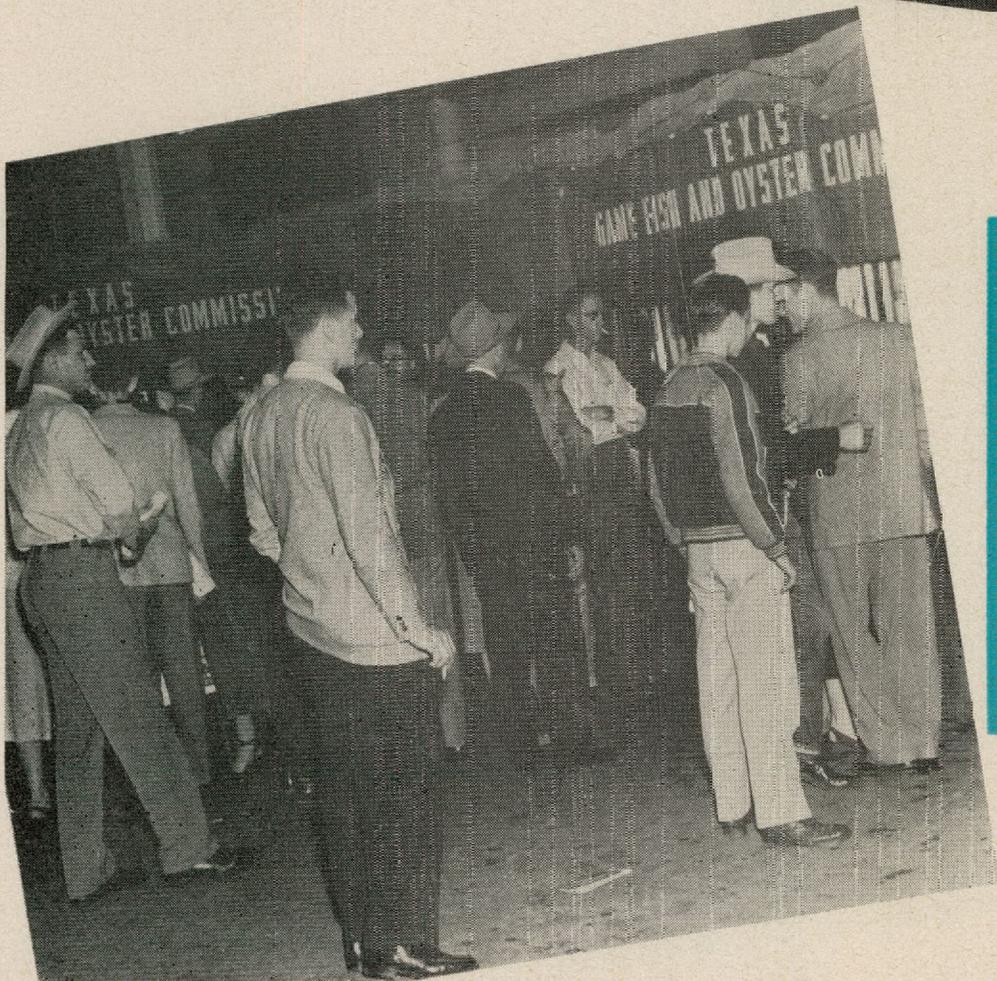


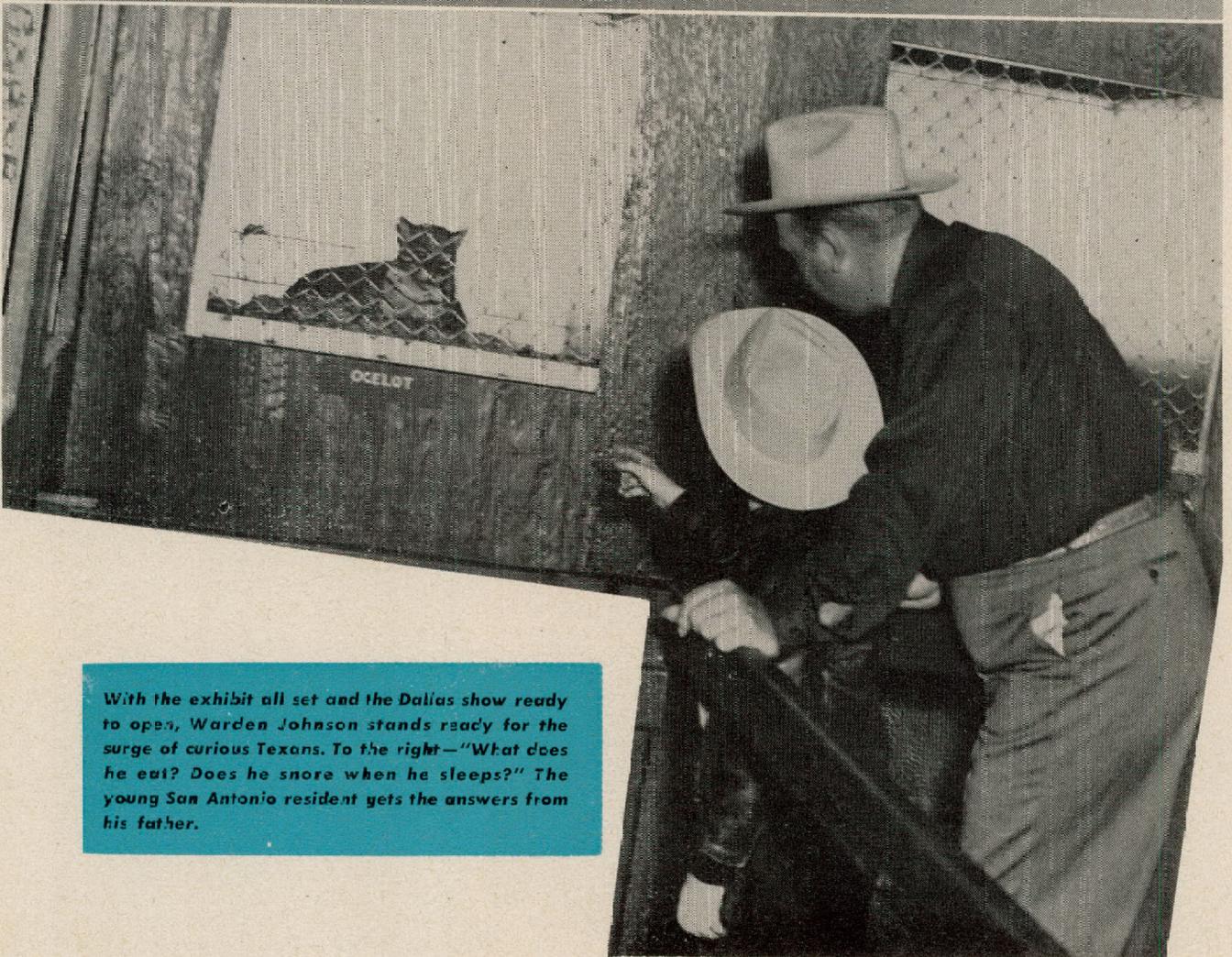
The young and the old found the Game Commission's exhibit both interesting and educational. To the left, a little girl, a wee-bit too short to see into an aquarium, is held by Game Warden Bob Cross and is told about the various species of fish that are on exhibition. Below, Game Warden Joe Matlock notes the quick maneuvering tactics of a fish through the use of its fins for steering and its tail for propulsion.





Game Warden Clifford Johnson points out the ocelot, giving its habitat and other related factors to the group of interested spectators. That's Game Warden Aubrey Stein of Dallas in the background. (Photo by Jack Beers.) Indicating the throngs that viewed the Game Department exhibit, this segment of a Houston crowd mills around the fish tanks.





With the exhibit all set and the Dallas show ready to open, Warden Johnson stands ready for the surge of curious Texans. To the right—"What does he eat? Does he snore when he sleeps?" The young San Antonio resident gets the answers from his father.

Let's Consider Chiggers

By RALPH POGUE

There is a little chigger,
and he isn't any bigger
Than the point of a
very small pin.
But the bump that he raises
itches like blazes
And that's where
the rub comes in.

IT'S SUMMERTIME and again the minute but mighty chigger comes forth to raise his big bump. Lying in wait among blackberry bushes, on lawns and in tall grass, this little red speck of a bug is probably responsible for more scratching and cursing in the Mid-West and South than all other insects combined. One can scarcely venture outdoors in early summer without picking up a few chiggers, and

tourists, children and persons with thin or sensitive skin are especially vulnerable to the pest.

There are precautions which can be taken to prevent much of the discomfort caused by chiggers, but first let us introduce you to "Mighty Mite" himself, whose name according to the scientists is no less than *Eutrombicula alfreddugesi*.

The chigger is really a mite and belongs to the Arachnids, the family of mites, spiders, ticks and scorpions. The chigger—the fellow who does the damage—is a juvenile delinquent. He is the newly-hatched baby or larval stage of the common, bright red, spider-like mite often seen in early spring crawling about in gardens and fields. In the southern states, the chigger is known as the "red spider." The pest is common in a wide range of habitat over most of the eastern, central and southern portions of the United States and different species are found in Central and South America.

To describe the life cycle of this colorful little pest, let's begin in late fall when chiggers hibernate. The adult spends the winter in an earthen cell an inch or so below the ground surface. After its emergence during the warm days of spring, the adult selects a humid, shady spot, lays its eggs, then crawls off and dies. The eggs hatch out into chiggers, whose sole ambitions are to become attached to a host. A "host" includes some 70 different forms of animal life ranging from rattlesnakes to birds and, of course, man. After a good meal, which requires three or four days, the chigger, if he hasn't already been scratched off, falls to the ground, sheds his skin and enters the "nymphal" stage. Later, he changes to the adult. Larvae have three pairs of legs; nymphs and adults have four.

We wish to remind you that Mighty Mite feeds upon man and other animals only in the infant or larval stage. The nymph and adult stages feed upon fecal droppings of insects and dead organic matter. In other words, the "old man" of the chigger is a scavenger of the insect world.

Advice on How to Get Chiggers.

The best way to get "loaded" with chiggers is to sit or lie down in areas where they abound. However, one can usually get sufficiently infested just by walking around, for while the chigger is very small, it is swift afoot. One observer found that an average healthy and hungry chigger can run a foot a minute. If a man could run as fast for his size, he would do better than 173 miles per hour for four consecutive hours before falling from exhaustion.

The chigger will usually run around on your flesh for an hour or so before settling down, probably because he is excited at finding so much to eat.

However, if he comes across a garter, belt, or a spot where the clothing fits tightly against the skin, he usually sits right down and goes to work. Some observers say he is probably too lazy to cross such obstacles while others maintain that belts or tight clothing offer him excellent footing so he can really dig in. At any rate, by placing a tight band around ankles and wrists, one can stop most chiggers there, and such locations are convenient for scratching.

The chigger does not chew. Neither does he burrow under the skin. Instead, he has a piercing and sucking mouth organ, something like that of a tick, only on a much smaller and more delicate scale. He frequently attaches at the base of a hair. Once the mouth organ is inserted, the chigger injects a fluid similar to that introduced by mosquitoes. The purpose of the fluid is to break down epidermal (skin) cells which are then sucked up through the mouth organs. These pre-digested cells, rather than blood, furnish the food. Whether intended or not, this fluid also causes the burning sensation which later develops into intense itching.

Soon after this attachment, there appears the red bump for which the chigger is famous. This bump is small when measured by the human eye but, compared to the size of the chigger that raises it, it is indeed a small mountain. A man, to equal such a feat, would have to raise a hill 180 feet in height. It is a good thing that the chigger is no bigger.

So far as is known, our American chiggers do not carry or transmit diseases in man. They do, however, cause Trombidiosis, which is merely a medical term for irritation caused by mites. Most people from the North, including New Englanders are apt to be seriously affected at first from attacks, and to them it is a real disease. But the greatest danger from chigger bites, scientists agree, is the possibility of secondary infection as a result of scratching.

Few tourists from northern states come to the South and Midwest in summer without inquiring locally what to do for chiggers. The usual reply is: "We scratch 'em." And, that is true for the most part. Few natives of chigger-infested areas pay more than passing notice to the pest. It has been said that if you'd take a native of a chigger-area to a region where no chiggers exist, he'd scratch all summer anyway from force of habit.

Very little was done about chigger control until during the last war, when the Armed Forces began losing thousands of man-hours of sleep due to attacks of the parasites. Many more man-hours were lost in hospital bunks because of secondary infections derived from scratching bites. Then, in the South Pacific, a chigger closely related

to our own transmitted a serious disease, scrub-typhus, to men in the military forces there.

Want to Start a Chigger Farm? Here's How.

So, when the chigger got to messing with the U. S. Army, he found himself in trouble. The army, not to be outdone by even the Mighty Mite, began "Operation Chigger." The parasite had to be studied first-hand and here was the first hurdle. Though chiggers are seemingly persistent creatures under natural conditions, they are hard to raise artificially for laboratory study. This was soon solved, however, and what was perhaps the first successful "chigger farm" was put into production. Each unit, which looked like a Rube Goldberg invention, consisted of a common box turtle in a wire cage suspended above a large glass funnel which emptied into a jar containing moist soil. Each turtle was staked out in a "chigger patch" until "loaded," then placed back in the wire cage. The larvae would feed on the tortoise until engorged, then drop through the funnel into the jar where they would develop into the nymph and adult stages. The adults were fed on mosquito eggs. How did the turtle scratch his chiggers? He didn't need to. The study disclosed that the larva apparently cause no discomfort or swelling in turtles or snakes as it does in birds and mammals.

After getting the low-down on the chigger, the Army, working in cooperation with the U. S. Bureau of Entomology and Plant Quarantine, investigated methods by which field uniforms could be impregnated with chemicals so that wearers would stay chigger-free for days. Over 6,000 different chemicals were tested, of which Diphenyl carbonate and Benzil gave the highest degree of protection through more washings of clothes in soap and water. The chemicals were applied at the rate of two grams per square foot of cloth.

Lindane which is 99 per cent pure benzene hexachloride, is a satisfactory repellent for both ticks and chiggers and may be used to impregnate clothing. It cannot stand as many washings as benzil but it is probably more readily available.

Powder of benzil, at a strength of 5%, dusted on outer clothing will give the wearer from 95 to 100 per cent protection for a week, according to the U. S. Bureau of Entomology and Plant Quarantine.

Dimethyl phtalate kills chiggers quickly and is found in some of the newer commercial brands of mosquito repellents. For best protection, spray the chemical on clothes or dip clothes in a water emulsion of it. Since it does not have lasting effects, treatment is required frequently, preferably just prior to entering infested areas.

Treating the feet, ankles and calves, or the shoes, stocking and trouser legs with a few pinches of ordinary sulphur, pyrethrum or derris powder will give temporary protection against chiggers. Taking a shower or bath with soap and water on returning home after several hours with the chiggers may help reduce the severity of attack. Hang infested clothing out in the hot sunshine, for if there is anything a chigger can't stand it is heat and dryness.

There Are Many Aids in Chigger Control

A number of household items will help relieve chigger bites, including ammonia, a weak solution of lysol, rubbing alcohol, camphor, vaseline, chloroform, iodine or fingernail polish. These materials will also kill the chigger.

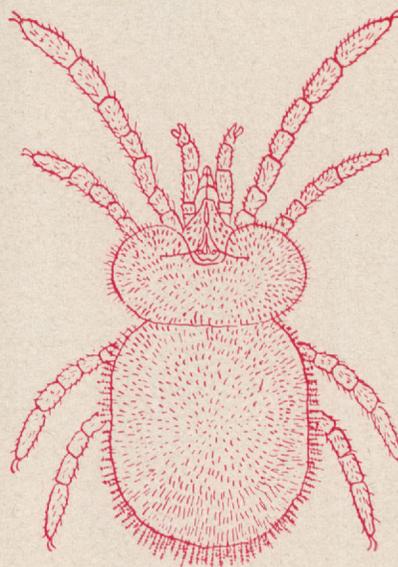
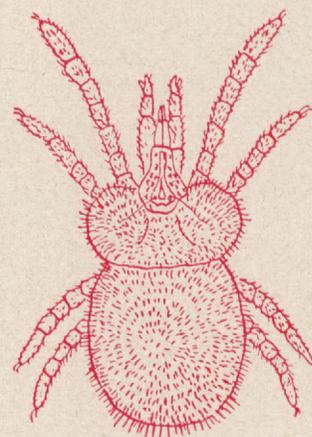
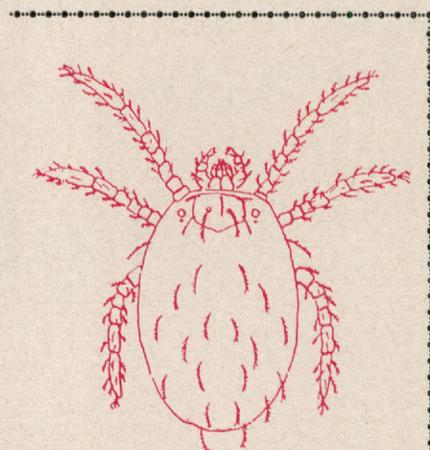
To control chiggers on lawns or on the ground, wettable sulphur in a 50% suspension in water will give good results when applied at the rate of about two and one-half pounds of spray per 1000 square feet. If sulphur is used in dry form, apply about one pound per each 1000 square feet. It should be applied two or three times during the peak of chigger season at intervals of 10 days to two weeks.

Lindane, 25% wettable, is recommended as a spray for lawns when mixed at the rate of two pounds to 100 gallons of water. Foliage should be thoroughly covered and repeat applications made at intervals of about three weeks. Another chemical, Dow-klor 40% wettable powder, produced by the Dow Chemical Company of Midland, Mich., is effective when applied in the same manner as Lindane except mixed at the rate of about four pounds per 100 gallons of water.

The life of the chigger isn't all fun and epidermal juice. He has a mortal enemy, the snout-bug. The snout-bug is a predacious mite known and feared among the mite world for his blood-thirstiness and homicidal mania. He is a quick little fellow and is equipped with a reverse gear so he can run backwards as well as forwards. It hasn't been determined as yet, although it is being studied, whether or not he can also run sideways. At any rate, the snout-bug has been observed to put a half-nelson on the chigger, then, with several rapidly successive strokes of his beak-like snout, deliver the *coup de grace*. After running amuck and waylaying some four or five chiggers in this manner, the snout mite then returns to the kicking, prostrate forms and leisurely sucks the juices from within their bodies, leaving nothing but shriveled exoskeleton.

So, if you choose not to do anything about chiggers but scratch them, you might at least pray for more snout-bugs.

—The Missouri Conservationist.



Top — Greatly enlarged larva of the chigger mite. Only the larvae feed upon animals. Other stages feed upon dead organic matter.

Middle — The nymph, or stage following engorgement of larva.

Bottom — The adult.

Texas Game Wardens Are College Trained

By WILLIAM H. JULIAN

"Public Relations is a planned program of policies and conduct that will build public confidence and increase public understanding."

That is the creed emphasized in the training of game wardens at the Agricultural and Mechanical College of Texas. The college Department of Wildlife Management, in cooperation with the Texas Game, Fish and Oyster Commission, trains fifteen to twenty carefully selected men each spring semester.

The qualifications of all men desiring to become state wardens are carefully checked in October each year by Frank Cowser, Director of Law Enforcement, Game, Fish and Oyster Commission. The top twenty-five men begin field work with experienced wardens in November. After two months of field work, the group is again screened and the fifteen or twenty top men work an additional month before reporting to Texas A. & M. in early February to begin the eighteen-week-training course. The men range

between the ages of twenty-one to thirty-five and must have a high school education or its equivalent. Veterans are given preference.

Far-sighted conservationists have realized the need for wardens trained in ways and means of educating the public. It is not hard to arrest a person for breaking a game law, but it is difficult to show that person the need for game laws and conservation.

The idea of creating a special training course for Texas wardens was put into effect in 1946, by Howard Dodgen, Executive Secretary of the Texas Game, Fish and Oyster Commission. Dr. W. B. Davis, Head of the A. & M. College Wildlife Management Department aided by E. T. Dawson organized the curriculum. The school was set up in the spring of 1946 with Dawson as instructor. Previously, Dawson was a Game Warden Supervisor for the Houston Region. He directed the school each spring until 1948, when he was made Supervisor of Wildlife Conservation Education for the state. James S. Smith, District Game Warden from Fort Worth, was appointed instructor in charge, and has directed the program since that date.

Law enforcement in upland areas is still relatively new, Dodgen told the 1950 class. "Enforcement of game and fish laws is unlike any other type of law enforcement," he said. "Many people believe in the old code of killing wild game when and where it is found. These same people believe that stealing property under a fixed value is a misdemeanor, yet they think killing quail on another person's land out of season is all right."

"Many people," he continued, "believe in enforcing all game laws only where the other person is being disciplined. Because of the large hunting territory, observance of the game law is largely a matter of respect for the law. Thus the need for men trained to lead the public has come to be important. The answer to all problems cannot be solved in any classroom, but the training received at A. & M. will be found to be very helpful in meeting situations as they arise."

The usual load for a regular student at Texas A. & M. College is seventeen to twenty-one semester hours. Prospective wardens carry the equivalent of twenty-three semester hours. The course in public relations receives the most emphasis. Here the pattern of procedure for a warden taking over a new district is stressed. Outside speakers—wildlife managers, biologists, newspaper men, public officials, and other leaders in conservation are heard.

Another course deals with game and fish laws. This course covers completely all general and special laws. Proper court procedure and methods of keeping complete and accurate records are also taught. A special science course explains measures to detect and prevent pollution. The English department cooperates by offering a course in public speaking. The latest developments in audio-visual aids are taught by the Industrial Education



James S. Smith is in charge of the training of game wardens at the Agricultural and Mechanical College of Texas. The college Department of Wildlife Management, in co-operation with the Game, Fish and Oyster Commission, trains from fifteen to twenty men each spring semester.



On May 29, seventeen men finished the required course at A. & M. College which qualifies them for appointment as Texas game wardens. They are, left to right, bottom row: Carl Putnam, to be stationed at Carrizo Springs; George Johnson, Port Lavaca; Harold Martin, Beaumont; Billy M. Sprott, Stinnett; W. A. Gentry, Sanderson; Second row: Garth D. Christopher, Liberty; Harold Bierman, Fort Worth; Max Kluge, Corpus Christi; Charles H. Lawrence, Nacogdoches; Third row: Starkey V. Whitehorn, Canadian; Newton F. Pennington, Raymondville; William Pratt, Dallas; William T. Harris, Woodboro; Fourth row: Jim White, instructor; Jim Pond, Eagle Pass; Olan H. Davis, Bryan; Calhoun Lovelace, Canyon; and Charles Keller, Childress.

Department. Game wardens are also given the opportunity to review the movies in the film library of the Game, Fish and Oyster Commission to help them in their work with the various sportsmen's clubs and organizations.

The Wildlife Management Department presents three courses to round out the curriculum: General Conservation and Management Practices; A Natural History of Vertebrates, stressing life histories and identification of important species; and Conservation and Management of Fishes, with emphasis on the farm fishpond.

In addition to these semester length courses, there are week-end field trips to fish hatcheries, lakes, ponds, game preserves and wildlife refuges. There is also a three-day trip to a large lake where departmental equipment is demonstrated and used.

Upon the successful completion of the courses offered by the school, the new warden begins work at once. Sixty men have finished the warden school from '46 to '49. Only four of these have resigned. One was killed in an auto accident while on duty.

"I believe the small number of men who change to other work is a direct result of the careful screening of the candidates; and that in itself is a recommendation to the warden's profession," said instructor Smith.

"A game warden's job has many phases other than that of arresting law violators," Dodgen told the wardens. "A warden's main job is to sell the public on the program of wildlife conservation." But it is also more than just education and enforcement. The most important asset that a successful warden can have is common sense, the Commission executive emphasized.

Bob-tailed Kittens



The two pet bobcats belonging to the Young family were spoon-fed milk until old enough to drink it from a saucer. Their diet was then supplemented with canned cat and dog food.

Photography is the hobby of Raymond H. Sharpe, who made the pictures in the accompanying article. Mr. Sharpe is employed as Patrol Inspector, United States Border Patrol, and is stationed at Brownsville.

As tame as any other pair of house kittens and maybe more friendly, the pet bobcats were soon pals with the family dog.



About ten months ago, Gay Young, of Brownsville, and her brother, Buford, went rabbit hunting. However, their kill was of a different nature; it was a bobcat. And after killing it, they heard a peculiar noise, a cross between a meow and a growl, which investigation proved came from one of three young bobcats about ten to fifteen days old. The kittens were presumably the young of the bobcat just killed.

Gay and Buford were successful in raising two of the kittens. The kittens' diet consisted of milk from a spoon until they were old enough to take it from a saucer. Later, they were fed canned cat and dog food.

The cats became very tame, playing in and around the Young home, even making friends with the family dog. They rode in a car just as any other pair of tame house kittens.

However, at the age of ten months, the cats became restless, and even though they were still friendly, the Youngs started keeping them indoors at all times. They were only taken out for exercise two times daily.

At this same time, Mr. Young became confined for a week with the flu. A little later, the cats became ill, too, and soon after died. The veterinary says they may have caught the flu.



Gay Young, of Brownsville, takes her pet bobcats for a stroll on Boca Chica Beach. Gay, a graduate of El Jardin high school, enjoys hunting and fishing as well as other sports.

Marine Fishes of Texas

THE SHARKS

By J. L. Baughman
Chief Marine Biologist



The next marine fish-like vertebrates in the evolutionary scale occurring in Texas waters are the sharks. These are members of a class of animals called, in formal ichthyology, the elasmobranchs. They are distinguished from the true fish, or bony fishes, mainly by the fact that their skeleton is not of bone, but of cartilage or gristle.

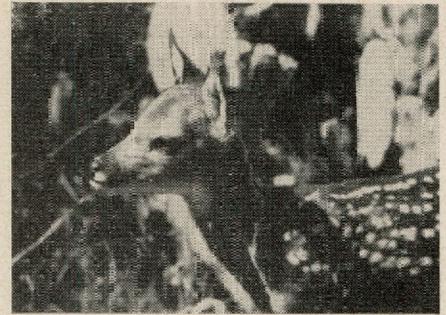
The old Hawaiian kings preferred to use human bait for sharks. It was cheaper than pigs and just as acceptable to the sharks. Most sharks, however, are not man-eaters. Ranging in size from a few inches long to prehistoric monsters 100 feet in length and 120 tons in weight, the multiplicity of things taken from their stomach well earns them the title of garbage cans of the sea.

Ever since the earliest man, sharks have exercised as great a fascination on the popular imagination as do the lions and tigers of the land. The idea that a fish may be large enough, strong enough, and well enough armed, to destroy man is a never-ending source of wonder and comment. It is true that at times sharks do attack and destroy swimmers; yet, despite popular belief, sharks do not hunt human prey as the puma does deer,

or the otter, fish. They merely gather him in as an unexpected, but nevertheless delightful, tidbit.

As a matter of fact, the two largest sharks of all would have great difficulty eating man, even if they wanted to, so small are their teeth, and so ill fitted are they for consuming any food except the minute plankton of the sea. These are the huge basking sharks of the Arctic regions, which may reach a length of thirty or forty feet, and are hunted for their oil; and the whale shark of tropical waters, which is even larger, sometimes reaching a length of sixty feet or more, and a weight of many tons.

There are a number of sharks commonly designated as man-eaters, most of them belonging to the genus *Carcharhinus*. To this belonged the greatest of all sharks, a giant in whose mouth several men might stand, and whose fossil teeth are more than five inches long. Dr. George Browne Goode once estimated the length of this shark at eighty feet, and in such case the weight was enormous, probably reaching well over 100 tons in large individuals. More modern members of the family are also of great size. The white shark occasionally reaches a



Movie is Released On White-tailed Deer

As a warmup for the coming fall big game season, Texans now are finding available "Master Whitetail," a historical and documentary motion picture of the white-tailed deer in Texas.

Several copies have been made of the film which is being made available to sportsmen's groups, wildlife clubs, schools and other organizations. This movie, as well as others in the Game Department's library, are provided, when available, on receipt of requests at its headquarters in the Walter building in Austin.

Several groups beyond the state lines have indicated an eagerness to schedule the latest authentic film of Texas wildlife.

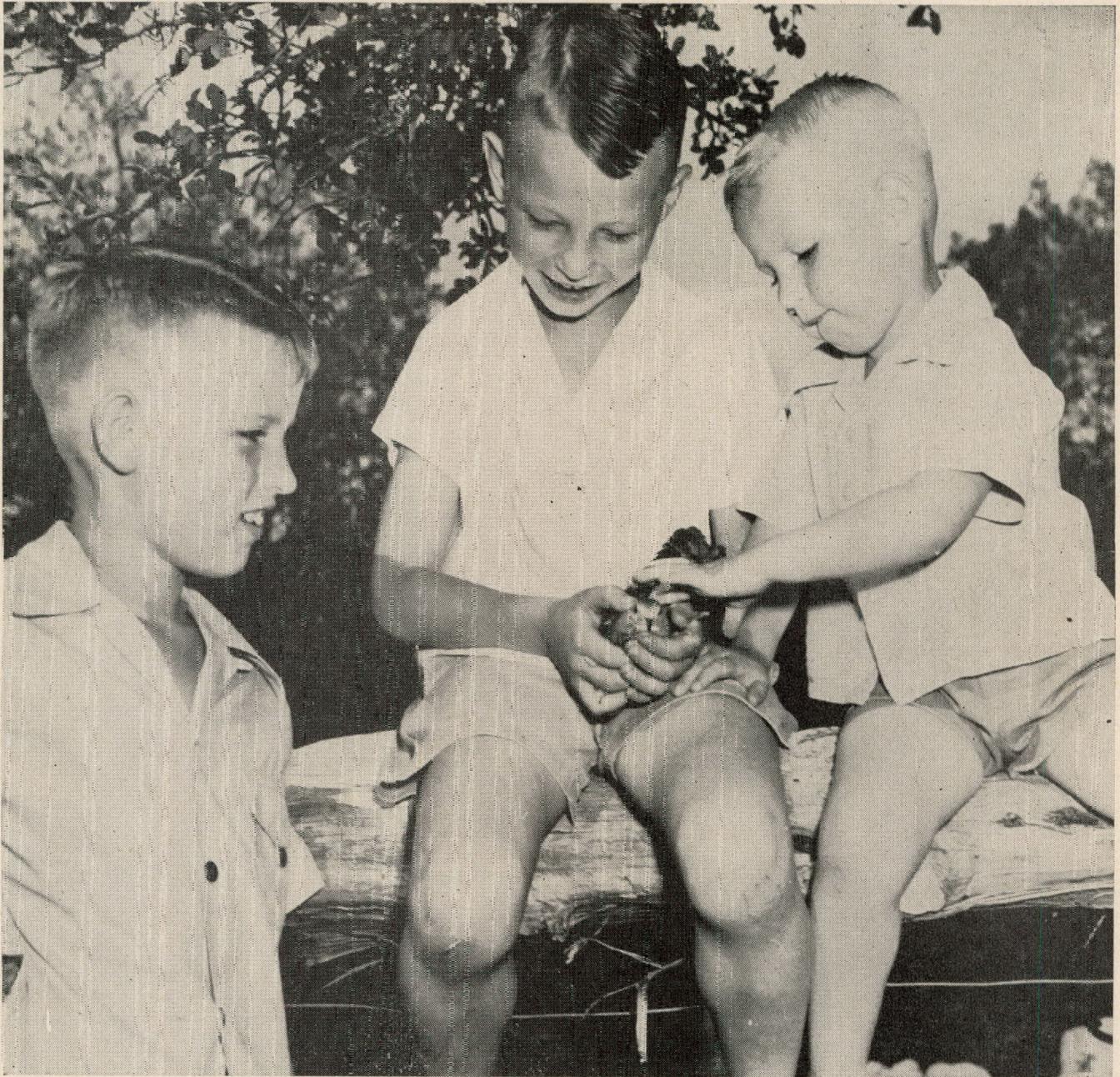
"Master Whitetail" is in color and carries full sound. It was filmed mainly by Len Fitzgerald, the Game Department's chief photographer. The movie is based on an interesting story, dating back to the pioneer period, and graphically portrays the life of a buck deer from his precarious days as a spindled-leg fawn or through the adventurous steps into maturity with a set of fine antlers.

The picture cites the restoration program of game management forces and stresses the urgency of public cooperation in modern conservation programs.

length of forty feet, and is capable of tremendous feats of swallowing. Hugh M. Smith, for many years commissioner of fisheries, reports a thirty-footer that had in its stomach an entire sea lion. A second species, the great blue shark, attains a fairly large size. The writer has an illustration of a third, a tiger shark, supposed to have been twenty-one feet long, and to weigh 1,700 pounds. Undoubtedly, to such huge engines of destruction, man would be an acceptable, but not too filling, cocktail before dinner. Many of our Texas sharks also belong to this genus, among them the bull shark so common in the Galveston and Aransas Pass area.

Some fifteen or twenty species of sharks occur in Texas. These will be dealt with separately, in later articles.

Three Boys and a Dove



THIS IS THE STORY of an old and often repeated good deed by irrepressible Texas youths.

A recent hail storm not only knocked a young mourning dove from its nest, but the violent stones shattered one of the baby dove's wings.

The nest was in the back yard of the country home of Mr. and Mrs. Jack McGlamery, near the western shores of Lake Austin. After the wonder of the phenomenal icy covering on the ground had ceased, the three McGlamery boys began looking

for the dove nest. They couldn't find it because the nest, frail as they invariably are, had been pounded to pieces. But near the

tree, helplessly floundering among the hail stones, was a crippled dove, easy prey to assorted marauders. It was gently carried into the house where Mr. McGlamery noticed one wing had been broken. An ex-navy man, and an electrician by trade, the father painstakingly prepared a splint. The son, Mike, (left in the photo) Kelly, (center with dove) and Tim (right) huddled around as their skilled parent patiently taped the wooden frame to the wing.

The bird immediately began a remarkable recovery. It ate bits of bread within a day after the accident, whereas it probably had never before sampled anything besides food

brought by its mother. Soon the dove's appetite developed so that it avidly ate baby chick scratch feed. It was content in the large urn provided for its home.

Thanks to the boys' care not to disturb it, the crippled wing seemed to mend rapidly. The bird, all the while, seemed to realize that it would be released when its wounded wing was strong and when its health permitted.

The triumph for the McGlamery lads was particularly significant because they were fairly new in the country, having just moved out from town a few months previously. Now they are keen students of birdlife and nature generally and, above all, are alert servants of their tiny guest.

The Practice of Fish Culture

Chapter XIII

By J. G. Burr

BACK IN 1924 there was but one State fish hatchery and its annual output naturally went but a little way toward filling the state-wide demand for fish. Getting out more fish was the crying need and it appeared that the way to do this was to multiply the number of hatcheries. The building of hatcheries rather than the building up of production in the hatcheries held first place in the minds of the culturists. During the intervening years, new hatcheries were built and the twelfth is now in operation at San Marcos. The original plant at Dallas was replaced by a new one at Lake Dallas.

Besides a dozen State hatcheries there are six federal hatcheries in Texas, making a total of eighteen, and yet it is impossible to meet demands. These plants are well placed in all sections of the State in the following locations: Lake Dallas, Dundee, Cisco, San Angelo, Fort Worth, Tyler, Jasper, Huntsville, Kerrville, Medina hatchery near Devine, Brownsville and San Marcos. A thirteenth, now under construction at Possum Kingdom Lake, will be completed this summer. The federal hatcheries are at Uvalde, San Marcos, Austin, Roy Inks Lake, San Angelo, and Fort Worth.

That more hatcheries were needed none could doubt, but following the construction of several new ones there arose the economic question: are we getting maximum production on our investment? It began to look as if we were getting just about what nature would produce under favorable conditions unaided by human skill. Undoubtedly there was a science in the practice of fish culture if it could be worked out. Of recent date an inland fisheries department was created by the Game, Fish and Oyster Commission, aimed at the elimination of a great deal of guess work and the placing of the business on a scientific basis.

First in importance was to step up production as high as possible; then by scientific studies of lakes and rivers to determine how best to place the distribution where it will count the most. Quoting departmental bulletin

No. 18:—The aims of the Inland Fisheries Department is to study the inland waters of the state. Through limnological studies it has been found possible to determine all of the chemical-physical properties of lakes, streams and ponds as well as the biological content. These factors have been likened to a chain made up of many links, and should one link of the chain become broken, the rest of it would also gradually break down and the body of water would become biologically unproductive. Through careful study it is possible to determine the broken link and apply proper measures to repair the damage.

It becomes necessary therefore that we find out the chemical-physical properties, such as free oxygen, hydrogen ion concentration, carbon dioxide, bicarbonates, methyl orange alkalinity, temperature and thermal stratification, and determine the amount and kinds of water organisms present. Such tests should be run over a period of at least a year in order to determine the seasonal changes. Such surveys require a great deal of work in which, fortunately, we have the cooperation of universities and colleges, such as North Texas State Teachers, Southern Methodist, Texas and Texas A. & M.

An ecological study is being made to ascertain methods of providing cover for spawning areas and in this connection the protection of food organisms both for fish life and migratory waterfowl. Another subject for study is a method of controlling aquatic vegetation which often completely chokes up a body of water.

The stepping up of hatchery production by all scientific means available is now being put into practice. In the past, hatcheries have operated with the same procedure from year to year with only an occasional change. This method has produced a goodly number of fish, but it is desired by experimenting with various methods of propagation and the introduction of fertilizer suitable to conditions in the various hatcheries, to increase the yearly yield both as to quality and

quantity as a cheaper production cost than heretofore possible.

Stomach contents must be examined both in the field and hatchery to find the variety and abundance of food eaten by fish from their fry stage to the adult age. After we feel that we know more of the food requisites of fry we intend to determine the potentially receptive waters; those waters which a detailed plankton study has shown will have the greatest amount of food that is required for fry.

Many of our streams today which a few years ago were alive with minnows, are now depleted. We know how to propagate and rear the golden shiner minnow, but the artificial propagation and rearing of other minnows equally as important is still more or less a mystery. It is intended to find out ways and means of producing these forage fish artificially and to attempt to induce minnow dealers to get private minnow hatcheries started so the streams will no longer be dragged and depleted of the supply of forage fish on which any successful fishery must depend. Control of predacious fishes is being studied.

As to the legal aspect of fishing we intend to study restrictions and lack of restrictions and their effect. Should we have a longer closed season on game fish or should we eliminate all fishing during closed seasons, or should all closed seasons be abolished? Should we increase or decrease the bag limit and size limit? These questions are constantly argued pro and con by the public and we intend to find an answer if possible.

Fish distribution has been climaxed with a yield at the several hatcheries of 14,137,196 bass; 456,929 crappie; 1,714,153 bream; 134,345 goggle-eye; 1,182,978 catfish, totaling 17,625,601 fish.

The Inland Fisheries program is admittedly an ambitious undertaking but the fruits of such labors, it is hoped, will be better fishing in Texas.

(Another article in this series on the history of Wildlife Conservation will appear in an early issue.)

Game Commission Recommendations

The Texas Game, Fish and Oyster Commission, at its last meeting, recommended that Texas be placed in two zones for waterfowl hunting this fall, because Texas has such wide variations in temperatures from northern, western and southern extremities.

The main reason behind the move is to enable the Panhandle and extreme western parts of the state to hunt ducks and geese at the same time as the surrounding areas of Oklahoma and New Mexico.

This plan would permit the affected parts of Texas to have an earlier shooting season and to enable residents in those areas to have a better opportunity to hunt waterfowl. The Commission acted in acknowledgment of sportsmen's suggestions that a later season established for the entire state works to the detriment of the northerly Texas points.

For the state at large, the Commission recommended that the United States Department of the Interior provide an open season "beginning not later than November 10, 1950."

The Commission, in its formal resolution, also recommended that the daily bag limit on ducks be fixed at not less than eight, and that the possession limit be fixed at not more than eight ducks.

Last year, the duck limits were four per day and eight in possession. The state had a split season for waterfowl. The first period was from November 4 to November 21; the second, from December 21 to January 7.

It is pointed out that the final decision rests exclusively with the Federal authorities. The state merely may suggest provisions in the annual fall regulations for waterfowl.

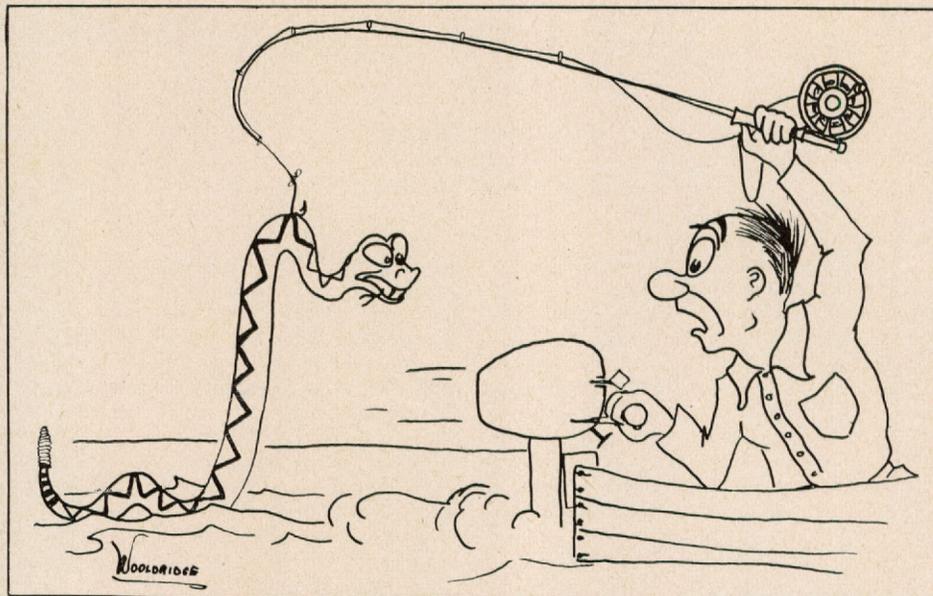
The Story of an Egg

• Continued from Page 5

Crip, his wings fanning, turned too, and both looked out toward the sea. With that the dance was over and the pair resumed their stately walk away from the shore."

When stopped by a still camera, the action of the dance stands out in all its rhythmic grandeur, mute verification of the breathless reports of those who have seen the spectacle.

Thus, the hordes of bird lovers are joined by the wildlife scientists everywhere in jubilant acknowledgement of the hatching of an egg. The emphasis on this single conquest to help restore what man has destroyed is bound to spread as a stimulating influence to the entire field of conservation.



Rattler Roundup

An Austin fisherman got rid of a huge diamond-back rattlesnake in an unusual manner this season. The angler is Bryan Bell, employed by the Motor Transport Division of the State Railroad Commission.

Bell, spending a Sunday morning on a solo bass fishing expedition on Lake Austin, spotted a likely looking spot on the fringe of some brush piled in the water along the shore three or four miles above a city park. He throttled back his motor. Just as he prepared to cast his fly into the area, he saw the big snake plunge into the water and start across the lake. The snake held its head about three inches out of the water and held its tail, rattles and all, about five inches high.

Snake and fisherman spotted each other at about the same instant.

"The snake seemed somewhat bewildered at seeing me," explained Bell. "It slowed up, half stopped and then started swimming again. Things happened pretty fast then. I had moved to within about fifteen feet of the snake. I cocked my right arm and flipped my yellow popper bug bait at the snake's head. I was using a five-ounce pole, nine feet long. I had a Size D line with a 15-pound test leader about six feet long. The bait landed a foot or so beyond the snake. When I began reeling in, I set the hook when it reached the snake's body about two inches behind its head. The snake began to pull violently as it threshed about in the water. The boat headed toward the snake as I kept a tight line. Just before I reached the reptile, I opened the throttle because I didn't want to be too slow in passing close to the snake.

"I began letting out line and then slowed down the motor again when I had about fifty feet of line out. I immediately realized I would need help since the wooded shore was such that I couldn't land and I couldn't handle the snake in the boat. And it was very apparent I wasn't going to be able to drown the snake. I motored slowly down the lake for almost three miles before I saw some people near a boathouse. I guided the boat close to the bank and asked them to get a gun to shoot the snake. They got the gun. I guided the boat close to the shore so that the snake, still thrashing violently, came close to a diving board where the man with the gun stood. He made a bullseye with a shotgun loaded with birdshot. We then took the snake in to shore and found it had nine rattles and a button."

The man who got the gun was Ike Fowler, Jr., whose home is on the lake front. The shooting was done by his neighbor, Jack McGlamery.

When this best snake story of the season came to light, similar fishermen-reptile yarns were recalled. These included the one re-told by E. T. Dawson, of the Game Department staff, about Marshall N. Counts of Austin, killing a rattlesnake in the middle of Lake Travis on September 11, 1949. Dawson said Counts first spotted the snake when it was coiled up and "sailing serenely along." He used a boat paddle to kill the reptile. He didn't say whether the "sailing" should be taken literally or whether the fact that since rattlers keep their tails out of the water, it means that they use the tail for a sail.

WHY GAME LAW VIOLATIONS?

By Fred Weston

Vice-President, Texas Wildlife Federation

Any report of a game law violation always disturbs a sportsman not only because of the does, fawns, and turkey poults that are killed but also because of the philosophy that warps the minds of otherwise law-abiding citizens and lets them violate a game law with no strain on their consciences. This fact should also alarm all citizens of this state, but it doesn't. Here is why, and what can be done about it

Strangely enough, the average citizen is reluctant to co-operate with enforcement agencies to bring to trial violators of game laws. On the other hand, that same citizen will risk his life to capture a thief seer entering the house next door. Likewise, he will lose no time in tipping off peace officers when he knows of some other infringement of the law.

That spirit of cooperation, however, does not extend to game law violations which, for some unknown reason, are not considered real infringements of the law. Yet the laws governing our wildlife are made by the same agencies that make our other laws. A game law violator often uses this peculiar kind of logic to justify his actions.

The landowner who disregards the hunting seasons says he feeds the game and is therefore entitled to take what he wants when he wants it. Others say they are just getting their fair share from the landowner or the rich man who has leased hunting rights. Then there are others who violate the law for spite, or because they think it is amusing to outsmart the game warden. Regardless of why they violate game laws, they are cheating the law abiding sportsman as well as the youngster next door.

It is this philosophy on the part of the citizen and the game law violator with which we should be concerned. Laws in our democratic state are made for all to obey and enforce. They are not selective. They are not made for or against any individual or group of individuals. Killing deer out of season is just as much a violation of a law as is burglary, for all laws are adopted in the interest of protecting the rights of all citizens. The citizen is just as much responsible in protecting his rights, to demand compliance by others as well as himself.

Our legislature has placed the responsibility of enforcing game and fish laws on the Game, Fish and Oyster Commission. It is, however, an impossibility for Commission em-

ployees to keep every hunter or fisherman in this large state under surveillance. The citizen must not leave it all up to state authorities but rather he must help by respecting such laws himself, then demanding that others do likewise. Moreover, he must consider a game law violation in the same light as a violation of any law and then do his duty by cooperating with game wardens and other authorities.

Citizen-warden teams are not idle dreams. There are, in fact, many of them now functioning in Texas. The San Antonio area has been notable for its team, which has secured more convictions for game violations than have been recorded in any other area in Texas.

Most wardens could not cover the ground as thoroughly as they do without the help of the citizens. In many sections of the state, there are individuals and organized clubs practicing game and fish conservation. Likewise, they demand it of others; therefore they not only stimulate the local warden to greater effort, but they also serve as his eyes, ears, and assistants. On occasion, conservation organizations of sportsmen and landowners have hired special prosecutors to obtain convictions of game law violators.

It should be emphasized, however, that convictions for game law violations must not be considered the ultimate goal of game and fish conservation. Rather, it is the prevention of violations with which we should be primarily concerned. Prevention is brought about by two conditions. Sincerity of conservation beliefs on the part of the individual is one, and sure punishment of violators is the other.

Both conditions exist in much of the Texas hill country. More and more individuals are becoming conservation-minded and certainly the knowledge of the great number of convictions obtained in this area prevents many violations because of the fear of getting caught.

Similar situations, when universally developed will mark the beginning of a downward trend in game law violations in Texas.

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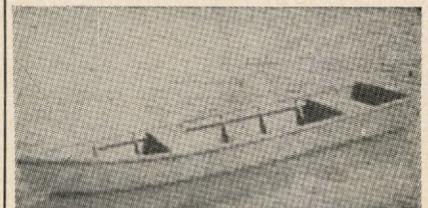
Cooperative Wildlife Research Units will be established at the University of Arizona and at Montana State University, according to the Wildlife Management Institute.

These two units, together with the one recently announced for Alaska, bring to a total of seventeen, the number of Cooperative Units established at various state land grant colleges and universities. The purpose of the units is to train wildlife workers so that they can assume positions of responsibility in state and federal wildlife programs. Cooperating to support the program are the U. S. Fish and Wildlife Service, the conservation departments of the states in which units are located, the various land grant colleges, and the Wildlife Management Institute.

The great need for wildlife workers, occasioned by the passage of the Pittman-Robertson bill in 1937, has been met largely by the units. Students at colleges participating in the unit program are able to receive practical experience in actual wildlife programs while they are learning and, for the most part, have been able to obtain employment in their chosen field immediately after graduation.

East Texas has a pine forest belt about the size of the state of Indiana. There are four national forests in this region which are great potential recreational grounds.

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Proper Stocking of Ponds and Lakes Pays Off

Sportsmen and landowners interested in improving fishing conditions are developing a better understanding of fish planting techniques and problems. This deduction is based on a decreasing tendency to request more fish fingerlings than the areas to be stocked, or restocked, can support. The immediate result has been to facilitate the entire fish management program which will provide even better fishing for the future.

Further strengthening of the fish planting routine has just been effected through an arrangement whereby applications for fingerlings to both federal and state agencies are cleared through the state game department. The improved system blends conveniently into a general trend to impound more waters in Texas both in public lakes and in private tanks and ponds.

Progress in this field which is so vital to outdoorsmen who emphasize fishing rather than hunting has resulted in part from an educational program. Oftentimes, there is a vast difference from the way some laymen view a project as compared to the way the game department's aquatic biologists understand it. For example, one of the oldest misconceptions among sportsmen is that by placing vast numbers of fish in a lake will provide the fishermen with more fish in his creel. It goes back to the old idea that if a little is good then a lot

should be better. In the case of stocking fish this is not true. Fish are no different from livestock. A pond, lake, or stream is just like a pasture and is capable of producing just so much food and can therefore provide suitable habitat for only so many pounds of fish. And whether a lake's carrying capacity is in a thousand pounds of runted fish or in an equal number of pounds of desirable catching-size fish depends a lot on how it is stocked.

If we had two ponds just alike and stocked one with 1,000 fish and the other with 10,000 fish and then drained them after a year, we would find that the total pounds of fish recovered from both ponds would be the same. However, it may readily be seen that the pond having 1,000 fish would have catchable fish while the other pond would be full of runted fish. The main point for cooperative sportsmen to remember is that they defeat their own purpose by overstocking.

It is desirable to stock waters with both predacious and non-predacious types of fish because the predacious types will forage on their own and other kinds and thereby keep the fish population from becoming over abundant; stocking forage species provides fish that are capable of making their own living and in turn furnish food for the other fish.

Here are six suggested groups for stocking ratios for waters of nine acres or less:

Group 1:

- (a) 150 bass per acre;
- (b) 100 bream (bluegills and red-ears) per acre;

Group 2:

- (a) 200 bass per acre;

Group 3:

- (a) 100 bass per acre;
- (b) 500 crappie per acre;
- (c) 100 bream per acre;

Group 4:

- (a) 50 catfish per acre;
- (b) 100 crappie per acre;
- (c) 100 bream per acre;

Group 5:

- (a) 100 bass per acre;
- (b) 50 channel catfish per acre;
- (c) 100 bream per acre;

Group 6:

- (a) 75 channel catfish per acre.

Proper stocking and restocking of fish enhances the possibilities for making artificial lakes attractive as recreation centers. Small lakes have the advantage over natural waters and large reservoirs from the viewpoint of fish management because they may be drained or otherwise rid of undesirable fish.

When large natural lakes as well as large artificial lakes become infested with harmful fish species they are virtually beyond the scope of fish managers. Netting may reduce the numbers of undesirable species but this method cannot be counted on to effect a permanent remedy.

Royal Bank of Canada Boosts Water Conservation

One of the most forceful pieces of conservation writing to come to the attention of the Wildlife Management Institute in some time was released recently by the Royal Bank of Canada in its MONTHLY LETTER, the March issue of which was devoted exclusively to an item entitled "Life Depends on Water." It is regretted that space does not permit reproduction of the significant article in its entirety. Excerpts from it are reprinted below, and complete copies may be obtained by writing to the Royal Bank of Canada, Montreal, Quebec.

"In thinking about food, let us start with the one essential ingredient: water. In thinking about soil conservation, let us start with the element which is the greatest friend or the most ruthless foe of soil formation: water. And in thinking about water, let us start, not at the tap or at the river-mouth, but away back where the

flow begins, on the mountain tops and hillsides . . .

"There is no use in spending huge sums on river control and valley development unless it is accompanied by a thoroughly effective attack on the needless evil of forest devastation. Well-managed forests are the best of all soil and water holders . . .

"Forests act as balance wheels. In the dry season the water stored in the soil dribbles out in springs and streams, and the water table is kept up on adjacent lands. Forests may not increase the total rainfall, but certainly they help to dispose of it more fruitfully than does land without forests.

"This is not to say that we need go to the extreme of taking land out of agricultural use to be reforested, although some of this may be needed. A wise use of land is to be aimed at, in accord with its natural aptitude.

"Huge dams and reservoirs are glamorous things. These monumental masses of concrete, as A. H. Carhart calls them in his article in THE ATLANTIC of February, are expected to serve irrigation, control floods, and produce power—all good objectives. But with sick watersheds above, the days of such dams are numbered.

"Conserving water nature's way is no mean objective. To unriddle the subtle aspects of the soil-water-plant-animal complex offers the natural science an exciting cooperative adventure. To persuade men of the wisdom of cooperation and forward-looking, slighting their immediate good for the good of all, is an objective worthy of the best in the social sciences. To deal wisely with the varying needs of agriculture and industry in the present and for the future; that is a challenge to governments worthy of the best that is in them."



BOOKS

EXPLORING OUR NATIONAL PARKS AND MONUMENTS by Devereux Butcher. 224 pages. Illustrated with 227 half-tones. Published by the Houghton Mifflin Company, 2 Park Street, Boston 7, Massachusetts; 1949 revised. Price, in paper cover, \$2.00; in cloth, \$3.50.

Few men, aside from the top administrators of the National Parks Service, are more familiar with America's extensive national park system than Devereux Butcher. As executive secretary of the National Parks Association, he has spent more time in each park than nearly anyone else has spent in all. In the pages of this revised and expanded edition of his book, the author tells of the history, outstanding features, and the travel facilities to all twenty-six national parks and thirty-eight national monuments.

National parks and monuments are, in a sense, natural museums in which scenic wonders, archeological treasures, and rare birds and mammals are preserved in their natural state for the pleasure and enlightenment of present and future generations. One shudders to think what Yellowstone or Yosemite National Parks might have looked like today had it not been for the foresight of Cornelius Hedges, one of the first explorers to view the Yellowstone area, and for the legislators who transmuted his dream into actuality. Although Yellowstone and Yosemite come into mind when one thinks of national parks, there are many others, each with its own unique characteristics, which are far less well known and, for this reason, far less crowded than the more famous parks. The thickly settled East has a large number of readily accessible parks from Arcadia in Maine to Everglades in Florida.

For those planning vacations this summer, this book, revised and enlarged to embrace new information and an entirely new section on "Other Nature Reservations in the United States," will prove invaluable. Many new outstanding photographs are used. This reviewer recommends that two copies be obtained: one bound in cloth for library use and a second in paper

as a field book for reference while traveling.

CUSTOM BUILT RIFLES: THEIR DESIGN AND CONSTRUCTION by Dick Simmons. 184 pages. Illustrated with more than 100 half-tones and line drawings. Published by Stackpole and Heck, the Telegraph Press Buildings, Harrisburg, Pennsylvania; 1949. Price \$3.85.

While most shooters are content with any rifle with which they can hold ten shots in the black at 200 yards, others want every shot in the middle of the bull. For these men the custom-made rifle is the answer. A custom-built rifle may be constructed from the action up by a good gunsmith, or a good over-the-counter model may be remade to the owner's specifications at the factory. Actions may be honed, set triggers may be installed, special sight and barrels for specific purposes may be obtained, a new stock to match the owner's physical peculiarities may be built, and inlays, engravings, or carvings may be added as expressions of personality. For shooters interested in such guns this book is highly recommended. It is not another book on

home gun tinkering but one of advice and instructions for the man who will deal with craftsmen of the gunsmithing profession. It tells what he should consider and what he should avoid. A listing of qualified gunsmiths and their specialties is furnished, and actions upon which custom rifles may be built are discussed in full. This volume will prove a handy addition to the library of the man interested in building a gun to bring out the best in his shooting ability.

THE RIFLE BOOK by Jack O'Connor. 332 xvi pages. Illustrated with 166 photographs. Published by Alfred A. Knopf, Inc., 501 Madison Avenue, New York 22, New York; 1950. Price \$5.95.

Behind this volume lie three decades of intensive hunting experience, experimentation with firearms, and outdoor writing. Jack O'Connor, whose articles are familiar to all readers of *OUTDOOR LIFE*, has hunted all forms of North American game from Alaska to Mexico. His past activities in the field of journalism and public relations, as a novelist and as a professor of journalism at the University of Arizona, give him the ability to write interestingly as well as authoritatively.

His new book, already in its second printing, is a complete study of modern rifles and rifle shooting, almost encyclopedic in scope. It contains all of the up-to-date material available on actions, loads, sporting ballistics, accessories and the care of firearms. Extensive sections cover the choice of rifles for all purposes from small-bore target shooting to hunting big game in Africa.

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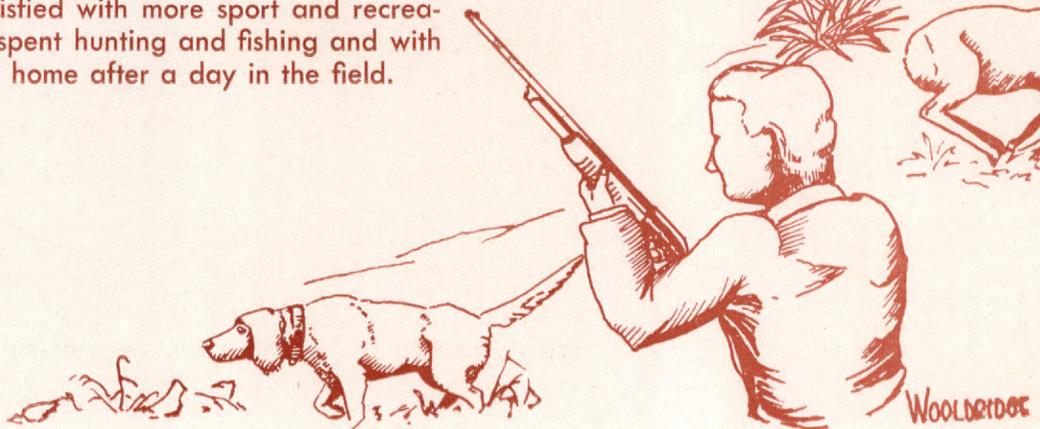
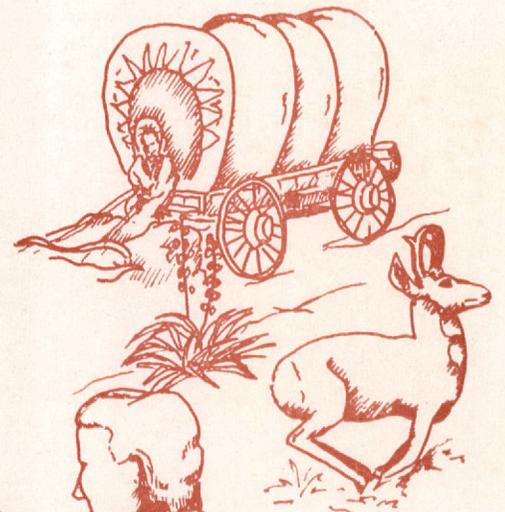
Message to Sportsmen

That hunting and fishing is big business no one will deny. But just how big this business is and how fast it is growing few sportsmen realize. Hunting and fishing is not only America's oldest sport but it also numbers more enthusiasts in its ranks than all other sports, including the great American sports of baseball and football. The army of nimrods who take to the fields each year have added more than three million recruits to their ranks since 1941. Last year more than twenty-eight million licensed hunters and fishermen took to the field in pursuit of their favorite game. This figure, of course, does not represent the total number of nimrods since several states do not require licenses of everyone who hunts and fishes. The economic importance of hunting and fishing has been the topic of much discussion and speculation. Surveys indicate that sportsmen spent around six billion last year on hunting and fishing, or about half of the nation's sports bill for the year.

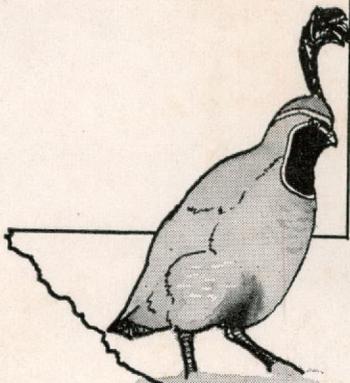
Along with this unprecedented increase in hunting and fishing there has also been a decrease in land available to wildlife. Increased production of farm and ranch products have reduced the habitat of many wildlife species.

Most big business is governed by supply and demand. Business managers, for an additional outlay of money for more equipment and personnel, can produce more of their product for consumer use. Wildlife and wildlife habitat, however, does not respond quite so readily to the demand for increased production. Game managers, unlike the custodians of other business, do not have a magic formula for stepping up the production of wildlife. The results of their efforts are dependent upon many factors over which they have very little control.

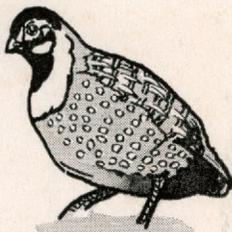
No matter how successful game management techniques may become, it will not be possible to supply full bag limits for all. A revision in the philosophy of what constitutes a successful hunting or fishing trip will have to be made by sportsmen. The truth of the matter, whether we like it or not, is that we are going to have to be satisfied with more sport and recreation for our time spent hunting and fishing and with less game to take home after a day in the field.



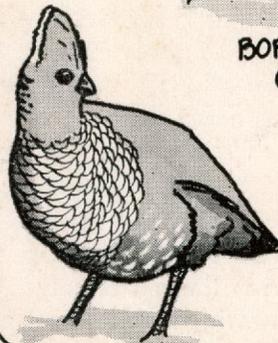
Conservation at Work



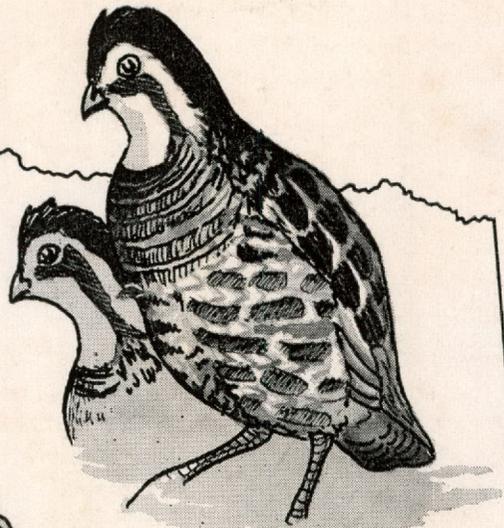
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