

Texas Game and Fish

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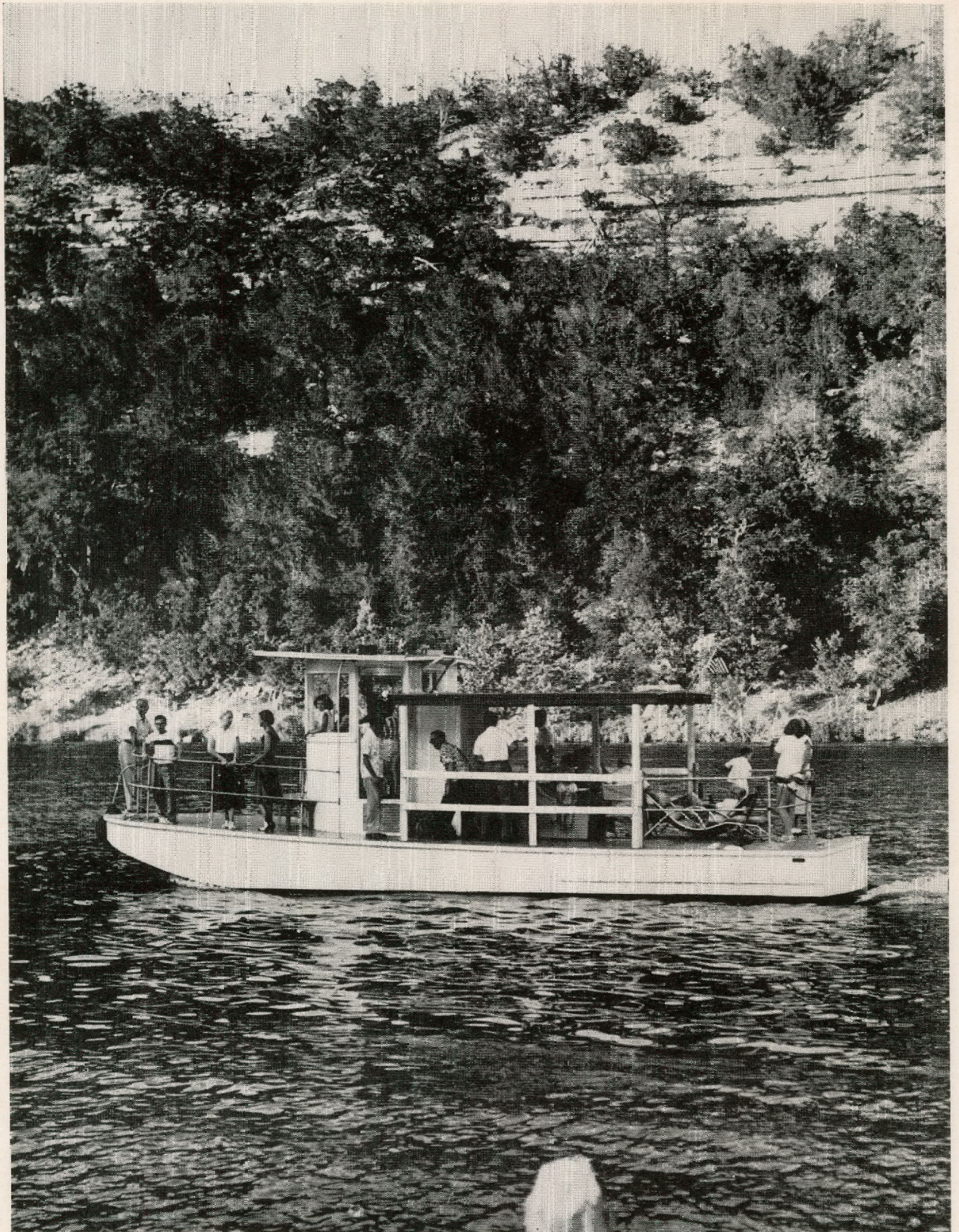
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RIVER RATS RALLY—Water coming back to Texas—rivers a risin'—the folks gather for their annual water-borne outings. Here a boatload of Lake Austin residents get aboard "The Pup" for the annual summer rendezvous at Shore Acres where the pappy craft "The Commodore" is berthed.

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 invites republication of material since the articles and other data comprise factual reports on wildlife and other phases of conservation.

★ In This Issue ★

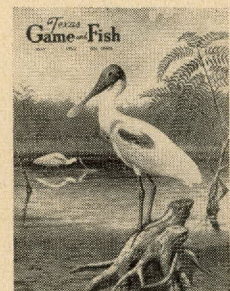
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The Cover

The roseate spoonbill, one of the beautiful wading birds found on the Texas coast, is this month's cover by Orville O. Rice. An article which deals with Vingt et Un Islands where these birds nest is also carried in this magazine on page sixteen.



Headstart for Bass

By TOWNSEND MILLER

Assistant Director, Departmental Publications

TEXAS' black bass, and the thousands of fishermen who favor these wily scrappers, may get a break if a revolutionary experiment now being conducted by the Texas Game and Fish Commission is successful. And preliminary trials already indicate success may be forthcoming.

Already past the "theory" stage and in the first phases of practical application at the Commission's San Marcos Hatchery is an outdoor heated pond designed to hatch black bass in midwinter.

The idea behind the experimental project is to give young bass used for restocking Texas waters a headstart in growth over other fish, which would hatch out later during the natural spawning period.

Heated ponds also should insure against the heavy losses of eggs and young fish which so often occur in the hatcheries when late spring cold spells send natural water temperatures skidding after spawning has begun.

Giving bass fry a headstart over the young of other fish is particularly important.

Those who know the black bass best have found that he is a fairly hardy individual. He thrives through a wide range of climatic conditions from the southern tips of Texas and Florida far into the frozen northland. He has little trouble warding

off disease and can adapt himself to diverse conditions of water, food supply, and temperature.

But aside from a fickle and at times exasperating attitude toward what lure he will strike and when, he is an independent cuss in other ways.

There is one thing a bass won't tolerate. That is overcrowding by other fish. For some strange reason, Mr. Bass refuses to thrive where there are too many intruders.

It's not that he can't hold his own in piscatorial pugilism. He is a rugged scrapper and can protect his nest or favorite feeding zone against almost all comers.

It is not a question of competition for food, either. Often he can be crowded out of the picture by other fish which feed upon entirely different food.

The fact remains that when black bass are forced to live where the fish population is too heavy, they gradually decline in size and numbers and may fade from sight completely.

The Inland Fisheries Division of the Texas Game and Fish Commission in the past has helped pioneer one method which often can be used to help remedy this overcrowding problem. Lakes, or sometimes streams, are treated to kill out all fish. The desirable species then are restocked.

The experience in Texas has been that in most cases where sports fishing has declined, the lakes and streams are crammed with shad, gar, carp, suckers, and other undesirable fish.

This eradication method is drastic, but Texas fish technicians, as well as those in other states, have found that usually in the long run it is by far the most practical way of eliminating crowded conditions to bring bass and other game fish back into the picture. Often it is the only method which can be used with any degree of success.

The heating of outdoor hatching ponds, like the "eradication and restocking" procedure, also is aimed at giving black bass a break in their fight against overcrowding by undesirable species, and it, too, seems somewhat radical and drastic. But the reasoning behind the heated pond experiment is sound, and there seems to be a distinct possibility that someday it, too, may come to be accepted as standard procedure in fishery operations.

The basic ideas for the experimental pond originated in the mind of the Commission's Executive Secretary.

The head of the Inland Fisheries Division, the chief of the Engineering and Hatcheries Division, and other members of the department's

OUTDOOR HEATED FISH POND IS DESIGNED

personnel contributed to the planning.

They reasoned that if baby bass could be hatched very early in the spring or in midwinter, they would have a headstart in growth over other young fish.

The oversize young bass then could feed on their smaller competitors when the young of other species hatched out at later dates.

This would give the bass fry a double advantage. It would provide them with an abundant food supply, and it also would give the species a chance to cut down on the survival rate of other fish during the crucial hatching period.

There was nothing new about this idea. Many states, including Texas, for years had tried to plan hatchery locations so that game fish fry could be transplanted in a northerly direction from the hatchery site. By hatching in the southern regions of zones to be served, the game fish fry were given some slight advantage in time of hatch due to seasonal differences.

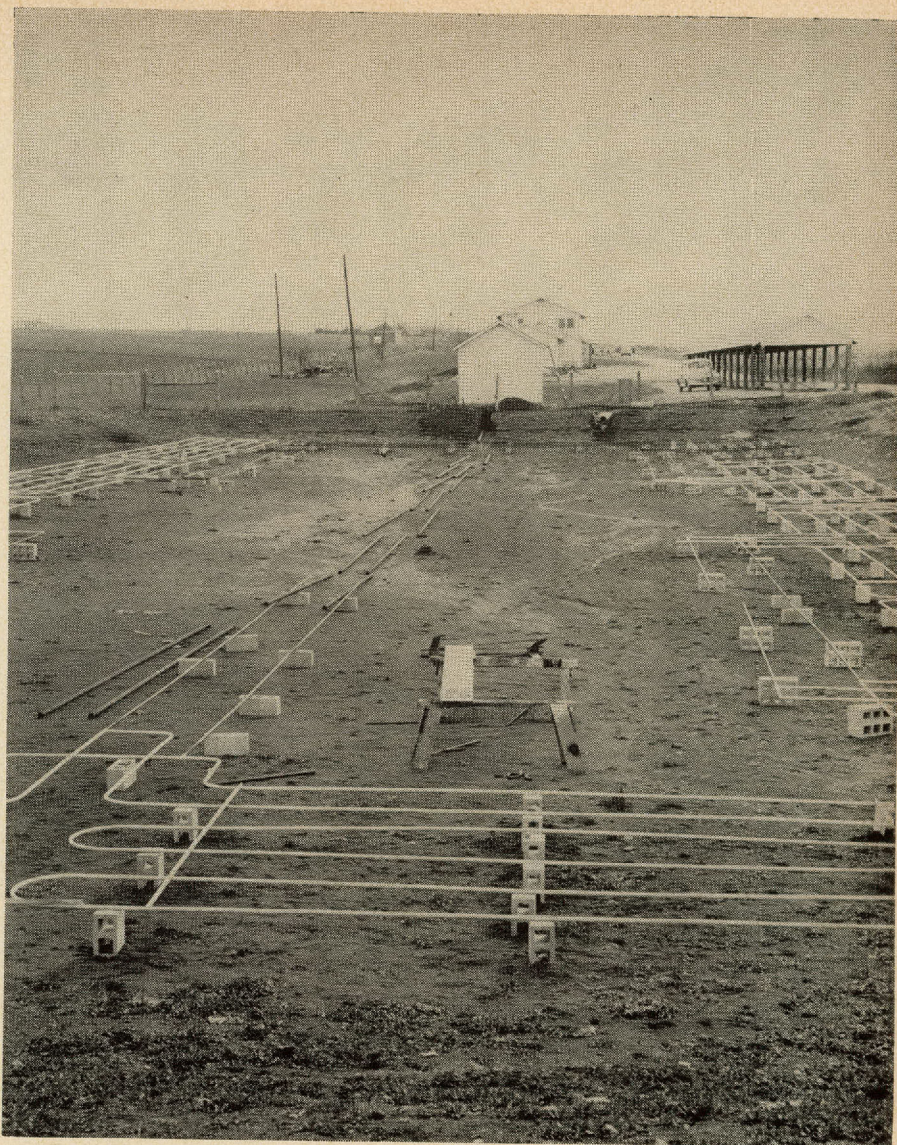
But this wasn't enough. The Commission's ichthyologists wanted to increase the growth advantage to an even greater extent.

The only possible solution seemed to be to heat by artificial means the water in hatchery ponds. The idea of heating an outdoor lake, even a small one, to maintain hatching temperatures in midwinter seemed fantastic at first, but they decided to see if the engineering problems involved could be solved.

The idea was turned over to Frank Frazee, sales engineer for the Calcasieu Lumber Co., Austin. Frazee, an enthusiastic bass fisherman, welcomed the chance to use his engineering knowledge in a scheme to improve his favorite sport.

He found a great amount of personal satisfaction in attacking the unusual problems involved, such as the loss of heat from wind action on the open water and the design of a rigid fool-proof system of temperature controls.

The engineering plan eventually



Hot water running through these pipes heats an experimental pond at the San Marcos Hatchery, making possible the hatching of bass in midwinter. This pond, after being filled and stocked with brood bass, carried an early spawn successfully through a late freeze this spring.

used, basically, was his, although minor changes were made in the actual installation, which was done by Climate, Inc., Austin, the successful bidder on the project.

The first experimental heated pond now is actually in operation at the Commission's San Marcos Hatchery.

Other states have hatched wintertime trout indoors, and some similar work indoors has been done with channel catfish. However, it is believed that the San Marcos pool is

the first to be attempted out of doors and the first attempt to be made to hatch winter bass.

To date, the project shows signs of success.

Water first was run into the heated pond March 10, and, following a brief testing period of the heating system, 90 brood bass were released March 14. They immediately began building nests for their eggs. The system and its bass successfully weathered a short period of freezing

HATCH BLACK BASS IN MIDWINTER



Bass fry were removed from the heated pond just 17 days after release of the first brood fish. These young bass already have been transplanted into Texas lakes, where their headstart in growth will enable them to feed off the smaller young of undesirable species.

weather, and the initial hatch was beyond fondest expectations and well above the average.

Seventeen days after brood bass were placed in the pond the first fry were removed. Already these have been transplanted to Texas lakes where they will feed on the young of less desirable fish when these hatch later.

Pioneering projects almost always develop problems which are not foreseeable at the time of planning. The heated pond experiment has proved no exception, but to date the "bugs" which have appeared, surprisingly, have been negligible.

Actually, however, another year at least will be needed to test the project satisfactorily. The heating system was not completed until early March, and except for the one short freeze, there was little chance this year to test the project under low-tempera-

ture conditions. Plans are to attempt the start of spawning in January next winter.

The idea of giving mama and papa bass a lift by providing artificial weatherproof living conditions sounds good, just as the prospect of built-in year-around springtime temperatures should please any homeowner.

However, the same old bugaboo of cost which causes Dad to dismiss the possibility of perennial springtime in the home might well have sent preliminary plans for the heated pond into the Commission office wastebasket had it not been for some further figuring.

These figures revealed that heated hatchery ponds should go a long way toward paying for their high cost through savings they, themselves, would make possible.

Losses of spawn and fry due to cold spells in late spring often have been

heavy and costly in past years. Heated ponds should prevent this loss by insuring uniformly warm temperatures regardless of the weather.

Another important but less obvious savings also would be possible. It costs money to provide food for brood bass, which are carried through from season to season. Under present methods, hatcheries usually carry about twice the number of parent bass actually needed. This is done as insurance against possible cold-weather losses of fry during the spawning season.

Heated ponds would permit a cut in brood stock with a resulting savings in the feed bill.

Bass usually begin spawning in the spring when the water reaches a temperature of about 65 to 70 degrees. The heating system of the San Marcos experimental pond is set to keep the water at 72 degrees.

Heat for the pond is provided by a boiler, from which hot water is pumped and circulated through a series of pipes lying near the bottom of the pond. The system resembles a giant underwater radiator, and thermostats act as controls to keep the water in the pond as nearly constant as possible.

The size of the experimental heated pond is approximately one half surface acre with an average depth of about three feet.

Woven through its waters are over 3,600 feet of pipe, ranging in diameter from three inches near the boiler to three-quarters of an inch at the terminal heating points. A pump circulates 70 gallons of heated water per minute through these pipes.

Under average conditions of outside temperature, the boiler heats this water to between 110 and 115 degrees.

The pump does not operate constantly, however, nor is the temperature of the circulating water always this hot.

That is where the controls play their part.

Most important part of the control system is a mixing valve. It opens in varying amounts when the water in the pond nears the desired point of 72 degrees. This permits some of the cooler water which is returning from a round trip through the pond's pipes to mix with the hot water being pumped from the boiler. A thermostat connected with the water in the pond adjusts the amount of cooler water going into the mixture.

Thus, the water circulating through the pipes usually is somewhat below the 110-115 degree figure, depending upon the actual temperature of the water in the pond.

At times when the pond's temperature is as warm as desired, the pump and the boiler cut off and do not operate at all.

Two additional controls act to further safeguard correct heating.

One of them can increase the maximum temperature of the circulating water to higher range if outside air temperatures fall so low that the usual 110-115 degree setting is unable to keep the pond at the desired warmth.

The other serves as a safety on the boiler's output, so that no matter what



Frank Frazee, who designed the pond's heating system, drew inspiration from his own personal fondness for bass fishing.

other controls might fail, the boiler still would not overheat the water.

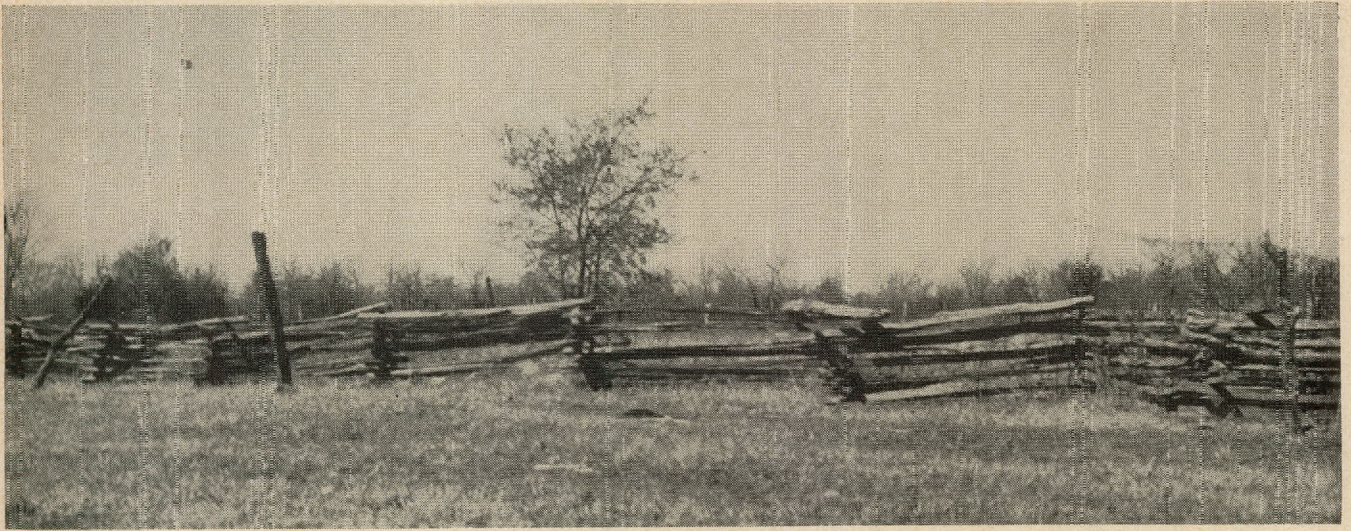
Individual valves placed at various points throughout the circulation system control the amount of hot water flowing through the pipes to different sections of the pond. These can be regulated manually to insure uniform heating throughout all sections of the pond.

The heating unit is a 32 horsepower low pressure boiler with an output of 1,352,000 B T. U.s. per hour. It is fueled with natural gas.

This spring the heating system is being used until the approach of summer makes artificial heating unnecessary.

Eventually, however, plans are to put the system into operation in mid-winter. After the first group of brood bass has spawned and the young fish have been gathered, the adults also will be removed, and another set of parents will be introduced. Repetition of this procedure should produce a steady succession of early hatches through the winter months.

Game Regions of Texas . . .



The Blackland Prairie

THE Blackland Prairie of Central Texas constitutes the best large continuous area of cultivated land in the state. The Balcones fault forms its southwestern boundary near Austin. From there it spreads fan-like to the Red River on the north. The Blackland Prairie region is bounded on the east by the Post Oak Belt, and on the northwest by the East Cross Timbers and the Grand Prairie. A small area of the Blackland Belt extends east from Gonzales County to Montgomery County.

The land surface of this game region is gently rolling. Rainfall varies from 30 to 40 inches per year, the higher rate prevailing in the eastern portion. The soils are of limestone origin and very fertile, but subject to severe erosion.

More than 80 per cent of the land in the Blackland Prairie is in cultivation, with much of the acreage being used intensively for the production of cotton. The principal crops are cotton, corn, grain, sweet sorghums, and oats. Wheat is a major crop in the northern portion. Although much of the land has been in cultivation less than 50 years, many

large areas have already lost as much as 50 per cent of the original fertile topsoil. Considerable progress is being made in the control of erosion within the soil conservation districts in the region. The losses due to erosion are being reflected in many ways, not the least of which is their effect upon wildlife. Increased erosion and the necessity for still more intensive use of the land as a result of erosion creates a vicious circle that ends in almost complete destruction of what little wildlife cover remains.

Lack of cover limits the populations of game and non-game animals. Providing the necessary cover often involves considerable expense. Diversified farming is one of the most economical ways to provide food and cover particularly for bobwhite quail and mourning doves.

The Blackland Prairie originally had numerous wooded belts along the streams that provided much of the border type of environment so necessary to many kinds of wildlife. The Greater Prairie Chicken, now extinct in Texas, formerly occurred here. Bison, antelope, deer, and wild turkeys were once abundant. The

bison and antelope disappeared from the Blacklands many years ago. Only a few deer and wild turkeys remain. Restoration of game in this region will always be difficult so long as the fertile soils are needed for farming.

The Blackland Prairie region played an interesting part in the development of Texas. Settlements spread rapidly as farmers discovered the productive possibilities of the black prairie soils. Early immigrants from Germany and Czechoslovakia settled entire communities and made the Blacklands the foremost cotton producing region of the state. So valuable was the land for farming that the row crops were usually planted to the immediate roadsides, and only the most necessary fences were built. Wooded and brush-covered bottomlands were cleared to the stream banks. Fall plowing destroyed the protective value of each year's crop residue. Cotton, the major agricultural crop, was of little use to game species even under the most favorable conditions.

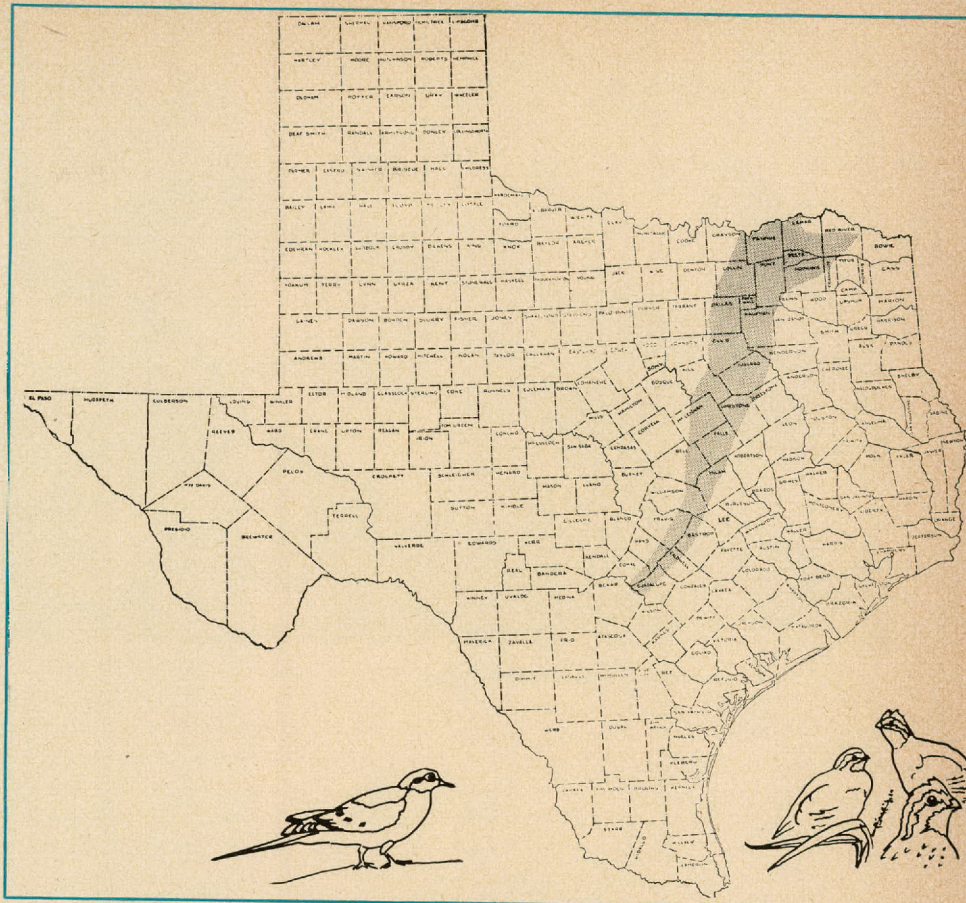
The agricultural activity of this region was largely responsible for the growth of most of Texas' largest

cities, including Dallas, Fort Worth, Waco, Temple, Austin, and San Antonio. This region contains less than ten per cent of the area of the state but has about one-third of the population. This concentration of people has added to the difficulties of wildlife, not only facilitating its destruction but also standing as a major limitation to attempts toward restoration.

The Blackland Prairie region cannot produce the game desired by so many of its residents. The very existence of desirable wildlife rests largely with the individual landowners. Many farms are so valuable for the conventional farm crops that no land is allotted to the production of food and cover for wildlife. Other farms can and should be reorganized with respect to land use so that badly eroded and critical areas can be used less intensively for cultivated crops.

Mourning doves are the most abundant game species in Texas and the most important game species in the Blackland Prairie. Doves have increased in some areas in spite of hunting pressure. One reason for this gain is the increase in doveweed or croton, snow-on-the-mountain, sunflowers, and pigweeds in pastures and fields.

In the intensely farmed sections such as the Blackland Prairie, the change from a one-crop to a diversified-crop system has encouraged the production of doves. Under the diversified crop system many grain and feed crops such as hegari, red top



Shaded area indicates the Blackland Prairie.

cane, and other grains are now grown where cotton was formerly the main crop. The construction of farm stock tanks is also beneficial to doves.

Mourning doves are generally most abundant in open brush and farming sections. In the fall, flocks of doves may be seen in farming communities

throughout Central Texas. Doves ordinarily find very little food in farming sections where fall plowing is practiced.

Texas is a great wintering ground for mourning doves. They migrate here from other regions of the United States. The greater winter concentra-



Dairy cattle may be seen on many Blackland farms. (Photo courtesy Ed Bryson, THE PARIS NEWS.)



Squirrels are found in wooded areas along the main streams in the Blacklands.

tions are found in that part of Texas south of San Antonio. Doves occur throughout the winter in the lower two-thirds of the state. The birds change their feeding grounds frequently, and local areas may be inhabited for only short periods. The availability of food and water largely determines the length of time the coves remain in any area.

Most of the Blackland Prairie region does not provide a suitable habitat for deer. There are a few whitetails in Lamar, Fannin, and Delta counties at the northern end of the region. Deer are more abundant in Hays, Comal, and Guadalupe counties at the southern extremity. Portions of Red River, Ellis, and Travis counties have been restocked with deer.

All of the Blackland Prairie region is within the range of the fox squirrel. The species occurs mainly along the wooded streams. Intensive farming and clearing of bottomlands have destroyed much of the best habitat for squirrels. The range of the gray squirrel overlaps the eastern edge of the Blackland Prairie but this species is not abundant in the region.

The swamp rabbit is found in the lowlands along the Trinity and Red rivers in the northern part of the Blackland Prairie and near the major streams at the eastern edge of the region. Most of the range of the

species is east of the Blacklands. Cottontail rabbits occur throughout the region, particularly in the wooded and brushy areas. The black-tailed jackrabbit is present in small num-

bers. This species has been declining over most of its range for several years.

The bobwhite quail is limited mainly to the waterways where there is suitable shrubby or viney cover and a year-round supply of food. Extensive restoration of quail is not practicable on land which is cultivated intensively.

The Blackland Prairie region has most of the common furbearers, such as the raccoon, opossum, skunk, fox, and mink. These species, like other kinds of wildlife, are restricted to areas which provide food and cover. The harvesting of furs is of comparatively little economic importance in the Blacklands.

Bullfrogs are important locally where suitable habitat, protection, and management are provided. In most places the destruction of habitat and increased hunting pressure has reduced the population of this species. The management of some farm stock tanks might well include the production of bullfrogs.



Cotton is grown extensively in the Blacklands.

Vitamin A—

VITAL ELEMENT FOR BOBWHITES

By V. W. LEHMANN

VITAMIN A is a colorless, fat soluble nutrient important for survival and reproduction. It promotes growth, appetite, and digestion; aids tissue formation; acts as a regulating substance; counteracts infections, especially of the eyes, sinuses, air passages and lungs; increases resistance to many infectious diseases; increases resistance to many parasites; is necessary for good fertility and hatchability; increases vitality and liveability; probably affects length of life; strengthens tissues and membrane formation; and maintains normal functioning of epithelial and nerve tissues (Ewing, 1941).

The principal source of Vitamin A for wild quail is believed to be beta carotene, a complex chemical compound (40 carbon atoms), which occurs commonly, but in varying amounts, in seeds, buds, flowers, and leaves (Schultz, 1948). Beta carotene is synthesized by the liver, and, in the case of quail, stored largely in the liver until required for body functions, (Nestler, 1946). By analyzing quail livers, it is therefore possible to determine Vitamin A reserves.

With the generous cooperation of the Celanese Corporation of America, Bishop, Texas, the Vitamin A levels of 270 wild quail collected periodically on the King Ranch from September, 1949, through August, 1951, were measured.* Considered against the backdrop of extensive data gathered simultaneously on quail food habits, nesting, population levels, internal and external parasites, move-

ments, weather, soils, and cover conditions, the Vitamin A data go far in explaining why Southwestern quail are periodically scarce.

In the late winter of 1950-51, large numbers of adult quail died. Heaviest mortality, on the King Ranch, was from mid-February through early March. Losses, while severe in all territory under study, were not uniform. In a sandy, semi-prairie pasture of 27,208 acres, decrease was approximately 77%. In heavy brushland, on the other hand, mortality was an estimated 95%.

The heavy quail reductions on study areas were not due to hawks or other predators; the quail were not killed by hunters. Neither did large numbers "move to Mexico" or somewhere else. Quail died, and on the very ground where they had previously thrived, yet feathers and other "sign" of quail mortality, on top of the ground, were practically none at all. Evidence of quail mortality below ground, on the other hand, was abundant. Because weak quail pursued by field men usually escaped into burrows of rats, ground squirrels, armadillos, etc., a series of 44 typical burrows or dens, most of them of animals neither predatory on quail or "collectors" of quail remains, were excavated. Twenty-four contained quail bones and feathers; one burrow held the remains of at least ten birds. Like normal quail crippled by shooting, most sick bobwhites evidently buried themselves.

But why were quail weak and sick in the first place? The supply of native food had not been entirely ex-

hausted; birds with full craws were collected throughout the die-off period and only 32% collected in late winter weighed less than 150 grams (5.3 ounces), a level at which quail usually exhibit normal health and vigor. Ten different species of parasitic worms normally encountered in Southwestern bobwhites (Webster, 1947) were present, as were two kinds of ticks, four kinds of lice, a flea, and a biting fly. Nymphal rabbit ticks were especially abundant (up to 123 per bird). Quail mortality was most severe, however, in brushy range where parasites were relatively few. Careful post mortems, including comprehensive laboratory tests, did not establish the occurrence of infectious disease.

Why, then, did quail die? The Vitamin A measurements are suggestive. In September, 1949, after a summer of favorable rainfall and continuously green cover, quail averaged 1954 IU's of Vitamin A per gram of liver and 5606 IU's per liver. With drouth nearly continuous thereafter, Vitamin A levels declined. At the peak of die-off in March, 1951, study quail averaged only 132 IU's per gram of liver and 236 IU's per liver. On the basis of laboratory experiments, it has been determined that about 40 IU's of Vitamin A per day are required for survival (Nestler, 1946). Quail collected at die-off time, therefore, averaged Vitamin A sufficient for only about six additional days of life.

In dry times, plants manufacture less carotene than in moist growing seasons (Nestler, Derby and DeWitt,

* By an analytical method described by Gallup and Hoefler, *Journal of Industrial and Engineering Chemistry*, Vol. 18, pp. 288-290, 1948.



1949). Cold, wet weather restricts bobwhite feeding activity; quail fed hardly at all during four and a half days of continuous sub-freezing temperatures accompanied by sleet and freezing drizzle in late January. Disagreeable weather, therefore, placed an increased drain on precious vitamin stores. The combination of weather conditions in 1951; i.e., a dry summer followed by a cold winter, therefore, was highly favorable for the development of Vitamin A deficiency.

Individual quail with low Vitamin A reserves (500 IU's or less of Vitamin A per liver), however, were not an exclusive phenomenon of winter. Quail with low Vitamin A levels, particularly young birds, were encountered at all seasons. The possibility that Vitamin A deficiency is a rather common accompaniment of drouth in rangeland lacking a wide variety of natural foods is very real.

When the average Vitamin A levels were minimal in March, 1951, some birds (approximately 20%) had respectable Vitamin A reserves of more than 500 units. The ability of a few individuals to sustain Vitamin A reserves higher than those of the population as a whole suggests how quail,

as a species, survive periodically adverse times.

Differential ability to manufacture and store Vitamin A, evidenced as between adult covey members and brothers and sisters in the same broods, undoubtedly traced importantly to variations in individual physiology and general "hardiness." On the other hand, it appeared that the ability to make and use Vitamin A also varied on the basis of sex and age. In the crisis winter of 1950-1951, distress was evidenced by young-of-the-year, old females, and old males in the order named. The reason why young birds were few and cocks outnumbered hens following the 1950-1951 drouth, and at least one other drouth (1937), is indicated.

Periodic fluctuations in average Vitamin A reserves, 1949-1951, were sometimes coincidental with changes in food habits as indicated by detailed analysis of 450 quail craws. Vitamin A levels were high when diet was principally weed seed, especially goatweed,* or mast, especially acorns or mesquite beans. On the other hand, reductions in average Vitamin A levels occurred when food intake was high in grass seeds, prickly pear fruits, and insects (especially termites). Marked Vitamin A improvement on diets importantly "greens" occurred only after greens were largely buds, flowers, and dough-stage seeds as contrasted to leaves.

In the die-off winter of 1951, quail were eating less weed seed (-15%), less grass seed (-19%), about as much mast (-.7%) as in a "normal" winter such as 1934-1935. On the other hand, they were eating more green leaves (+10%) and vastly more Vitamin-low insects (+22%), principally grass termites (*Isoptera*).

It does not follow, however, that the best way to have helped quail through a period of seed shortage would have been supplementary feeding with common domestic grains. Given hegari in abundance at selected points on the range, wild quail registered Vitamin A reserves only about 35% as high as those of unfed birds in only two weeks. Of all the readily available domestic grains tested, only yellow corn of high quality recorded a pro-Vitamin A content (2000 IU's

* Principally *Croton engelmannii*, *texensis*, and *capitatus*.

per pound of feed) nearly adequate for bobwhite's known high requirements (Nestler, 1946).

Vitamin A also was established as important in quail reproduction. With most quail selecting mates from members of their own coveys long before bobwhite calls were common, or actual break-up of winter groups began, high Vitamin A reserves appeared unnecessary to awaken the breeding urge. Progress of mating to the point of actual covey break-up also occurred about the same time each year regardless of whether the range was "wet" or "dry," or Vitamin A levels, in the population at large, were high or low. *Large scale pairing* and *general breeding*, however, were a phenomenon of rainfall sufficient to produce verdant range and its accompaniment of Vitamin A-high foods. General breeding, "late" by 45 to 60 days, was recorded in the absence of spring rains, and occurred only after May rains in both 1950 and 1951.

In addition to importance as the "trigger" of general and vigorous breeding, high Vitamin A levels appeared necessary for sustained nesting effort. In 1949, a year of generous rainfall, with attendant "green" ground cover and Vitamin-high feed, nesting continued on a significant scale, spring to early fall. With summer drouth in 1950 and 1951, on the other hand, adult quail grouped into non-breeding associations and laying was postponed until rainfall revived ground cover and the supply of Vitamin A-high foods.

Vitamin A reserves of male quail were lower than those of females by an average of about 900 IU's at mating time. Wild hens collected in the first stages of laying invariably showed relatively huge Vitamin A reserves of 2235 to 8320 IU's per liver. The Vitamin A levels of incubating females, however, were low (200 IU's per liver). Laying, therefore, is exhaustive of Vitamin A reserves, and frequent and successful reneating appears improbable if not impossible under severe drouth conditions.

Even in territory where natural enemies of quail were under close control, survival of young quail was importantly regulated by rainfall and the presence or absence of Vitamin

A-high foods. Thus, on one study area, quail yield was 3.9 young per adult in "wet" 1949, 2.6 young per adult in dry 1950, and only 1.3 young per adult in ultra-dry 1951. Early nests under study (92) averaged almost the same number of eggs (14-17) each breeding season; hatchability was high (91% to 96%). Young birds hatching on dry range, however, seemed largely incapable of building Vitamin A reserves necessary for growth and development.

In a real sense, therefore, the timing, vigor, and effectiveness of bobwhite breeding effort appeared contingent on the occurrence and duration of verdant range. On lush range, the building of high Vitamin A reserves was rapid. In both 1950 and 1951, reserves adequate for full clutches and high hatchability were attained within 25 days after rains occurred.

Despite the indicated great importance of Vitamin A in bobwhite reproduction and survival, it should not be implied that Vitamin A, alone, is the key to quail increase. As Nestler (1946) has been careful to point out, Vitamin A, as important as it appears to be, is but one factor in the nutritional complex of carbohydrates, fats, at least 14 necessary minerals, and at least 17 other Vitamins, which themselves hold only a niche in the complex of weather, habitat, predation, and disease. On the King Ranch, for example, it was found that quail at nesting time were far less tolerant to crowding by their own kind than at any other season. Even in the best preserved, most moderately used grassland, and only in that type, did quail occur in nesting densities as high as a pair per eight acres. Only well-preserved, tall grass semi-prairie* appeared basically suitable for high sustained quail production, therefore, and the amount of Southwestern Texas rangeland in condition to "come back" at all rapidly, granted an immediate break in the present severe drouth, is far more restricted than at any known former time.

Although limitations to human effort are imposed by weather, opportunities for progress in quail manage-

ment are significant. High annual reproduction is essential for high continuous populations because adult losses from a multiplicity of natural causes have been found to be about 80% per year,* even in those years when food conditions are good. High annual production may be promoted.

Tall perennial grasses such as the bluestems (*Andropogon*), joint grass (*Elyonurus tripsicoides*), prairie drop seed (*Paspalum plicatulum* and *dilatatum*) provide the required framework for high annual quail yield; range management to allow the restoration and survival of tall grasses will almost certainly be followed by higher quail production. Brush clearing, especially when it involves subsoil plowing, almost invariably benefits quail, at least temporarily, by stimulating both grass and weed foods while leaving woody growth sufficient for refuge. Unless brush control is followed by moderate grazing to allow a "comeback" by tall perennial grasses, however, benefits to quail are highly transient.

With spring nest losses high in Southwestern Texas (Lehmann, 1946), and in every other section where quail have been studied, control of nest predators is a logical way to promote maximum quail hatch from limited rain. Close predator control (of coyotes, bobcats, skunks, raccoons, opossums and snakes) is both possible and practical; it has reduced the previously recorded nest losses of approximately 70% to an average of 22%, on experimental areas, King Ranch.

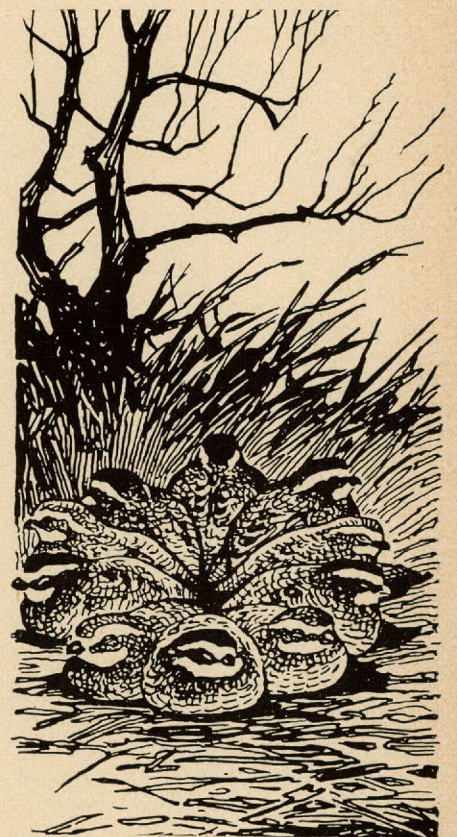
Quail harvest by humans might be regulated more effectively in many places by more nearly adjusting annual harvest to actual surplus. Higher than average quail populations in Southwestern Texas and the Panhandle are a certainty in "wet" years. In the knowledge that nesting densities higher than a pair of quail per eight acres are unlikely, quail seasons and bag limits might well be adjusted upward in wet years to allow hunters a far larger portion of a crop doomed to be removed anyway by other causes upon the return of "normal" conditions. At the same time, human harvest in severe drouth years might well be no birds at all.

All plant species considered for use in quail feed plots, and all supplementary feeding programs for quail and other game birds, merit the closest scrutiny to avoid the opposite of results intended.

Vitamin A studies have shown that "trace" nutritional elements are far more significant in quail welfare than was previously suspected. Further research to identify food requirements, periods of deficiency, practical corrective measures, etc., appears most worthwhile.

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* With the following specifications: average height, 8-10 inches; density, 4 to 6; nest sites, 1.5 to 7 per 100 sq. ft.; composition, 60%-75% perennial bunch grass.

* On the basis of later winter, summer, and fall censuses of 5,000 acres or more of the Canelo Pasture, King Ranch, July, 1946-February, 1952.

Texas Tracks

By JAY VESSELS

MEXICAN CONSERVATION

Kenneth Foree, outdoor editor of The Dallas News, writes that "Mexico has acted to preserve its wildlife, and Americans who have killed high, wide and indiscriminately had better stop, look, and listen."

He says a "law has been passed taking control and enforcement out of the hands of the local military, putting it in charge of the Ministry of Agriculture and Livestock and throwing into the law enough teeth to make an alligator's mouth look like an Easter bunny. Violations can be punished up to \$10,000 and three years in prison. And three days in some Mexican jails are a lifetime."

Foree reports that the law strikes hardest at market hunting and that seasons and bag limits will be regulated. For example, individuals are limited to two deer a season. Seasons are more generous than ours, says Foree, since the open season on ducks, geese and swans are November 15 to March 15, inclusive.

PERSONNEL PROBLEM

A new member of the staff on the Derden Wildlife Restoration Area, in the Palestine region, had a problem.

He was filling out an employment form. At the line concerning state pension on retirement at 65, the rookie employee hesitated.

His puzzlement was complete, because he is 71 years of age. "And outworks anyone of his six-man crew," reports the high command.

The name is George Christ. His energy is just one of his virtues, according to field men. He knows every stump and every snag in the area.

But his prize asset is his sense of humor. And he had a good laugh because there was no place on the employment form for a Texan beginning a career at 71.

BIG GAME SLANT

Fred Maly, outdoor editor of the San Antonio Express, relays a conversation with W. Scott Schreiner of Kerrville, member of the Texas Game & Fish Commission, that deer "have been having a rough time in his country because of the drouth."

Maly continues:

"The Schreiners have been feeding deer for weeks but deer never thrive very well on commercial feeds. Many of the doe on Schreiner's big Real and Kerr County spreads are sick, and Scott doubts their fawn will survive when fawning time comes.

"Weak from a lack of green forage, a doe won't have much milk for a new-born fawn and it looks tough for the deer crop on what is easily, in good times, the best deer range in Texas.

"The turkey have returned to the Schreiner pastures after disappearing during the hunting season. Schreiner says that his wild turkey pull out nearly every year in November to hustle up some wild grape and wild cherry country, none of which he has on his acreage. Which may be why turkeys stage the vanishing act on so many of the other hill country hunting leases."

EDUCATED FISH

The fish younger generation also is getting smarter. Smart enough to challenge the Jasper State Fish Hatchery crew.

Ferriss Garrett, superintendent, said that for the first time in his 16 years at the place, the bass fry refused to conform to custom and swim into the traps for transfer to the rearing ponds. He thought the strange weather could have caused this.

One thing for certain the tiny fry,

barely big enough to see, had to be corralled.

So Garrett and his crew—John Allen, Bill Byerly and Earl Fountain—switched to night strategy. Knowing that most fish succumb to the lure of light, they tried strong beams on the balky bass.

It worked. By moving the light from the center of the tanks toward the shores, they attracted the pre-

Field Data

cocious fry into reach of fine mesh dip nets. Thus the transfer was effected.

WILDLIFE TRAGEDY

The Houston Post reported killing of three deer in one highway collision.

B. I. Jones, pipe line contractor, said he was driving near Centerville, Leon County, when he saw a deer and pointed it out to his children.

Meanwhile, he said, three other deer he had not seen leaped across the road. In the crash, his car was upset. None of the passengers was hurt but the impact made the animals—two does and one buck—unavailable for salvage.

WIRED FOR SMELL—NOT SOUND!

Warden John R. Wood who's supposed to have put the "wood in Brownwood" so far as sportsmanship is concerned, says there was a time when he suspected that not everyone liked him.

It was because of something that happened one dark night when Wood was slowly cruising into an inlet off Lake Brownwood looking for illegal fishing nets.

He was peering into the darkness with his head well up. Suddenly his nose seemed to take off. He barely stayed in the boat.

After retrieving his dignity, Warden Wood poled back to the scene of the excitement. Telephone wire stretched across the area had clipped him under the schnozzle.

"Could have been worse," observed the warden, gently rubbing his proboscis, "such as piano wire."

FELINE FIASCO!

Man conquers space!
Women fight bulls!

And cats may be on the way out as mouse catchers in Texas post-offices!

In one large postoffice the vote finally went against the cat.

Here's why:

A hunter's shipment of quail wings, forwarded for scientific study to the Game & Fish Commission, arrived with the container damaged.

The P. O. immediately pinned it on Tom, the pet cat. Postmaster sent a note with the torn package. If it

Game Notes

happened again, some changes would be made.

Then, came another note with a lacerated container. This, solemnly said the P. M., was the end for Tom. Tom doesn't live here anymore, etc., etc.

But the Commission interceded. "Please give Tom another chance. His long and noble record justifies an opportunity to vindicate himself."

Came more quail wings and came many neat, unscratched packages. Patience had been rewarded.

Finally, came the concluding line with the tattered evidence and a memo to the effect that all of Tom's remaining nine lives would be to no avail so far as duty in the postoffice was concerned.

Science marches on!

SNAKE STORY!

A harmless rattlesnake—a petrified one—got that way in an unusual manner, according to a top bracket Commission source.

The snake, described "as big as your forearm and about five feet long" had crawled up into the small hollow of an oak tree.

There it had become caught and could not go either way, especially the back way which was the route to escape.

Finally it was discovered there, ap-

parently years after the incident, and maintained in what was described as "a fine state of preservation."

RING TAIL REPORT

Everybody knows that a narrow river ordinarily would be no barrier to a ring-tailed cat. Yet the folks in the Palestine area agreed that no ring-tails had been noticed on the east side of the Trinity river in that vicinity.

Now, at last, John Carlisle, biologist in charge of the Derden Wildlife Restoration project, says the ring-tails have made it across the stream, officially.

The ring tail, you understand, looks like a cross between an ordinary raccoon and a fox. One of its confusing characteristics is that it runs like a fox—that is, Carlisle explains, "its tail floats."

Fish Reports

MAN OVERBOARD

Bob Pointer of the Abilene Reporter-News, guarantees this one under "I-swear-it-is-true" department:

Ben Gray, Jr., and Tom Neal were fishing from a railroad trestle and having fabulous luck with black bass. Gray was using albino crickets, and, according to Pointer's report, the bass were "coming right up on the bank for them. Neal was using minnows and a cane pole."

Here's Pointer's account from there on, quoting Gray:

"A switch engine came down the track and Tom stepped back cautiously to let it pass—but part of the engine stuck out too far. Tom stepped back another inch or so and hooked his boot heel in the planking. Down Tom went, cane pole and all."

Gray related how he rallied to the rescue, figuring his comrade had fallen into the water and knowing he couldn't swim. Then he observed that Tom was hanging by one hand to the trestle cross-beam and delicately holding his precious cane pole in the other.

Finally, Neal pleaded in response to Gray's offer of help:

"Help me? Heck, Ben, save my minnow."

TRADING STOCK

A teacher at a Texas Nature Camp was concerned because one of the boy students took too literally the counsel that most snakes are harmless.

The lad caught a garter snake and was carrying it around in his pocket. He was having great sport frightening the girls.

To stop the flutter and spare the snake, the teacher sought to use psychology and to reason with the lad that the reptile would do more good than harm if turned loose.

That was very good up to the point where the youngster suddenly said:

"I'll tell you what I'll do—I'll turn this snake loose if you'll turn loose that pet raccoon you have tied up over there. Maybe he'll do more good on the loose, too."

The youngster won.

BUSINESS BOOM

T. D. Carroll, Director of Conser-

Press Views

vation Education for the Game & Fish Commission, has gone out of the turtle trap market.

In a grade school speech, he mistakenly implied that pupils could obtain turtle traps by writing the Game Department. The ensuing letters swamped the place.

Here's one letter:

"Dear Mr. Carroll—Will you send me a turtle trap. I would like to have it because I think it is so nice. And I also think it is so nice to give us a package and a turtle trap."

Carroll hastily replied that he referred to turtle trap designs which are furnished along with animal track drawings, wildlife photos and other conservation education material.

By the dozens and by the hundreds the letters keep coming. The fact that the youngsters mean to follow through was shown in a letter from a 14-year-old San Antonio boy who sought instructions for starting a conservation club.

Sages of Silsbee

By

STEVE HAMLIN

THE tall, spry man locked his arms to cushion his chin against the end of the long handled shovel.

"Just say . . ." His voice trailed off.

"Just say," he resumed, "that I retired in 1945 after 49 years, six months and 14 days of railroading."

This man who railroaded from the days of the wood burner on through to the diesel powered, streamlined age is Richard E. Jackson.

Now settled down to a new career on his modest pine-studded acreage, he has found the abundant life in nature study, particularly ornithology. And those railroad tracks just behind the Jackson home have no significance.

Jackson ridiculed any idea that a man spending his working lifetime on a train would want to retire where he could hear the locomotive whistle and the clackety-clack of the wheels and see the trains whiz by.

"Don't pay any attention to them," he said. "Railroading was good to me, but I'm living in another world now."

He smiled at the story book pattern that he should fret if Number 16 wasn't on time.

"This is my life now," insisted Richard Jackson, swinging his long right arm in a majestic arc to indicate the preciousness of his home place.

Nevertheless, that old gleam returned later when conversation led back over the early days of his railroading. He spoke sentimentally of Mile Post 63 and other landmarks. He talked largely of the days when everybody in the crew made the fuel stops to load up with pine knots. And Jackson proudly described his first

highballing background when he fired a wood burner on a logging train.

That covered the rugged days around the turn of the century which found his first love, the Gulf, Beaumont & Kansas City, penetrating heavily forested East Texas. Next came the climaxing white-collar days when he was conductor on a fast Santa Fe passenger—the Santa Fe which skirts his pine shaded estate.

This railroader turned bird man, now is an authority on the Big Thicket of East Texas. He conducts groups into the area on camping and lecture forays. And he speaks intimately about the present and the past Big Thicket.

He saw the primitive area, traveled through it daily when game was so

plentiful—big game—that the herds almost interfered with train schedules.

"It was commonplace to cut into a herd of deer on a curve," he explained. "That usually meant a stop for equipment check and also a stop for venison."

Jackson says he remembers that the big change in wildlife in the Big Thicket began in the early thirties, "say 1933 or 1934."

At that time, he explained, the timber cutting became so extensive that civilization began quartering up the wilderness area. The trees were felled indiscriminately; the land was put under cultivation. Then came the rush of people.

Jackson belittled tales about the timber wolves overrunning the deer herds, explaining: "They were numerous, and they were big, vicious fellows, but they merely provided the predator factor in the balance of nature. Can't blame wolves for something we humans did."

The lean veteran of fascinating East Texas smiled when he told how he first became interested in birds 15 years ago.

"Went to Huntsville to make a speech about the Big Thicket to the students of Sam Houston College. There I heard a speech by Dr. John H. Baker, president of the National



Richard Jackson, retired railroad man turned ornithologist, watches his grandson, Richard Hardy, probe a bird bath on the Jackson grounds.

Audubon Society. He was on the same program. Dr. Baker made his speech so exciting; he made the relation of birds to human beings so graphic that I simply could not resist beginning to major in birds."

Jackson then fervently related how he saw an ivory-billed woodpecker on his grounds. This rare bird first gave away its presence by probing the bark on a giant pine.

Clutching the shovel handle, Jackson showed how the bird dodged behind the tree; how he followed and how he finally got a good look at it.

This pantomime ultimately prompted the enthusiastic Texan to credit his wife, Velma O. Jackson, for showing "so much patience with me all my life, especially now that I am an ornithologist." Mrs. Jackson, he explained, loves the out of doors "but more from the slant of a botanist."

Here is where "the bird triangle," as he called it, entered the picture.

A neighbor's wife spiced the situation, that is, ornithologically speaking. This "neighbor's wife," it turned out, lives down the highway toward Beaumont from Silsbee and indeed proved to be a celebrity in her own right.

She is Bessie M. Reid, a distinguished bird woman and nature lover who writes voluminously, conducts groups (particularly students) and lectures as often as her time permits.

Mrs. Reid, whose husband, David Reid, is a retired oil man, seems proudest of her international citation as the first person to successfully raise a baby humming bird which she retrieved after it had been hurt.

This gracious lady, referred to by Jackson as "our own Texas celebrity," writes vigorously and entertainingly in this reference to some of the bird affairs in the Silsbee area:

"... Sparrows, English sparrows, are as persistent as they are tough. Smart, too. No bird on earth is more fully aware of gang tactics value. A pair bent on retrieving the apartment from which martins have driven it, is fully aided and abetted by neighbors and relatives in hearing of its shrill war cries.

"The martins are pretty gregarious, too. They fight the sparrows, always outnumbering them, somewhat in the manner that several species of pugnacious scappers, with neither talons

or hooked beaks, manage to get the best of hawks and buzzards. They attack an enemy on the wing, getting above him, lighting on his back if he isn't able to remove himself in a hurry, and going for his eyes. No wonder martins, mocking birds and red-winged blackbirds, can make predators, after songsters' fledglings, hot-foot it ignominiously from a scene of threatened murderous kidnapping."

Writing in the March (1951) issue of *The Port Arthurian*, Mrs. Reid expresses a motherly attitude toward baby birds and counsels the folks on equipment:

"Let all else be otherwise serene, what is as tormenting as it is dangerous awaits baby martins. Houses built to Boy and Girl Scouts, Camp Fire Girls and other youth organization specifications, the best that can be devised, get infected with mites from being used or visited by sparrows, or just having sparrows as close neighbors.

"For sparrows are given to salvaging poultry yard feathers as nice warm nest linings. Few and far between are feathers of this description without nits attached to them. The nits hatch coincidentally with eggs the feathers have helped to warm. In never ending misery from voracious blood sucking lice, birds, too young to instinctively groom their plumage themselves, can do nothing but squirm or wriggle.

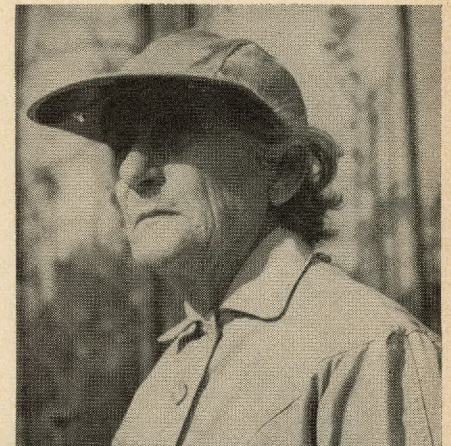
"Sparrows and martins get killed

by resulting falls to the ground. Or, if their feathers are sufficiently sprouted to bouy them up and break their fall, they are apt to be crippled. In any case, cats soon finish up most of them.

"Does Lady Luck smile on any of them, human friends happen up before the cats, and thus acquire a bird or birds. For one of life's phenomena is that hand raised birds appreciate their status. In particular the swifts, swallows, humming birds, whip-poor-wills, nightwals and orioles."

Thus these two sharp-eyed East Texans help inform their neighbors of the bountiful local birdlife and provide a convenient link between their home area and the outside.

The Big Thicket—that is its remnants—and the natural wonders it provides could scarcely find two more competent or enthusiastic spokesmen.



Mrs. David Reid (above, right), who shares the Silsbee Big Thicket prominence, is an ornithologist of international note. Mrs. Richard Jackson's love for the outdoors runs to botanical subjects.

Vingt et Un Islands Offer Scenic Splendor

☆

By
MRS.
MINOR
A.
HURST

ON THE eastern side of Galveston Bay, just off Smith's Point, Texas, is located one of the greatest scenic attractions of this continent, beautiful Vingt et Un Islands Bird Sanctuary, the summer home of the spectacular flame birds or roseate spoonbills. Either name is equally fitting to this beautiful bird which is featured on this month's cover of TEXAS GAME AND FISH.

At the present time, there remains from the ravages of time and tide only six of these small flat islands but in the days of long ago there were supposed to be 21 in the group, hence the name, a French word meaning 21.

Another version is that old Jean Lafitte, a French pirate, and his men used the islands as a base for their operations. As their favorite pastime was a card game called Vingt-et-Un, the islands came to be known by its name, giving them a romantic atmosphere still felt by all who visit these alluringly beautiful bits of land.

Only two of the islands are large enough to have sufficient trees and shrubs to support the nests of the large birds. The largest one is about a quarter of a mile long and three hundred yards wide at its widest points.

The smaller one is crescent shaped and from the air must look like a green crescent moon against the sparkling blue waters of the bay. These two islands have been planted with salt cedars, hackberries, oleanders, and other vegetation for nesting supports and to prevent erosion by wind and water.

For several years, this has been a project of the Outdoor Nature Club. A member of the club once remarked on a cold raw February day as he dug and planted, "This is indeed a project for strong backs and stout hearts," but as ever true, with many working together, the islands have been preserved and not only the spoonbills, but thousands of other birds share this small paradise, liv-

ing together and rearing their young in perfect harmony.

On a boat trip around the islands in mid June one may also see great numbers of American and snowy egrets, white and white-faced glossy ibises (close relatives of the roseate spoonbills), Louisiana, black-crowned night and Ward's herons, a few gallinules and many red-winged black-birds. The shy and seldom seen least bittern may be glimpsed along the edges of the marsh grass.

At that time of year the oleanders are in bloom, shining pink against the cool green of the trees. The large white and pink birds hovering over the nests and perched on top of the trees and shrubs resemble huge tropical flowers.

As the boat draws nearer, hundreds of the birds arise and soar in beautiful patterns against the deep blue Texas sky. The half grown birds congregate at the edge of the water to view with great curiosity these visitors to their island homes. They are amazingly tame, knowing no fear because they are never molested.

For the past 20 years, the National Audubon Society has assigned a trained warden to guard the island sanctuary during the months of April through July. Twice or more each day he makes the rounds of the islands in his small boat to see that his charges are safe and to estimate the numbers and species. The Society has also erected large wooden signs with warnings: "No Landing, Bird Sanctuary."

During the nesting season when the midday sun beams hot upon the islands, the parent birds stand on the nests with wings outspread to protect their youngsters from the heat. The young birds would die quickly if the parents were frightened away; this is one of the reasons no one is permitted to land. However, a small flat boat can draw near enough for good pictures to be made without endangering the birds.

One hundred years ago, the

roseate spoonbills were numerous along the Gulf Coast, but a fashion fad for their lovely feathers on women's hats and for feather fans caused them to be slaughtered in large numbers. This took place during the nesting time when the plumage of birds is always the loveliest. The young roseate spoonbills died on the nests—and along with the egrets were nearly wiped from the face of the earth.

As recently as 1917, the spoonbills were thought to be nearly extinct—then a few pairs were found nesting on Vingt et Un Islands, and they have nested there in increasing numbers ever since.

Many years ago, mainly through the efforts of the National Audubon Society, a law was enacted prohibiting the sale of or the possession of feathers of egrets, spoonbills or other protected birds.

Arriving on the islands in April, the spoonbills, egrets and others conclude the nesting and rearing of their young by the end of July. They leave then, going farther south to new feeding grounds. The warden also returns home and only the red-winged blackbirds and perhaps a few alligators are left to await the coming of winter and the next inhabitants.

The islands have year-round state sanctuary status and in winter are used as resting places by ducks, geese and other shore birds and their young after the long hazardous journey from the northern nesting grounds. Such resting and feeding places are essential if we hope to increase their numbers.

The steady increase of the egrets and spoonbills after their near extinction proves that our remaining remnant of wildlife can be replenished by providing more sanctuaries and protection, and in arousing the public's interest.

A trip to Vingt et Un Islands in June can be expected to excite even the duller interest. Why not plan to go in June?—COTFAG NEWS.



The birds view with great curiosity visitors to their island home.



The large white and pink birds perched on top of the trees and shrubs resemble huge tropical flowers.



Bats, Creatures of Mystery

By OSMOND P. BRELAND, Ph.D.

Professor of Zoology, University of Texas.

SINCE earliest times bats have occupied a prominent place in the beliefs and superstitions of the peoples of many lands. To Caucasians the creatures have as a rule symbolized evil or misfortune and have been thought of as being associates of vampires, witches and demons. Among certain Orientals, however, bats have been regarded as heralding good fortune and happiness and even today bats are frequently used as emblems in Chinese handicraft. A Chinese talisman considered of great value is the *Wu-fu*, a design symbolizing the tree of life encircled by five bats. Each bat represents one of the

five great happinesses supposedly sought by man: wealth, health, good luck, a long life and tranquility.

Most people know that bats are mammals rather than birds, but their habits, actions and capabilities are quite different from those of other mammals. These facts probably account for the inclusion of bats in folklore and legend while more conventional creatures are often disregarded. They are the only mammals that can fly in the true sense of the word. Others, such as the so-called flying squirrel, are capable only of gliding for short distances. Bats prefer caves, hollow trees and the attics of old and

deserted buildings to surroundings more compatible with human tastes. Here they sleep during the day and do most of their foraging at night. Although the creatures are at home in the air, it would be difficult to find one more awkward on the ground. Laboriously they pull and push themselves along and will take to the air at the first opportunity. One reason for the unsuitability of a bat for progression on a flat surface is that the knees bend backward, a situation found in no other mammal. To cap the climax we find that bats sleep head downward, hanging by their hind feet to some projection which

they can grasp. These weird creatures are obviously not disturbed by the possibility that their blood might "rush to their heads!"

Everyone has seen bats flitting about at dusk, but these flying mam-



mals are so seldom seen at close quarters that there are few people who can give an accurate description of one of them. The smaller species are surprisingly mouse-like in general appearance, a fact that accounts for their common names in some countries. In Germany a bat is a *fledermaus* or flying mouse while in France the word for bat is *chauve-soris*, meaning bald mouse. The latter name was doubtless given to the creatures because their wings are formed from leathery skin which is "bald," being entirely devoid of hair or feathers. The braces for these wings are elongate bones, which correspond to the arm and finger bones of human beings; the thumb is the only finger that is free of the membrane. The thumbs form a short clawed projection on the front margin of each wing, and they are used by the bat in clinging to surfaces and in crawling about from place to place. The body, like that of many mammals, is covered with hair, the "face" is often extended into a sharp muzzle while the ears are usually large. The eyes, rather small compared to the body size, are black with a distinctly beady appearance. Within the mouth are many sharp teeth which the bat does not hesitate to use on any person handling it incautiously. The hind legs except for the feet are included within the membranes of the wings and this is often true of the tail. In some, however, the tail trails free, a feature that heightens the resemblance of these species to mice.

Almost two thousand different kinds of bats are known from tem-

perate, tropical and subtropical areas throughout the world. As might be expected, there is considerable variation in size, color and general appearance among the different members of the bat clan. There are white bats and black bats; red, spotted and even orange-colored bats. Some have leaf-like frills on their noses and others have such large ears they are called jackass bats. The tube-nosed bat has its nostrils drawn out into two long tubes of unknown function, a feature not found in any other group of mammals. Largest of the bats are the so-called flying foxes of India, Malaya and adjacent areas. They have a fox-like face—hence the common name—a body as large as a small cat and wings that stretch for five feet. According to popular conception, these large bats should be the vampires that suck blood from innocent victims, but investigation has



shown that they eat nothing more objectionable than fruit. Beauty in the strict sense of the word is certainly not an outstanding trait of most bats, but the prize for repulsiveness must be awarded to the naked bat of Malaya. This creature is shamelessly naked except for a ruff of hair about the neck, while from an enlarged throat pouch, when disturbed, it discharges an oily fluid that smells to high heaven. The naked bat is certainly not a species that one is likely to select as a pet.

There is still much to be learned about the reproductive habits of bats, since only a few have been studied and even these not in great detail. The period of pregnancy or gestation probably varies from about three to six months, depending upon the species. Most bats have only a single youngster at birth, but twins are born occasionally and in at least one species, the so-called red bat of the United

States, three and four have been recorded in a single brood. During labor, the female usually suspends herself by the thumbs and hind feet. Then she forms the hind legs, tail and attached wing membranes into a pouch for the reception of the young. In most observed cases, the youngsters have been born feet first in contrast to the head-first birth of other mammals. An occasional female has actually been seen to assist in her own delivery by grasping one of the feet of the emerging bat-child and pulling gently! Young bats at birth are almost as helpless as a human infant except that they are capable of clinging to the body of the mother with their thumbs and hind feet. Their eyes are closed and they cannot fly. Like the young of all mammals they are fed milk from the mammary glands or breasts of the female. These breasts, by the way, are located in essentially the same position as those of human beings. This fact, plus the fancied resemblance of a bat's face to that of a man, caused some of the earlier naturalists to believe that bats and people were rather closely related. Those of us who are fastidious, however, will be relieved to learn that modern biologists classify bats nearer a group called the insectivores (including moles, shrews and hedgehogs) than the human branch of the family tree of mammals.

The first few weeks of a young bat's existence are likely to be quite precarious because their mothers fly and cling to small projections far above the ground or floor level when they



are at rest. The females carry the babies along on their nightly forays until they get too heavy and after this time, they are left attached to the wall of the cave, attic or hollow tree that serves as their sleeping quarters by day. Woe betide the youngster

that loses its attachment and falls earthward; the chances are good that the little fellow will perish. Adult bats have been seen to swoop about such victims of misfortune, but no attempt was made to rescue them and the squeaking unfortunates were shortly deserted. Proprietors of caves inhabited by bats and open to the public have stated that in the spring and early summer they are forced to remove from the floors of the caves large numbers of young bats which have fallen and been left to their fate.

Many of the small species of bats feed upon insects which they catch on the wing as they dart about through the skies at dusk and at night. Before a detailed analysis was made of the kinds of insects that were eaten, even some biologists assumed that bats fed largely upon mosquitoes and other harmful insects. As a consequence, a few people became overly enthusiastic in their attempts to attract bats to their vicinity. One of the most elaborate of these experiments occurred in San Antonio, Texas, where several sturdy "bat towers" were erected. The designer of the bat roosts believed that the bats would eliminate malaria by eating the mosquitoes which transmit the disease, and that in other regions, the establishment of his bat towers would free the area of such pests as the codling

moth. But extensive advertisement failed to convince prospective customers, and the project was abandoned. It is now known that mosquitoes form a very small portion of the diet of insectivorous bats, and it is considered doubtful that the creatures are capable of significantly reducing the numbers of harmful species of insects. Some bats live almost exclusively on fruit while others will eat almost any small living creature it can capture, even including smaller bats. A few kinds of fish-eating bats are known, and it is reported that the fish are captured as the bats skim over the water surface.

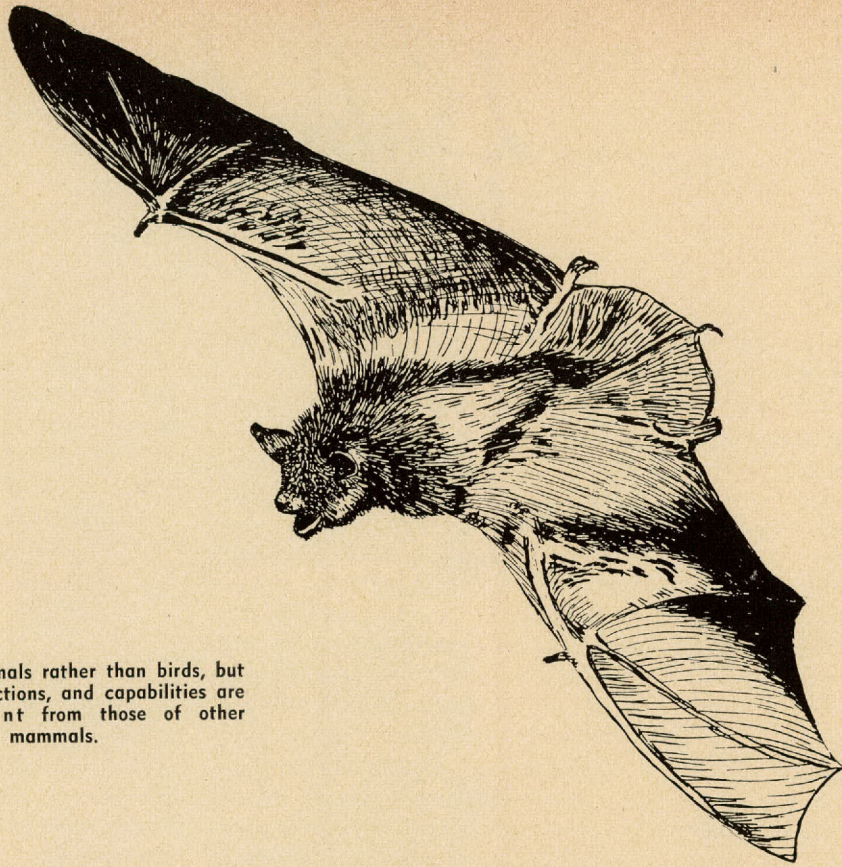
The vampire bats deserve special comment because their blood eating habits have given rise to many incorrect stories and beliefs. So far as is known bats that eat blood occur only in South and Central America. This is somewhat surprising because stories of human vampires and their transference to the bodies of bats and other animals have had their origin principally in Europe. Vampire bats have been known to attack human beings while they were asleep, but they feed upon other animals as well and do not show a preference for human blood. They do not attempt to fan their anticipated meals to sleep with their wings, but have been seen to alight directly on their bodies.

Sometimes they alight nearby and then crawl up to their victims. The teeth of the vampires are very sharp and with them the creature makes a small wound through the skin. It may very well be that the saliva of the vampire contains a substance that deadens the pain of the wound because very few people are awakened by the bite. The bat does not suck the blood as commonly stated, but laps it up with its tongue as a cat drinks milk. The wound bleeds for some time after the bat has stopped feeding and the chances are good that a substance to prevent the blood from clotting is injected when the bite is made. In parts of South America vampire bats are so numerous that it is difficult to raise chickens, horses and other domesticated animals because of their attentions. People are seldom seriously injured directly by the feeding of vampire bats, but some of them do carry a type of rabies. This often fatal disease has occasionally been transmitted to human beings.

One of the best known and at the same time one of the most unusual features of bats is their ability to avoid obstructions even in total darkness. This ability, however, is not perfectly developed as often believed. Experiments with wires strung across dark rooms show that bats sometimes do hit one of the wires, while an occasional dead bat is recovered from the bases of lighthouses along with numerous birds that have been killed. It was at one time thought that this trait was dependent upon a mysterious "sixth sense" which made the bats aware of nearby obstructions. It is now known that flying bats utilize the principles of radar. As they fly about, they are continuously emitting cries which they can hear, but which are inaudible to human ears. Bats receive the echoes of these supersonic cries as they are deflected from objects which they are thereby able to avoid.

In temperate areas bats disappear from the twilight skies as winter approaches and do not reappear until the following spring. This is because the creatures either hibernate during cold weather or migrate to a warmer climate. Deep caves, where the temperature remains well above freezing, are favorite hibernating quarters for bats. Here they may be found by the





Bats are mammals rather than birds, but their habits, actions, and capabilities are quite different from those of other mammals.

thousands, clinging to the roof and sides in dense clusters. If disturbed, some will release their attachment and flit into deeper recesses while others simply squirm and chitter in protest before falling back into the deeper sleep of hibernation. The waking process is a gradual one and full activity is often preceded by short intermittent flights about the cave and to the outside. Several migratory flights of bats have been recorded, although as yet little is known of this phase of their activities. Some are thought to migrate to the southern United States and perhaps farther southward. Flocks have been observed far at sea and large numbers have been known to settle on a ship, much to the consternation of the passengers and crew. An occasional specimen of species from the United States has been found in Bermuda in the fall indicating a hop of several hundred miles over open ocean.

Not only do bats hibernate in large numbers in caves, but a large cave may also serve as the daylight sleeping quarters for literally millions of

bats during the summer. As dusk approaches most of the creatures apparently get the urge for action about the same time because they often emerge from the cave in hordes. One of the most spectacular of these nightly flights occurs in the summer and early fall at Carlsbad Caverns, New Mexico. The bats pour from the entrance like smoke from a volcano and form a writhing black column visible for two miles away. It is an interesting fact that it was a search for the source of this vast multitude that led to the original discovery of this great system of caverns. The emergence often continues for nearly twenty minutes, and it has been estimated that no less than 8,000,000 bats are involved. All in all the Carlsbad bat flight is a phenomenon well worth seeing.

Favorite beliefs connected with bats include the idea that they are blind and that they harbor bedbugs and other human parasites. Actually, bats see reasonably well even in broad daylight as indicated by observed day migrations, and they have excellent

eyesight in semi-darkness. The expression "blind as a bat" is thus not very descriptive of anyone with poor eyesight. A variety of parasites have been reported from bats, but the well known bedbugs is not one of them. Many of these parasites feed only upon bats, and so far as is known, none of them have developed an appetite for human beings.

According to popular concept the hair of the human female has a special attraction for bats. Many people are convinced that bats get into women's hair routinely, and the implication is that the creatures do so deliberately. While it cannot be stated positively that no bat has ever gotten into a woman's hair, it can be said that if such occurs it is rare and certainly accidental. For a bat to get entangled deliberately in a woman's hair would be the height of asininity even by bat standards. This action would put it completely at the mercy of its outraged victim, thereby ensuring the creature a speedy demise.

—(Article and illustrations reprinted through courtesy of FLORIDA WILDLIFE.)

Bobwhite Quail

BOBWHITE quail management has evolved through several stages. The first was legislation to restrict hunting pressure. Seasons and bag limits were gradually reduced, and many counties were given three-year or five-year closed seasons. In spite of these measures, quail declined with little relation to hunting pressure or game laws. On many farms and ranches where no hunting had been done, quail numbers were no greater than on near-by hunted territory.

Restocking was another definite stage that was tried thoroughly. In 1941, restocking was dropped after field checks showed little or no results. Apparently, the factors which caused the native stock of quail to decline also operated even more severely to limit the success of introduced birds. The next stage was the recognition of food and cover as the first essentials of quail production. This explained why legislation and restocking had failed. Habitat improve-

ment remains the basis of quail management today.

In most places, some improvements can be made in the food and cover supply. In western Texas, rainfall is such an important factor that habitat manipulation to increase food may be impracticable. When it doesn't rain, nothing can grow. When it does rain, native weeds grow so well that plantings are unnecessary. Some form of cover improvement can be practiced to advantage where needed, even in the western part of the state.

Quail are a product of the land, and quail management practices must be compatible with other land uses. Practically all of the quail range in Texas is privately owned and operated for the purpose of producing economic crops. The several million bobwhites in the state are largely produced as by-products of private ranching and farming operations. The management practices recommended for increasing quail are sound and practicable in some, if not all, parts

of the state. Landowners will doubtless choose the type of management that best meets the needs of their quail and the limitations of their land-use programs.

It is recognized that soil conservation and improvement is beneficial

By D. W. LA

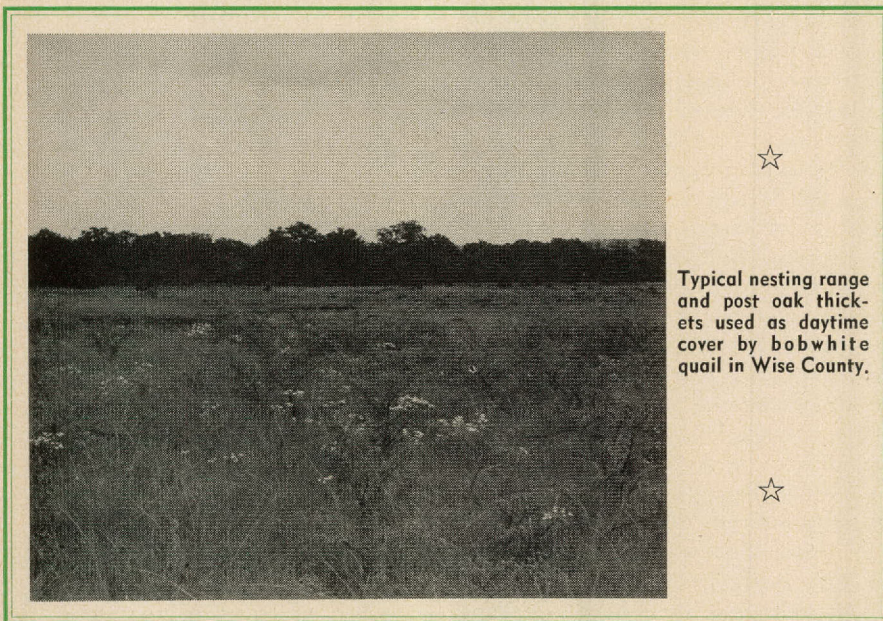
to quail. Whatever helps the land also helps wildlife in the long run.

In Southeastern States, some private plantations are operated for the primary purpose of raising quail. Such intensive land management for quail is not practiced in Texas, nor is it likely to become common. Birds in the bag on the southeastern preserves cost more than 50 dollars each. It is obvious that Texas quail must continue to be a by-product of other forms of agriculture.

Quail need to be considered on less than five per cent of the acreage. Excellent populations can be produced where the other 95 per cent is of little value as quail range. Quail cannot be crowded beyond the limit of perhaps eight coveys per one hundred acres, no matter how ideal the habitat may be.

The average quail population in Texas over the range as a whole may be less than one covey per one hundred acres. An excellent population, and first-rate hunting, would be three coveys per one hundred acres. The three coveys can be produced by managing five acres out of one hundred.

The cheapest way to improve quail habitat is to plan farm and ranch operations that will pay for themselves and give incidental benefits to quail. Almost any group of native seed-bearing plants will include some



☆
Typical nesting range and post oak thickets used as daytime cover by bobwhite quail in Wise County.
☆

Management

very acceptable quail food. Just letting weeds grow in the right places about a farm will help. Letting them grow next to cover is better than leaving them in midfield.

When only a part of a farm unit is to be cultivated or improved for

Wildlife Biologist

pasture, there often is the choice of making improvements in one block or scattering the developments. If a farmer has time to mow only half of his pastures for weed control during one season, he often mows a solid block. Mowing the same number of acres in scattered small blocks or strips away from cover would be less harmful to quail. This practice would develop as many acres of improved pasture, and the birds would not be hurt. The more the pattern of crops and pasture can be broken up, the better for quail. A straight row a mile long is attractive in some ways, but not to quail.

In Newton County, it has been observed that landowners with surplus acreage do best to scatter their pasture developments. In this way, the best soils can be developed first. Planting lespedeza, clovers, and grasses forces cattle to use some of the native grasses in order to get to all of the improved parts of the pasture. From the standpoint of quail management, the value of such developments is largely in proportion to the amount of field edges, rather than total acreage.

Fire lanes, when plowed each year, are beneficial to quail as dusting places and travel lanes, although they produce little food when plowed in summer. Winter plowing may produce good crops of weeds, but fires can

cross the lanes the next fall. An excellent method of helping quail with fire lanes is to lay out two or three parallel lanes and plow one each year. The two- and three-year-old lanes serve to check the spread of a fire before it reaches the newly-plowed line. The weed growth on the fallow lanes is fine for quail.

The fencerow is often the only permanent quail habitat on a farm, and the farmer should consider the cost before cultivating up to the fences and destroying this habitat.

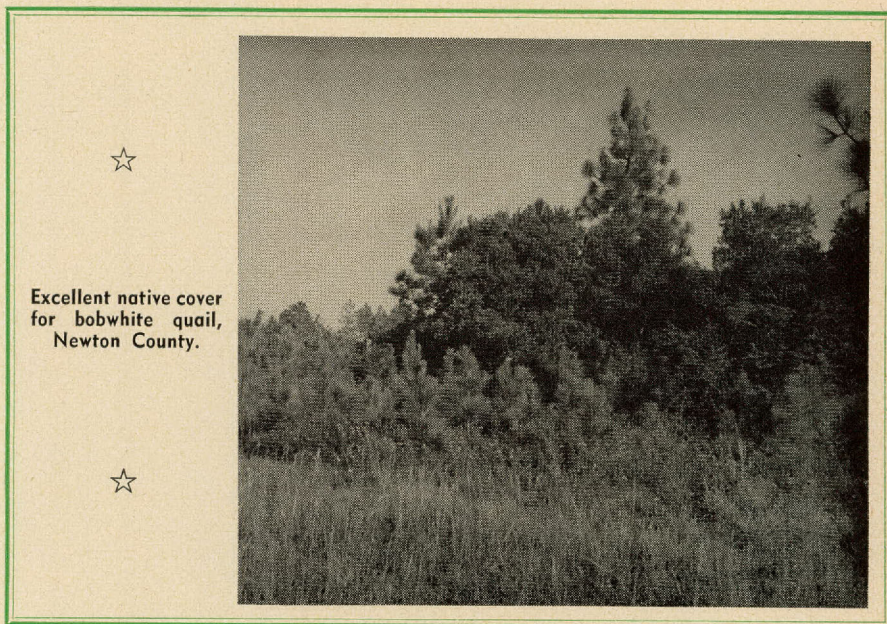
There is a mile of edge around a 40-acre field. If weeds and shrubs are permitted to grow naturally on an 8-foot strip around the field, only one acre is taken out of cultivation, assuming that it is practicable to cultivate up to the fence posts. The cost of clearing an acre of fencerow and keeping it clean may be greater than the possible net profit.

Frequently, a farmer makes a choice of crops in which he could consider quail without cost. Serecia and kudzu

are perennial hay and pasture crops which require the same soils. The serecia has some value for quail, but kudzu has none. The large-seed crimson clover seems better than other clovers for quail and may be as good or better than the others for pasture improvement. Goats and sheep eat more quail foods than do cattle. Sometimes the economic advantage of goats and sheep is negligible. Open-range hogs do more damage to quail, pine trees, and pastures than the hogs are worth.

Among winter cover crops, the vetches and singletary peas, which often reseed themselves are better for quail than the large-seeded Dixie-wonder and Austrian winter peas.

Hay meadow can be handled for the benefit of quail. Mowing should be delayed until July to reduce nest damage. The baling of Kobe lespedeza should be done in July or early August, and the cutter blade should be set high. This method of cutting permits the growth of a good seed



crop, whereas late and close cutting eliminates the seeding. A good seed crop insures a hay crop the next season, unless late frosts occur, and also provides excellent quail feeding.

Next to the careful planning of

land use, the cheapest quail-food management is fallow plowing or disking. Many excellent native quail foods usually volunteer, as in corn fields, the first and second years after the land has been broken. The kind

of growth that volunteers varies with the locality and soil; but it can be predicted accurately by observing the growth along graded roads and in fields recently removed from cultivation.

If plowing is to be done primarily for quail, the land should be fertilized at the same time, following local recommendations as to the kind and amount needed. About 400 pounds per acre of 5-10-5 fertilizer is a good average application. The fertilizer will increase seed production on most soils so much that it is better to reduce the amount of plowing than to omit the fertilizer. Some call this weeding, but it is excellent for quail where food is scarce.

The distribution of fallow plowing should be close to cover and in long strips 20 to 50 feet wide. Care must be taken to avoid slopes that will wash. The time for such plowing is from December to May. Five per cent of the acreage fallow-plowed each year is enough to show a marked improvement in the quail food supply. Perhaps the two plants that react best to this form of management are doveweed and partridge pea. If either of these species occurs regularly in the locality, it may be expected to flourish on the plowed strips.

Fire is a valuable tool in quail management when properly used, but caution and thorough understanding of the technique are necessary. When fire is properly handled, it can be made to open cover that is too dense. This increases the food supply where roughs of tall grasses occur.

In the Southeast, where controlled burning for quail was developed, spectacular increases in legumes and other quail foods resulted from burning the accumulated rough of tall grass during the winter. All of those soils were formerly cultivated, and the fire merely released the dormant weed seeds in the soil. In Texas, the results on land that has never been in cultivation are much less spectacular because the dormant seeds are not present in such abundance and variety.

On the Newton County Project, controlled burning has been practiced, but the principal benefit has been the improvement of the physical quality of the range so that the quail



☆
Goat weed, a native food plant for bobwhite quail, is pictured on the left. A half-cut mesquite tree, below, provides cover for bobwhites, while also controlling erosion.
☆



can move about and feed more easily. An increase in quail food has been observed on old fields where the burning of thick stands of broomsedge was followed by good growths of partridge pea and trailing wild bean.

Plowed fire lanes are necessary to properly control burning. The fires are set in spots late in the evening to produce many small irregular burns. This leaves some old grass for nesting and roosting. Hotter fires are necessary when jungles of cover are thinned.

Most important quail foods are palatable to livestock. Some of the better legumes are sought out by stock before much grass is taken. Lack of grazing often explains the presence of quail along railroad rights-of-way, in golf courses, and in cemeteries. It is true that some ungrazed areas are worse for quail than are adjoining pastures. This occurs when the ungrazed areas have become dominated by tall grasses. Plowing, burning, or even moderate grazing will increase the food production for quail in such grass roughs.

Many farms have units of land which might well be protected from grazing for reasons of soil or range improvement, livestock sanitation, or ease of handling stock. In general, the elimination of grazing or deferment and rotation of grazing are highly beneficial to quail.

Many trial plantings have been made for quail. Peas, millet, sorghum, soybeans, Florida beggarweed, sweet Sudan grass, and other annual crops that require cultivation have not been very satisfactory. These crops must be fenced from livestock and replanted every year. In most instances their seed deteriorated rapidly in winter when quail needed them most. However, the cost of the crops was the principal objection. In the Southeastern States on private preserves where cost was no concern, extensive food patch systems have been used to produce high quail populations. The practice is declining now, however. The same investment in other types of food production pays better dividends.

(Editor's Note: Next month, more intensive land management for quail will be discussed.)



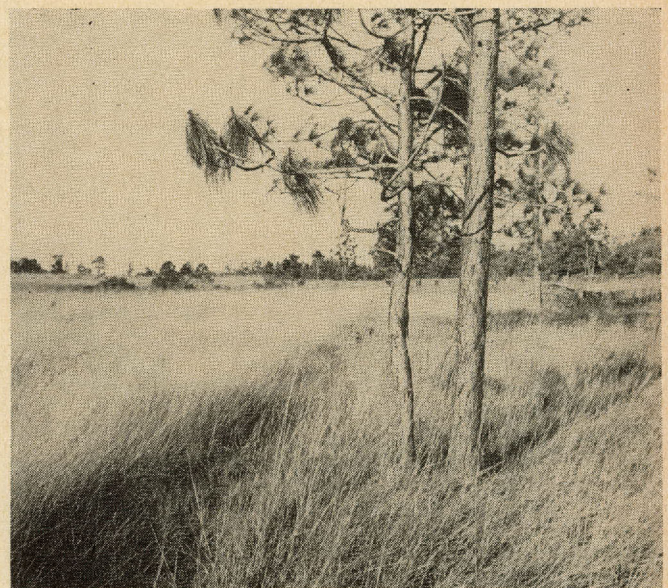
Kobe lespedeza is an important quail food on some farms in East Texas.



Grasses and weeds in East Texas corn fields are excellent for quail.



Panicgrass in a Newton County field.





These five black bass were caught in Williams Lake by G. T. "Curley" Dossey of Texarkana. He used minnows.

(Photo by Texarkana News-Digest.)

SOMETHING FOR THE SKILLET!

They're hitting! At least, the folks in this exhibit will back up that statement. And it's practically a border-to-border showing.



This 29-pound blue cat (above) was caught in Lake Austin, with cut bait on a two-hook throw line. The line was attached to a tree limb and was set in about seven feet of water with the bait one foot off the bottom. Time McGlamery, age 5, didn't catch the prize but he posed to indicate its enormous length. Jim Vaughan, right, of Liberty Hill, snared this eleven and three-quarter-pound fresh water drum in Lake Austin on a river runt.

(Photo by Austin American Statesman.)



Rudy Hurta, Bellville pharmacist, caught his black beauties in Austin County on a rex spook with pork rind trailer. The larger weighed eight and one-half pounds; the smaller, five and one-half pounds.

Lake Texoma made these two men happy with this string of 31 crappie and three bass, all hooked casting. They are Grady Isbell (left), Dallas, and Tag Anderson, Garland.

(Photo by Tom Dillard, Dallas News.)



Get Acquainted With That Boy



“TAKE that young son on a camping trip this summer.” This is the advice of Henry P. Davis, public relations manager, Remington Arms Company, Inc., Bridgeport, Conn., who says the varied values of such an expedition, even though it covers a weekend only, are inestimable.

“A father-and-son camping trip opens new vistas in personal relationships for both,” says Davis. “It places them on a ‘buddy basis’ which develops a spirit of camaraderie that is bound to bring them closer together. The length of the trip makes no difference. It may be a week’s fishing jaunt in the wilderness or only a single night under the stars along some neighborhood pond or in some nearby woods. But somewhere and somehow something will happen that will bring the pair closer together. It never fails. It may be a ‘man-to-man’ talk about things that are not common to everyday conversation, or it may be some display of ingenuity that will add to the stature of the father or increase the father’s interest in his son. Regardless of its nature, the pair will return home with a newfound respect for each other and the bond of affection between them more solidly forged.

“One of the greatest delights of a father-and-son camping trip lies in the planning of it. And now is the time to start doing just that for a jaunt sometime after school vacation starts. Food, clothing, cooking utensils, fishing tackle, camp equipment, bedding, shelter are all things to be discussed to the increasing interest of both Dad and Junior. Locations are to be considered, maps studied, probable weather conditions investigated . . . all of which are pleasant chores made the more fascinating by sharpening anticipation. There will be equipment to check, replacements to make and, if Dad works it right, plans for the trip will prove an incentive for Junior to make all-out efforts to please the whole family for weeks before shoving-off time.

“Don’t forget to bone up on woodlore and bring Junior in on the reasons for doing this and not doing that. Every moment of that camping trip can be one of great interest if your boy only knows what to look for. There are innumerable books and articles on camping, fishing, hunting and nature study and all of them are interestingly instructive.

Things You May Not Know

The ocelot gets its name from the Latin *ocellus*, meaning a small eye. This refers to the animal’s being marked with small spots or “eyes.”

The owls have an external ear, or *conch*, covered by feathers, which exists in no other bird.

In swimming downstream a fish must swim faster than the current or be suffocated by water entering its gills and remaining stationary.

The parrot does not build a nest but lays its eggs in the soft dust that accumulates at the bottom of the trunks of decayed trees.

A deer’s antlers grow so fast that the process is almost, if not wholly, without parallel in the animal kingdom.

The chameleon has a tongue twice as long as its body.

The snake-killing secretary bird uses its wing as a shield and a club at the same time. Often it will soar high into the air, carrying its prey with it, then drop it on the hard ground, putting an end to the battle.

“These will all make thrilling reading for the youngster for he’ll learn about camp sites, the type of wood which makes the best fire, where to look for what and why, and hundreds of ‘how-to’ tips that will add infinite pleasure to his trip. For when he puts this knowledge into actual practice, he’ll feel like a ‘been-there’ sportsman. And when father and son sit down around a campfire, in an atmosphere of peace and tranquility and discuss things in ‘man-to-man’ fashion, there is no room in either heart for anything but love and respect.

“Be sure to see that Junior is properly and comfortably shod. A boy is never more uncomfortable than when he is hungry or when his feet hurt. A blister on his heel can ruin a boy’s vacation, so see that he not only wears the proper shoes, but also takes care of his feet morning and night.

“Travel as light as possible. Carry the things you are sure you’ll need and don’t clutter yourself up with articles that are neither essential nor useful. If this is Junior’s first camping trip, make it as attractive as possible by taking along a few little extras for his comfort if you can do this without too much inconvenience. Break him in on the ‘raw living’ a bit easy, which is advice you probably do not need as some of those ‘extras’ will likely find a warm welcome with you. And don’t stint yourself on food. This is one department that will be particularly interesting to Junior as his appetite will be especially keen in the atmosphere of the wild. Be sure to carry some bug or mosquito dope along. Take every precaution against poison ivy infection. A first aid kit is a MUST. And don’t forget the sunburn lotion.

“If such an expedition is carefully planned, everlasting benefits may come from it. There is no better way to build closer father-son relationships, warmer affection, mutual respect and satisfying understanding than through a trip of this kind. Try it.

Fishes of Texas

The White Bass

By MARION TOOLE

Chief Aquatic Biologist

THE white bass, *Lepibema chrysops* (Rafinesque) has probably caused more controversy among the angling fraternity than any of our other Texas fishes. Many anglers condemn these fish unmercifully but the majority of fishermen are equally vehement in their praise of them.

One of the main objections to white bass seems to be a fear that they will take over a body of water by destroying the black bass, crappie and catfish populations. Observations made by our aquatic biologist staff does not bear out this fear. They have been unable to find undue competition among the various species of game fishes. Undoubtedly, white bass must occasionally eat some of the young of the other game species, but thus far, stomach analysis work shows that black bass do eat young white bass, and we have not found white bass eating black bass.

All of the above mentioned fishes do feed on gizzard shad, but our lakes and rivers carry such a large shad population the food competition angle is not a problem. From population studies made by nets and chemical treatment of the water, it has been found that rough species of fishes eventually take over our waters and that with their increase in numbers, the game fishes decline in numbers. It is this factor that causes lakes to furnish excellent fishing for several years and to then show a decline in game fish angling productivity. Even if white bass are not present in a lake, the black bass population will show a severe decline.

When Medina Lake was treated with rotenone we found that gar, shad, buffalo and carp had taken over the lake and that the only game or semi-game fishes that were able to hold their own in competition with the rough fishes were the white bass and the channel catfish. These two species were present in all age groups which was not true with black bass and crappie. Since the white bass apparently can successfully compete with

the rough fish in a lake, in maintaining their numbers, it would naturally look as if the white bass had crowded out black bass and crappie, and consequently cause the anglers, who like fishing for black bass, to become concerned over the situation.

Another objection to these fish arose from the fact that young white bass bit on the angler's minnows which affected the angler's pocket books. It is true that the white bass young of the year do have a rapid growth rate and that the waters are full of small white bass in the early summer that are large enough to bite on minnows but really too small to keep. Unfortunately, nothing can be done about this situation.

On the other side of the ledger, it has been pointed out that the white bass can successfully maintain their numbers against rough fish competition and thereby afford good fishing to the public that would otherwise be unavailable. Thanks to the white bass, many, many anglers have had successful fishing trips from which they returned with good fresh fish for their frying pans.

White bass, until 1932, were found in Caddo Lake in Texas. That year, J. A. Wilkerson, then Superintendent of the Dallas State Fish Hatchery, brought 13 brood white bass to that hatchery and then transplanted them in Lake Dallas.

From these 13 brood fish and a few more which have been taken from

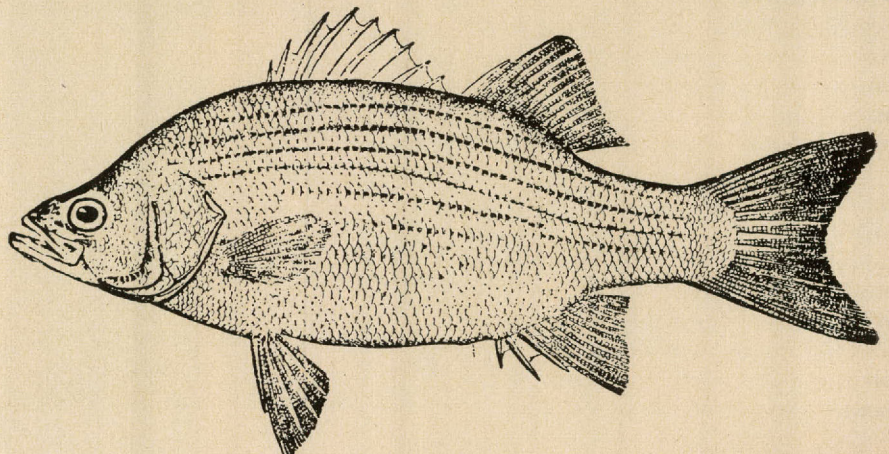
Caddo Lake has come enough fish to stock waters throughout Texas.

Lake Dallas provided an excellent example of the proficiency of the white bass. Three years after the initial stocking, thousands of these fish were taken by the anglers. Commercial fishermen netted as many as 400 pounds of them in a day. The Game and Fish Commission soon had these fish placed under the same regulations as applied to the black bass and stopped their commercialization.

In 1938, following the Lake Dallas stocking, Bill White, former Superintendent of the Lake Dallas Hatchery, placed 100 in Lake Kemp, 140 in Lake Buchanan, 126 in Medina Lake, 50 in Eagle Mountain Lake, 108 in Lake Waco and 125 in Lake Wichita. Subsequently, they have been moved to other waters and now occur in many of our waters from the Rio Grande to Sabine Rivers and from the Red River to the Coast. If conditions were proper for their requirements, their introduction into new waters has proven successful.

The white bass belongs to the *Serranidae* family. Members of this family are the true basses. This fish is usually colored dark gray on the back, which changes to white sides and belly. Dark stripes or lines run laterally on the sides of their bodies. They have a divided dorsal fin. The front fin contains the spines and the rear fin is made up of soft rays. Small teeth are

● Continued on Page 32



Marine Fishes of Texas

Oceanic Sunfish

By J. L. BAUGHMAN

Chief Marine Biologist

THE recent capture of an oceanic sunfish by Florida Roberts, of Port Isabel, marked the first actual record of this fish from the waters of the Western Gulf of Mexico. These sunfishes are among the largest fishes that occur in the seas of the world, and are also one of the oddest looking inhabitants of the ocean.

There are three kinds of them: *Mola mola*, which is the one Mr. Roberts caught at Port Isabel and which is found throughout the warm seas of the world; another form known as *Ranzania*; and a third known as the Pointed-tailed Sunfish. They are peace loving giants that spend considerable time floating on the surface of the sea and sunning. Hence their common name of sunfish. They are also called a headfish because they look like they are all head and that the tail portion of their bodies had been chopped off right behind the dorsal and pectoral fins.

Despite the sunfish's seemingly unsubstantial diet of jellyfishes, it grows to an enormous size. An Atlantic Coast specimen of *Ranzania* measured over seven feet long and the overall depth was two inches greater, making it almost round in outline. Its weight was estimated at 1,000 pounds.

Another sunfish reported from Australia was 10 feet long, measured 14 feet from the top of its dorsal fin to the bottom of its anal fin, and weighed 4,400 pounds.

This Australian fish was taken by accident, just as Mr. Roberts' was. Roberts ran over the 150 pound specimen with his boat, then turned around and gaffed it. The Australian fish was hit by a steamer.

On Sunday, September 18, 1908, the steamship "Fiona," about 40 miles from Sidney, New South Wales, suddenly shook from stem to stern, and her port engine stopped dead. When a boat was lowered, the crew found a huge fish resembling an elephant in bulk and skin texture, jammed in one of the propellers.

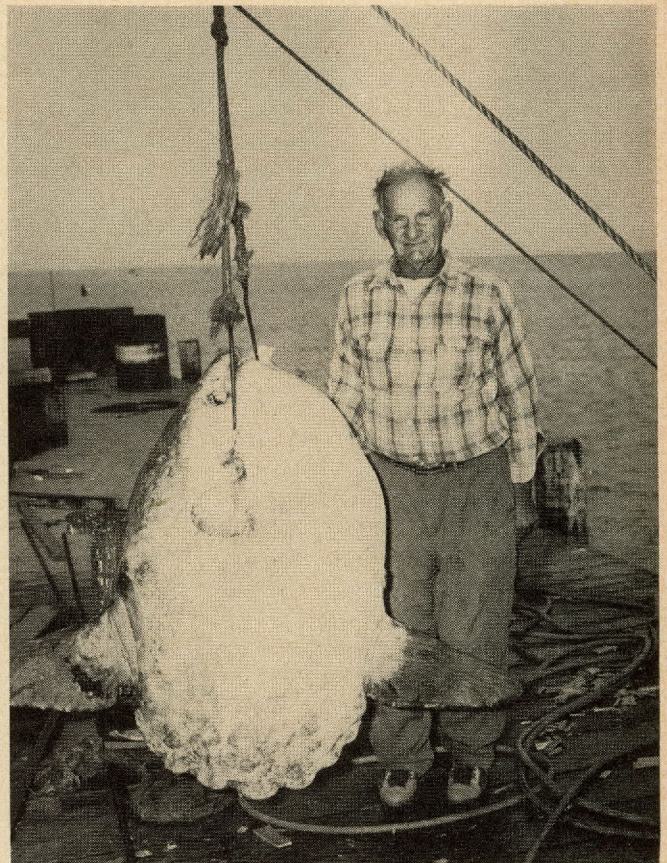
It was impossible to dislodge the creature so the "Fiona" limped into port on one engine. Here, using a huge iron hook especially forged for the purpose, the fish was removed from the propeller. It was two and one-half feet thick!

The capture of both of these fish is undoubtedly due to their structure and habits. The short, stumpy tail is of no use whatever as an agent of locomotion. The thick, heavy, stiff dorsal and anal fins are not efficient helps in swimming. They can progress somewhat slowly by flappings of these fins, the dorsal generally projecting above the water, but are most often seen lying on one side on the surface, slowly carried along by the waves and currents, unable to get out of the way of a boat.

While we have no accurate knowl-

edge of the growth of *Mola*, *Ranzania* has been found to increase in size from one-tenth of an inch, when hatched, to over 10 feet, when full grown. This is an increase of 60,000,000 times the original weight. To put it in another way, the tiny sunfish bears the same relation in size to its mother that a 150 pound rowboat does to the Queen Mary's tonnage of 80,773.

Roberts, a deep water commercial fisherman for the past 67 years, said he snagged his specimen while snapper fishing over Big Seebree Reef, about 25 miles off Port Isabel. Other local fishermen after looking at it said that they had caught fish of the same kind before this but that they had never had them identified by a biologist.



Florida Roberts, deep water commercial fisherman for the past 67 years, poses with the oceanic sunfish he captured about 25 miles off Port Isabel.

(Picture courtesy Flash Nollman.)

Diary of a Farm Pond

By CHESTER CRITCHFIELD

THE pond described in this article is located near Temple in Central Texas. Silting in one end of the pond has reduced the surface area from two acres to approximately one and three-fourths acres.

This pond was originally formed about twenty years ago by damming a ravine. Springs behind the dam keep the water level fairly uniform the year around. The depth of the water varies from a few inches at the silted end of the pond to seventeen feet at the deep end. A drain and cut-off permits the draining of nearly all of the water from the pond.

A rain of two inches or more washes mud into the pond and causes water to run over the spillway. The water is normally clear, and the bottom can be seen to a depth of seven feet. The banks and much of the bottom are limestone.

Control of water plants had always been a problem before improvement work began. Also, there was an overpopulation of small sunfish of little value. A solid mass of parrot-feather was growing in all water with a depth of less than eight feet. These plants extended from the bottom of the pond to a height of several inches above the surface. A few water lilies and cattails were present, but they were not a problem. Approximately three-fourths of the water surface was covered with pond weeds.

Machinery cannot be used to remove the plants because most of the banks are small bluffs. The bottom is also irregular, with many drop-offs and large rocks.

Previous attempts had been made to control water plants by cutting or pulling them. The pond had also been drained and the plants allowed to die. A weed burner was used on the dry plants. These measures were only temporarily successful.

A one-year improvement program

was started in September, 1950. The water plants had not reached their usual autumn growth because some vandals had opened the drain to get fish. The water level dropped until only a small pool remained. Three weeks were required for the pond to refill. During this time the stems of the plants died, but the roots were still alive.

Nearly all of the fish which were more than six inches long had been removed from the pond. Enough small bass and sunfish were left to restock it.

On September 20, 1950, two hundred pounds of 6-12-6 commercial fertilizer (6 per cent nitrogen, 12 per cent phosphorus, 6 per cent potassium) was scattered over the pond surface from bank to bank. A wheelbarrow and small shovel were used to spread the fertilizer. About ten days later the water began to turn greenish in color.

The water failed to get as green as was expected. On October 15, one

hundred pounds of 5-10-5 fertilizer was added. The parrot-feather had been thickening and seemed to benefit from the fertile water. By November the greenish color of the water was such that an object could barely be seen a foot below the surface.

As the plankton-filled water kept sunlight away from the underwater stems of parrot-feather, the plants compensated by growing above the water. This caused the pond to resemble a well-kept lawn. The above-water growth resisted freezing temperatures very well.

When an additional one hundred pounds of 5-10-5 fertilizer was added to the pond in February, 1951, the parrot-feather was growing six inches above the surface. In March the sunfish, including redear, bluegill, green, longear, and orange-spotted, began to bite well. The fish were easier to catch at this time and they were larger than the ones which had been taken the year before.

In early April several patches of weeds were hand-pulled from the shallow areas of the pond to find out whether the fertile water would smother them before they could again send stems into the sunlight.

By early May the cleared patches were rapidly becoming filled with weeds. This indicated that it would be impractical to keep the weeds in check by mechanical measures, even in conjunction with fertilizing.

A few cattle were watering from the pond, so 2-4-D weed killer was selected for spraying the surfaced shoots of parrot-feather. This chemical was sprayed over the water plants in the same concentration recommended for dry-land plants. One gallon of concentrated solution was more than enough to mix all the spray that was needed.

The tender tops of the parrot-feather wilted almost immediately

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after contact with the spray, and within a week they formed a mat over the pond surface. Plants which were missed at the first spraying were easily detected for spraying the next day.

The mat of dead stems and leaves was left for three weeks. While floating on the surface, this mat kept sunlight from penetrating the water and helped smother underwater growth. Much of the mat was blown to the edge of the pond as the stems rotted and broke. A hand rake was used to remove the dead plants.

A quarter-inch cable twenty-five feet long was equipped with a handle at each end so that two men could drag it through the shallow water. This proved to be a valuable tool. The pressure of the cable snapped the old stems, and a large portion of the mat was pulled to the shore and thrown out.

In June, after the parrot-feather had been cleared from the pond, two hundred pounds of 5-10-5 fertilizer was added to keep the water green and to replace the fertility which was lost through overflow from a heavy rain.

The fertilizer and 2-4-D weed killer cost less than twenty-five dollars. More than 185 pounds of fish have been caught during the seven months from February through August. One bass was eighteen and three-fourths inches long and weighed a little more than three and one-half pounds. Two other three-pound bass have been taken, but the average is about one and one-fourth pounds. One redear sunfish was ten inches long, while many were only slightly smaller. One green sunfish (goggle-eye) was eight inches long. Many hand-size fish of several species have been taken.

By September 15, 1951, it was difficult to see lone sprigs of parrot-feather in the shallow water. The fishing prospects for next summer are better than ever. The bass and perch reproduced well during the summer of 1951, and the populations are balanced.

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Write today to the South Bend Bait Company, South Bend, Indiana for your free, postpaid copy of this exciting new book. Please address 1400 South High Street.

Membership Drive Opened by the Wildlife Society

The Wildlife Society, a unique professional organization of North American wildlife workers, is looking for new members, according to the Wildlife Management Institute. The organization is working constantly to improve the training and professional standards of state and federal fish and game technicians and to promote sound programs for the restoration and improved management of the wildlife resources.

Although a large number of professional workers are enrolled, the Society's membership committee has found that many federal and state fishery and wildlife men are not members. Much of this seeming lack of interest is attributable to lack of knowledge of the benefits which Society membership brings. The Society publishes the quarterly "Journal of Wildlife Management" which is devoted exclusively to significant research findings, population trends, new techniques, and other important developments in the field of wildlife management. It also publishes a monthly newsletter which reports on significant recent developments in this field. To the graduate wildlife student, the Society offers reports on employment opportunities and trends, a feature of value to those entering the field for the first time or to experienced workers looking for a change in environment. Graduate students majoring in wildlife management or fishery management as well as those already actively engaged in this work are welcome. The Society is international in scope, and its membership embraces all of North America.

In the unpretentious way of most professional societies, the organization has never conducted a promotional campaign for membership. For this reason the fact that the Society is open to outdoor writers, leaders of sportsmen's clubs, and other lay workers never has been publicized. Further details may be obtained by writing to Caleb Glazener, Secretary, The Wildlife Society, Walton State Building, Austin, Texas.



BOOKS



HIGH BIRDS AND LOW by Coombe Richards. 216 pages. Illustrated with 13 halftones and numerous thumb-nail sketches. Published by Herbert Jenkins, London, England; 1950. Distributed in America by Greenberg: Publisher, 201 East 57th Street, New York 22, New York.

American hunters will enjoy reading this English book because most of the methods described contrast so sharply with our own. The species of game do not differ greatly from our own, but the similarity stops there. England is a "tight little island," America a vast and complex continent. In England the game is the property of the landowner; in America it is the property of the people. Because few among the English masses have an opportunity to hunt, the limited few who can enjoy this privilege can also enjoy long seasons and liberal bags. Modern American wildlife management evolved from the English system and had its beginning when English and Scotch game keepers were brought here to help restore shrinking wildlife stocks. It was not until Americans developed their own management systems based upon more complex needs that restoration programs became wholly effective.

This book covers all phases of British bird hunting and is similar in coverage to a number of narratives that have appeared in America, which makes the contrast all the greater. As in America, it gives the impression that things are not what they used to be in field sports. The book is well written, entertaining, and gives a foretaste of what Americans can expect if present-day efforts to maintain free hunting fail.

RAISING SMALL ANIMALS FOR PLEASURE AND PROFIT by Frank G. Ashbrook, 260 viii pages. Illustrated with 148 half-tones and line drawings. Published by the D. Van Nostrand Company, Inc., 250 Fourth Avenue, New York 3, New York; 1951. Price \$4.00.

Here is a book which will appeal to many people—either those who wish

to follow a new hobby or those who are interested in supplementary financial returns. A vast range of activities is covered between its pages. Some of the enterprises described would require at least an acre of land; others may be conducted as backyard or basement projects. One or two, if the landlord is broad-minded, could even be conducted profitably in a city apartment. Mr. Ashbrook uses the term "animal" in its broad biological sense and his book covers the propagation and care of birds, fish, animals, and insects.

Fishes of Texas

• Continued from Page 28

found on the tongue. The average white bass attains a length of 12 inches and a weight of from one to two and a half pounds. Many larger white bass are taken that weigh slightly over four pounds.

White bass eat insects and their larvae, minnows, small pan fishes, but in our waters, the bulk of their diet consists of gizzard shad. The writer has opened their stomachs that contained enough shad compressed in a ball shape to equal the size of a golf

ball. In order to have a white bass population maintain a rapid growth rate, the presence of gizzard shad in numerous quantities seems to be necessary.

White bass spawn in flowing water on windswept sandy shoals. Their best reproduction is obtained when they are furnished a flowing stream of water entering into the lake in which they live. The white bass adults start working toward the headwaters in the fall and by January they can usually be found in a river or rivers that flow into their lake. Spawning usually occurs in March or April. The white bass are extremely prolific since an egg count of 500,000 per female is not unusual. The eggs are scattered helter-skelter and left to their own fate. In Texas the white bass lives a rapid life. In checking scales to determine age, very few white bass live past their third year of life.

White bass can be taken with artificial lures or by minnows. While they are upstream they can be caught by casting. While they are in the lake proper, they travel in schools following schools of minnows or shad and may be caught by trolling. Anglers are most successful when they fish for white bass at night, hanging gasoline lanterns on the sides of their boats and fishing with minnows. The white bass is a good fighter and is not boated without a struggle. Their flesh is very palatable and can be considered as one of the most desirable fish of the finny tribe.

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“The Key Deer—Will We Be Too Late?”

(Editor's Note: Much has been written about the Florida Key deer and the significance of its precarious position within recent months, but no writer has set his finger more solidly on the pulse of this matter than Werner O. Nagel of the Missouri Conservation Commission. His published comments are reprinted in full below.)

Many Americans spend many words and much emotion bemoaning the vanished wilderness. There is breast-beating and tub-thumping about the rape of natural resources. There are cries about the murder of the passenger pigeon; tears for the giant auk; sobs for the passing of the buffalo.

Crocodile tears! How many of the mourners, magically transported back in time to the reign of the wilderness, to the hey-day of the passenger pigeon, the auk, and the buffalo, would do other than their forefathers did? How many, taken back to when the shadow was looming over these species, would write, act, cry out for their preservation?


The answer is written in the pages of Now. “Just about as many,” it reads, “as are now concerned about, and acting to prevent, the passing of the Key deer.” The measure of the answer is written too: In spite of the lessons of the past, in spite of the advance of conservation, in spite of the progress and enlightenment we are constantly told marks the new era of civilization—in spite of wealth and luxury and learning, and regrets and tears for the past, this country is not able, or not willing, to act to save a species that is vanishing even while we mourn. Repeating the history of the queer creature that is man, we cry over the graves of the past while the diggers prepare yet another grave.

When the Key deer is gone, we will erect a monument to its passing. We will wail over the headstone, and bitterly condemn the carelessness, selfishness, and lack of understanding that brought it low. We will cast up the accounts, measuring the profits of the course that exterminated this species against the debits of its loss. We will say the loss was greater than the profit, for the profit is fleeting, the loss forever. We will think back, and say—“This should not have happened” and we will cast about for an object to blame.

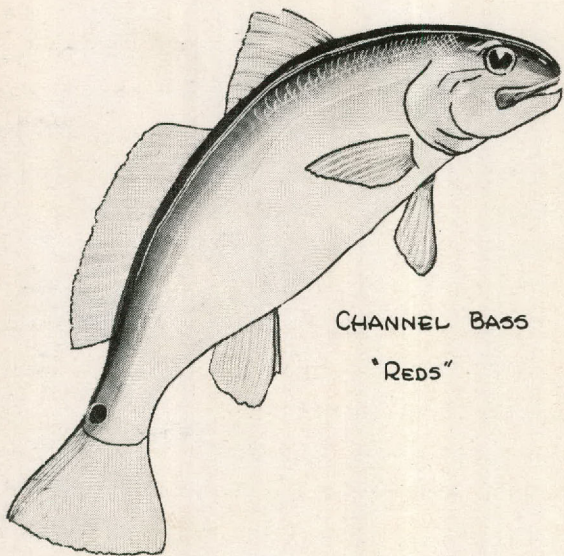
That is the pattern of the past. It is not a pretty one. Yet, each day, we make a new pattern and with each day it becomes part of the tapestry of the past. We can set today's weaving as we will; tomorrow we cannot change a thread of it. We can prevent the Key deer from joining the ghosts of the buffalo, the pigeon, and the auk by action now; tomorrow we can only mourn.

Congress can act to make a refuge of the Key deer's last stand—a few small keys off the Florida Coast. Congress will act to save these deer, if enough of us tell Congress we prefer to keep this species to enjoy, rather than to make a ghost of it to mourn.

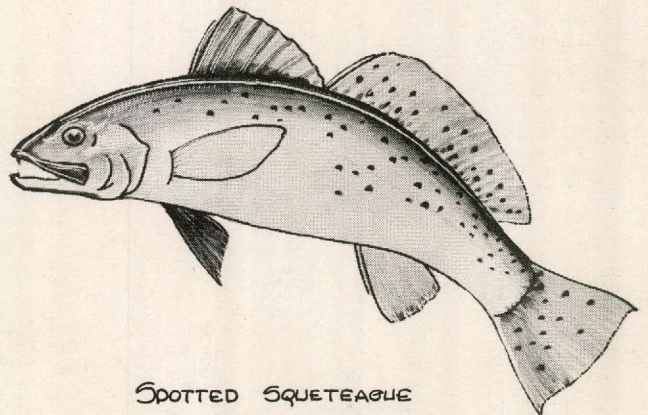
The pattern we weave today becomes the unchangeable history of tomorrow. Will the pattern of our action on the Key deer be another shadow, or a bright thread in the loom?



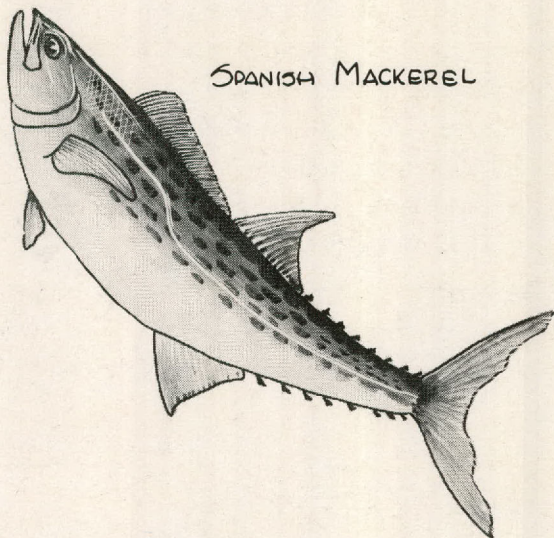
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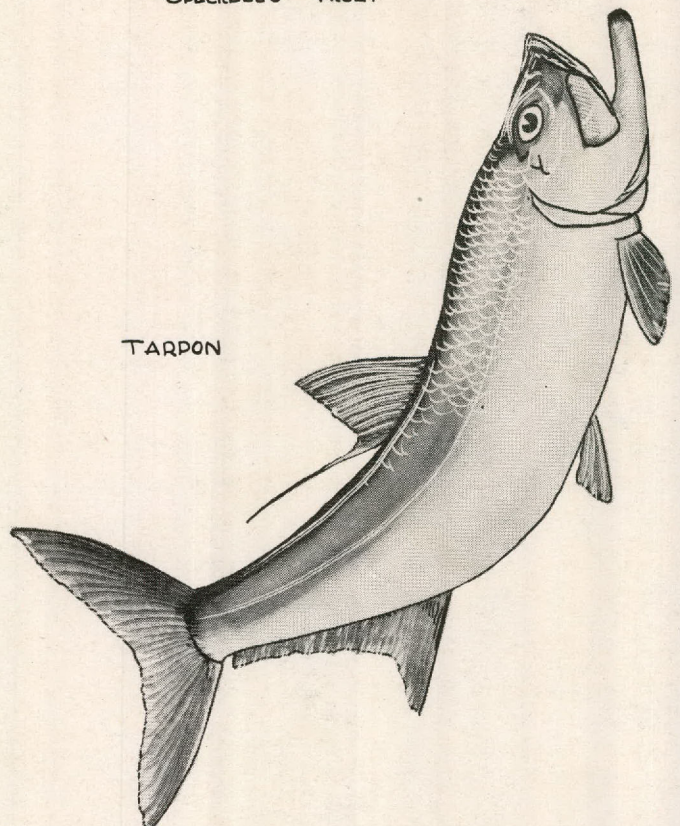
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"REDS"



SPOTTED SQUETEAGUE
"SPECKLED TROUT"



SPANISH MACKEREL



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