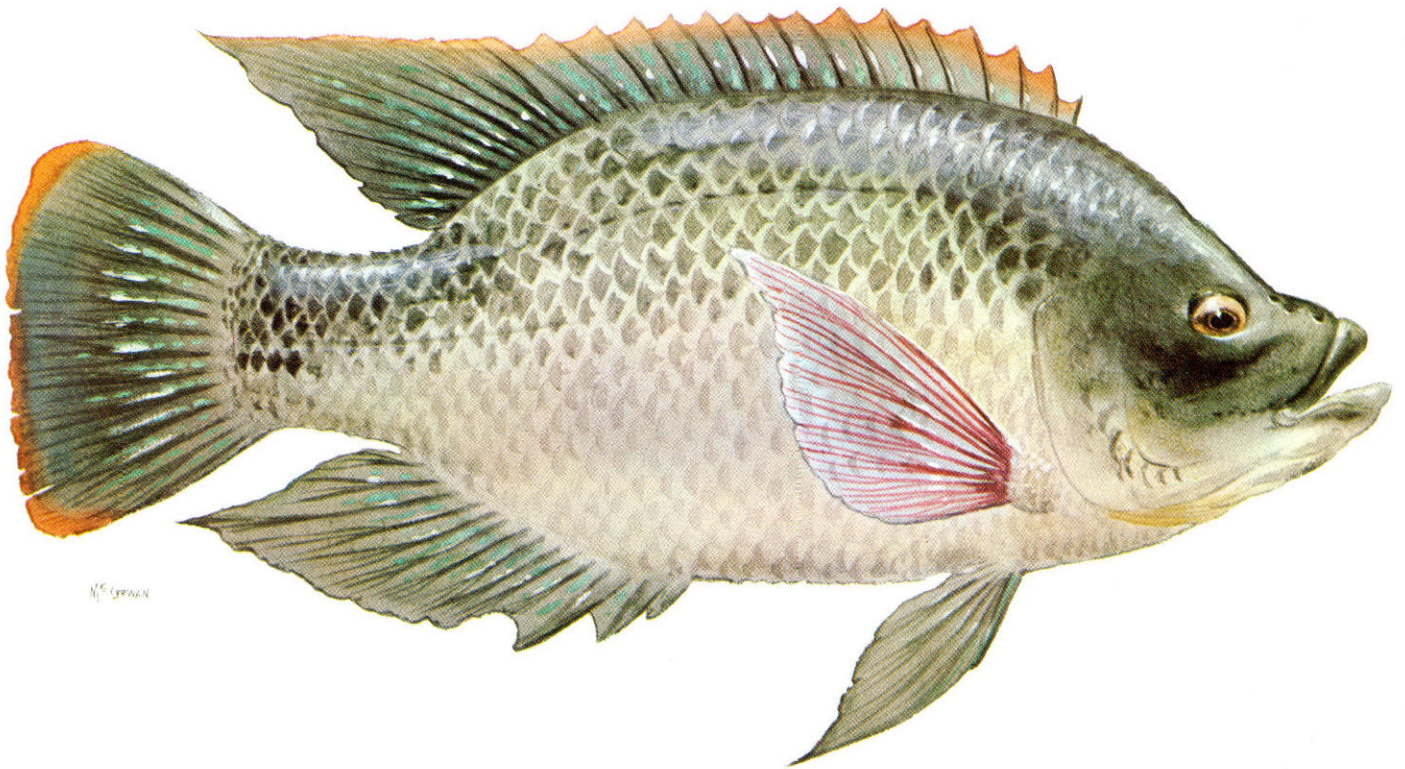


TEXAS

PARKS & WILDLIFE



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The Fishes of Texas

Tilapia mozambique, also called African mouthbreeder, old red lips, and big lip perch, is a native of Africa that has spread through the tropical waters of South America and southern United States. In Texas it was originally introduced into the San Antonio River to control algae. Cold weather prevents its further spread.

Coloration varies from pale green to black. *Tilapia* changes color rapidly, turning lighter or darker in seconds. A male in breeding conditions turns black and develops bright red lips.

After spawning, the adults fast and both sexes pick up the eggs in their mouths to incubate them. For a while after the young hatch, they take refuge in the parents' mouths when startled.

Tilapia meat is greasy, tender, and buttery—but good eating. Adult fish average 11 inches and some grow to 15 inches.—*Nancy McGowan*



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**TEXAS PARKS & WILDLIFE
magazine**

Dedicated to the conservation and enjoyment of Texas fish, game, parks, waters, and all outdoors.

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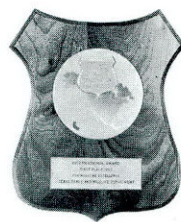
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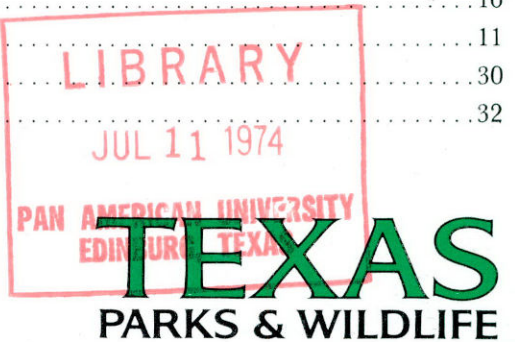
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Beginning at the southern tip of Texas and marching northward, a parade of flowers brightens the State every spring.

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... first place winner of the 1967 international award for magazine excellence given by the American Association for Conservation Information.



Cover: The bright blossoms of the prickly pear cactus add a touch of color to the arid parts of the State. For other Texas wildflowers see page 24. Photo by Reagan Bradshaw.



Apollo 7's camera catches Houston, Galveston Bay, and the cloud-dotted Gulf 101 nautical miles below.



The Fate of a Bay

Can Galveston Bay Survive Multiple Use?

by Terrance R. Leary
Coastal Fisheries Coordinator

and

Kenneth C. Jurgens
Administrator of Technical Programs

THE LARGEST and most productive bay system in Texas is the Galveston-Trinity Bay system which comprises some 336,000 surface acres, or about one-fourth of the total estuarine water area in the State. Annually, it contributes more fish and shellfish to Texas' \$100 million coastal sport fishery and \$90 million coastal commercial fishery than any other bay system. The productivity and economic value of this estuarine area, however, are seriously threatened by man-made problems with which we must soon learn to cope or lose a major source of food and recreation by default.

To begin to understand the importance of the problems facing the Galveston-Trinity Bay system, it is necessary to have knowledge of what comprises an estuarine area. According to Webster, an estuary is defined as "an arm of the sea at the lower end of a river." More technically, as defined by biologists W. M. Cameron and D. W. Pritchard, an estuary is a semi-enclosed coastal body of water having a free connection with the open sea, and within which the sea water is measurably diluted with fresh water derived from land drainage. John Dingell in a bill to

The Fate of a Bay

preserve, protect, develop, restore estuaries, (submitted October 1967, Serial 90-3, U. S. Government Printing Office, Washington, D. C.), said, "... an estuarine area is an environmental system consisting of an estuary and those transitional areas which are constantly affected by water from an estuary."

Besides carrying fresh water to dilute the salt water of the bays, rivers draining the land carry into the estuaries nutrients which can and do make estuarine areas more productive than the best of farm lands.

In an estuarine area, the dilution of sea water is the major environmental factor in that the estuarine dependent fish and shellfish species, so important in the sport and commercial fisheries, require at some point in their life cycles a habitat in which the salinity of sea water is diluted to their particular needs at that stage in their development.

Salinity is measured as the weight of dissolved salts in a given volume of water compared with the weight of the water itself. Standard sea water has a salinity of 35 ppt (parts per thousand) whereas the salinities of an estuarine area may vary from 0 ppt at the mouth of the entering river at the head of the bay, to nearly 35 ppt near the bay's connection to the sea.

Estuarine fish and shellfish species each have a preferred area within the range of dilution from fresh water to sea water in which they can best survive, find their food, and grow. Their need for a specific range of sea water dilution is based on their capability to regulate osmosis between body fluids and the surrounding waters, and osmotic pressure varies directly with salinity. For example: saline water at 30 ppt has 20 times the osmotic pressure of brackish water at 1 ppt.

Young white shrimp prefer areas in which salinities are below 10 ppt. On the other hand, young brown shrimp are most abundant in areas where salinities range from 10 to 20 ppt, and the optimum salinity for oysters lies between 15 and 20 ppt.

Young blue crabs are dependent on low salinities, and at salinities above 20 ppt this commercially important species is displaced by a smaller, non-commercial species.

Parks and Wildlife Department records of fish and shellfish production compared with varying volumes of runoff entering the Galveston Bay system

show that maximum production is reached when the annual flow of fresh water is about 7 million acre-feet per year. When fresh water flows exceed or do not reach this volume, less fishery production can be expected. Ninety-nine percent of last year's statewide commercial fishery production was composed of estuarine dependent species.

The need for adequate flows of fresh water then is the primary problem facing the estuarine areas of Texas. As serious as this problem is during times of drouth and low runoff, it will be made more serious still by plans to develop the freshwater resources of the State.

The Texas Water Plan, which is vitally needed to satisfy the needs of an expanding human population and economy, when fully implemented, will allow only about 2.4 million acre-feet of water to reach all of the Texas bay systems annually. This volume is considerably less than half the optimum flow needed for Galveston Bay alone.

Presently, the lack of fresh water available for the bays is aggravated by the disposal of concentrated brine into the Gaveston-Trinity Bay system. Such concentrated brine originating from oil fields and underground LPG (liquefied petroleum gas) storage cavern operations requires extensive dilution with fresh water to reduce it to acceptable salinity levels. It would require, in less than a year's time, the equivalent of 12 percent of the total conservation storage of fresh water in Lake Houston to dilute the daily flow of 1.8 million gallons of concentrated brine from only one of three present LPG storage cavern operations to an acceptable level.

Another function of estuaries for marine life, in addition to providing for their salinity requirements and the necessary nutrients for a fertile habitat, is to serve as a nursery area and refuge for the small and young of estuarine dependent species. The shallow water at the very edge of the estuary, along the marsh, is the most valuable as a nursery area and, unfortunately, this is the area most endangered at this time. Bulkheading and filling projects along the shoreline destroy such nursery areas when the shallow margin of the bay is dredged for fill to be placed behind the bulkhead.

A recent study in the Galveston Bay area by the U. S. Bureau of Commercial Fisheries compared the productivity of natural shoreline with shoreline which had been bulkheaded, dredged, and then filled



WAYNE L. WENTWORTH

WAYNE L. WENTWORTH

PAUL HOPE

As industrial complexes and residential developments form along estuarine shorelines, the natural environment of the shoreline is altered.

behind the bulkhead. The study showed that natural shoreline produced 2.5 times as many brown shrimp and 14 times as many white shrimp as the bulkheaded shoreline.

At the present time, numerous bulkheaded residential developments have and are springing up around the bay system. As a result, a great deal of nursery area is lost piecemeal.

Another serious problem facing the bays and estuaries of Texas is the slow but sure increase in steam powered electric power plants which use bay water for cooling purposes. Presently, still another is planned for Galveston Bay.

In the production of electricity, tremendous quantities of bay water are heated and returned to the bay. During the winter, this is no problem; but during summer months, if the heated effluent is not sufficiently cooled before reentering the bay, large areas can be rendered unfit for fish and shellfish. Depending upon the size of the plant, as much as 1,000 acres or more of shallow bay areas adjacent to the outfall can be lost to the fishery at each power plant. Meanwhile, millions of planktonic (or drifting) larval and juvenile marine fish and shellfish are carried into intake and killed as they pass through the plant.

Presently, the U. S. Army Corps of Engineers is studying the feasibility of a hurricane protection levee along the Gulf Intracoastal Waterway from San Luis Pass to Texas City, then up the west side of Galveston Bay to Dollar Point, and across the bay to Smith Point. The building of this levee would drastically change the ecology of the bay system and those areas of the bay would be cut off and water exchange impaired. In addition, other bay bottom areas would be covered by fill for the levee, and still others would be deepened as dredged borrow areas. Estuarine habitat thus lost could never be recovered.

One major estuarine dependent species has not been mentioned to this point. This species has greater need for the productivity of the estuarine environment than all the other species combined. The name of this species is MAN. But all of these problems endangering the future productivity of the Galveston-Trinity Bay system as well as most other Texas bays are man-made. They are the result of the expanding influence of man and his planned and unplanned alteration of his environment. **



LEROY WILLIAMSON

Ideal for the bird watcher as well as the birds, Bentsen-Rio Grande State Scenic Park offers the best of the outdoors for the visitor. Interested bird watchers often find their subjects returning their stares.

Birder's Paradise

by L. D. Nuckles Information Officer, Rockport

NESTLED on the Rio Grande, near the southern tip of the United States, is a State park unknown to most Texans, yet there are certain people all over the world who are living in hopes that some day they'll get to visit there. Bentsen-Rio Grande Valley State Scenic Park is located on the river about five miles southwest of Mission. The 585 acres of land and five acres of water make up a bird watcher's paradise. Birders come from all over America; and it is not unusual to find visitors from foreign countries.

During Hurricane Beulah in September 1967, the park was inundated by the flooding Rio Grande, and the nine feet of muddy water covering most of the facilities closed the park for a time. As soon as the water receded the park was patched up, cleaned up, and reopened to the public. Since then, though, an



GROOVE-BILLED ANI BY REAGAN BRADSHAW

extensive face-lifting and rebuilding program has begun. New facilities are being added and old ones refurbished to make this a much more attractive park. Rest rooms and service buildings will be torn down and new ones built, and more and better trailer sites are being constructed. The water system will be overhauled and two miles of paved road will be built. Selective clearing and landscaping are being done and the electrical system will be almost completely rebuilt. Before the end of this year, Texas families will have a lovely place to camp with facilities to make roughing it as pleasant as possible.

Bentsen-Rio Grande is unique in that it is one of only two areas set aside to preserve the virgin river bottom woodlands of the Southwest. Most of the vegetation in the park is typical of South Texas—mesquite, prickly pear, and heavy brush—but there

are scattered areas which resemble a tropical jungle. Thick stands of Mexican ash, hackberry, cedar elm, anaqua, and ebony, liberally festooned with Spanish moss, grow along areas where the silt has almost filled in old river channels.

This intermixing of vegetative types and the protection they afford bring and hold a variety of bird-life. Semi-tropical birds mingle with species often referred to as desert birds and many species are observed here that are seldom, if ever, found in other parts of the United States. Gray and black hawks, rose-throated becards, ringed kingfishers, clay-colored robins, and varied buntings are included in these rarities.

Inca, mourning, and white-fronted doves; road-runners; pauraques; golden-fronted and ladder-backed woodpeckers; Bewick's and cactus wrens;

Birder's Paradise



KISKADEE FLYCATCHER

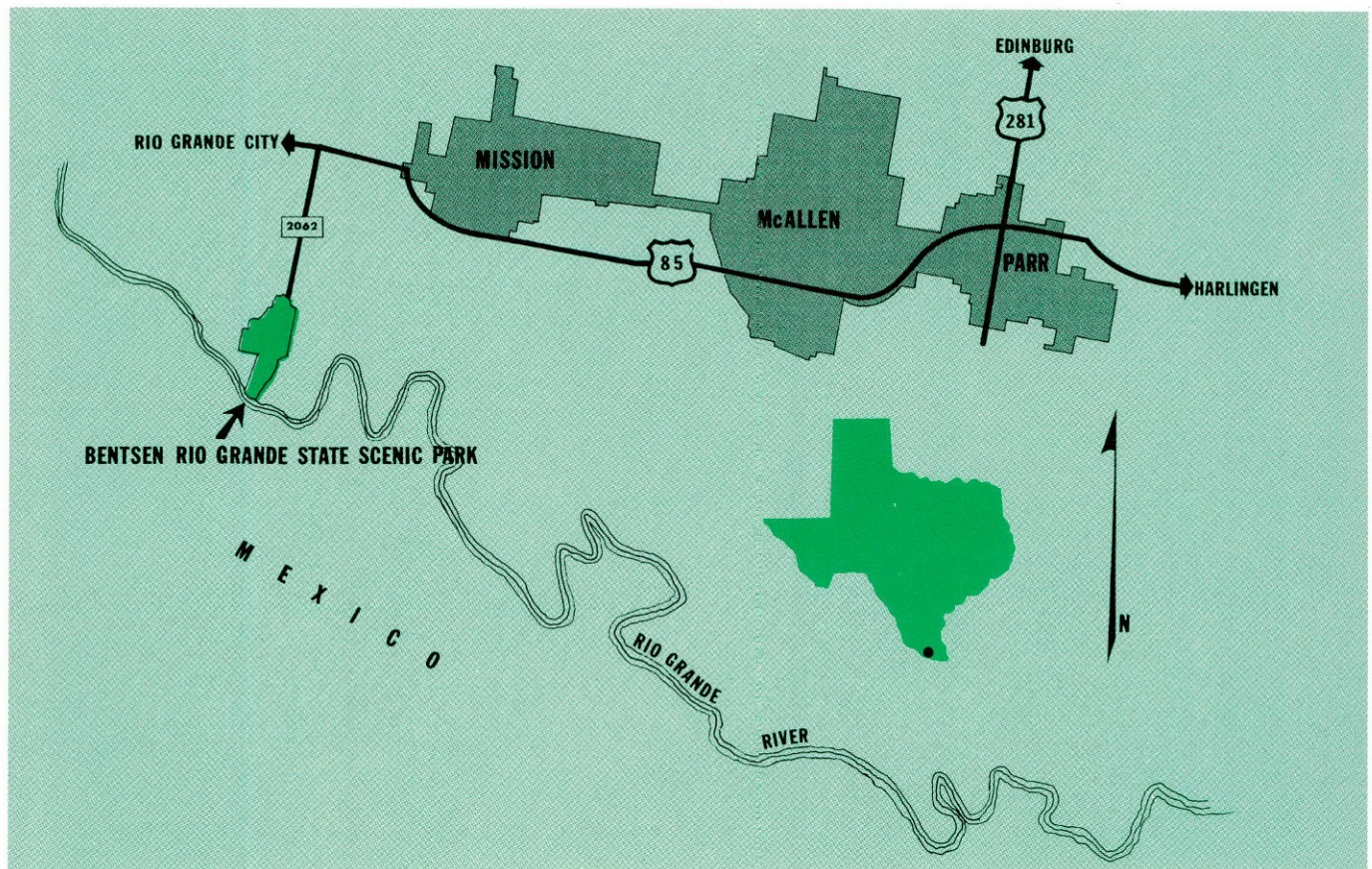
kiskadee flycatchers; curve-billed thrashers; green jays; black-crested titmouse; Lichtenstein's oriole; and bronzed cowbirds are common year-round residents in and around the park. Other permanent residents of the park include the white-collared seed-eater, white-tailed kite, black-headed oriole, beardless flycatcher, and ferruginous owl.

During the spring, the park serves as a nesting area for the groove-billed ani, elf owl, buff-bellied hummingbird, tropical kingbird, Wied's crested flycatcher, painted bunting, and the hooded oriole. Black-bellied tree ducks nest near the park and can

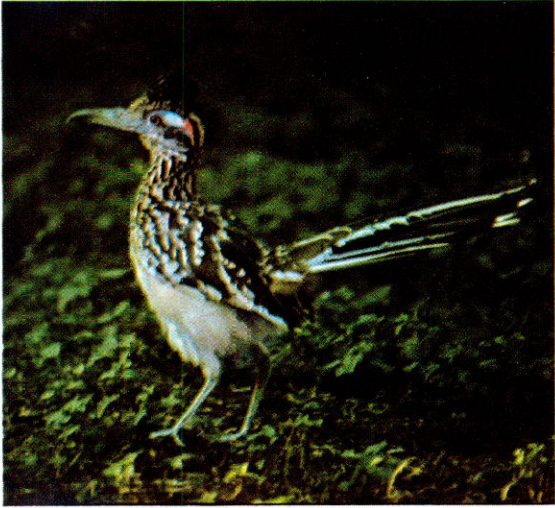
often be seen near the little lake. A guide to birdlife in the park is available at the headquarters.

Winter is the park's busiest season. When snow covers northern states, thousands of tourists come south and many of them make their way to Bentsen-Rio Grande. They camp for the whole season and leave only when spring winds blow over the land.

During the summer, as Texans flock to the more popular recreation parks and visitors from the north return to their homes, Bentsen-Rio Grande still draws its share of families who like to camp and observe nature in its virgin state. **



ROADRUNNER BY REAGAN BRADSHAW



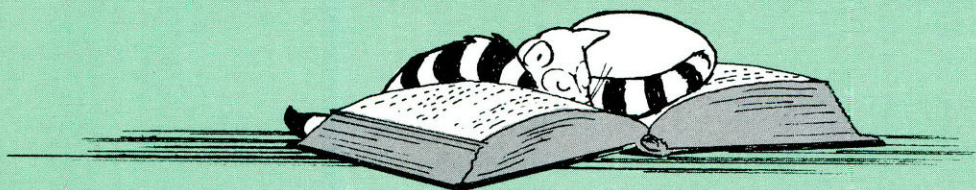
Unique avian residents of the park make it a popular vacation spot for birding enthusiasts from all over the country.



▼ GREEN JAY BY REAGAN BRADSHAW



Outdoor Books



CLEAN AIR—SPARKLING WATER
by Dorothy E. Shuttlesworth; Double-
day & Co., Inc., Garden City, N. Y.,
1968; 95 pages, \$3.95.

In remembering the days of Dick and Jane, those two unforgettable stars of first-grade readers, grown-ups often overlook the fact that children today are more advanced than those of 20 or even 10 years ago. The "with it" generation is exposed to more advanced information, and at a much faster rate than their parents would ever have dreamed. *Clean Air—Sparkling Water*, suggested for ages 8 to 10 or grades 3 to 5, takes this fact into account. Though it is simply written, Dorothy Shuttlesworth tells the ugly pollution saga without "talking down" to her audience.

Reflecting the urgency she herself feels for our endangered earth, Mrs. Shuttlesworth instills the desire in young readers to keep their own communities from losing their most precious assets—clean air and water. "We can live without many things. But not," she says, "without air. Not without water. And the air must be clean. The water must be pure."

But little can be done to keep our air and water unpolluted by simply talking about the problem. The author explains in simple, uncomplicated terms, some basic facts about how and why water and air become polluted and suggests what individuals can do about it. The reader is introduced to simple principles of air inversion and pollutants.

Surprising to older readers too, the book includes instances of just how powerful polluted air can be: 3,000 dead in the 1952 London smog attack; 200 deaths in New York City in 1953, apparently caused by smog. Other similar occurrences emphasize the fact that more automobiles are being produced every year, more factories are being built, and more smog is pouring into our cities.

The author has written children's books and magazine articles about nature and conservation and is a member of the executive board of New Jersey Citizens for Clean Air, Inc. The list of persons that aided in writing the book include an impressive number of out-

standing conservation authorities.

The many photographs help illustrate one of the better conservation books currently available for young people. Mrs. Shuttlesworth seems to be experienced in working with children and knows how to "tune in" young readers to a problem that will confront their generation more than the last.

—Jeanette Hunt

SO HUMAN AN ANIMAL by René
Dubos; Charles Scribner's Sons, New
York, N. Y., 1968; 267 pages, \$6.95.

Homo sapiens, the human animal, is the product of both his genetic endowment and his 20th century surroundings. It is the century—and the environmental factors it imposes—that greatly enhance or inhibit an individual's potentiality. In *So Human an Animal*, Dr. Dubos questions whether our present situation and the future it implies is a healthy force in shaping the individuals of our species. He wonders if the crowded cities, jam-packed freeways, and smoky skies are the only backdrop for a prosperous civilization. He fears that our children reared in an oversocialized environment will no longer feel happy or even safe outside a crowd of their own kind. He also suggests a rather frightening possibility—that our environment will favor selective reproduction of those best suited to strict and regimented living.

The book is hardly a stab at our civilization—we are not totally wicked or hopeless. Nor is Dubos groping for a Utopia. "To live is to struggle," he writes. And he insists that life without challenge is arrested and static.

The unexpressed fears of the many people worried about our environmental predicament are brought to light by Dubos. The reader no doubt will find himself pausing often to consider the plausible points about himself and his earth. Then he will find himself agreeing—or disagreeing with Dubos. But at least the reader will stop to ponder.

Of course, Dubos does not offer any fool-proof solutions. He lives in mid-Manhattan in New York City on the 26th floor of a concrete and steel building. "Smog is a euphemism for the mud that constantly befools the sky and

blots out its blueness," he writes. The reader perhaps will wonder why Dubos can write against this mode of life yet continue to confront it daily. It would seem that the author would feel ineffective removed from the dilemmas he seeks to relieve. In addition, he admits he must accept many urban unpleasanties to continue his work as a microbiologist.

Books of this nature are always in danger of becoming an accumulation of platitudes. This is not the case with *So Human an Animal*. Dubos' knowledge of biology plus his genuine concern for the future of man yield a carefully written and sincere critique of us. Reading it and sharing its ideas with others would be a wise investment of one's time. Dubos may leave us without answers, but we know he is sharing our problems. At least he is not smirking at us from a tiny cabin in the woods or a straw hut on an island in the South Seas as we struggle with our problems.

—Suzanne Winckler

FINDING BIRDS IN MEXICO by
Ernest P. Edwards, illustrated by
Edward Murrell Butler, Ernest P.
Edwards, and Frederick K. Hilton;
Ernest P. Edwards, Sweet Briar, Va.,
Second Edition 1968; 282 pages, \$4.95
paperback, \$6.95 hard covers.

As different bird species become more and more rare in Texas and the Southwest, birdwatchers and nature enthusiasts are turning to Mexico as an ideal spot to see much of the wildlife that has left our own shores. Mexico is a naturalist's haven. It has fewer industries and big cities to drive away its avifauna, is easily accessible from the Southwest, and accommodations are reasonable.

In this handy, paperback field guide, Ernest Edwards has tried to aim his comments and observations to the highway traveler. He includes the birds to be seen in each region and sub-region, and much about topography and weather conditions.

The section most useful for the field contains a listing of all Mexican birds by English common name, Spanish common name, and their scientific name, size, and distribution.

Illustrations include 212 Mexican bird species, 74 in full color. Mexican birds not usually found in the United States are illustrated or described briefly.

For the serious birdwatcher looking for new territory, or the casual vacationer who is planning a trip south of the border and wants something unusual to highlight his trip, this book is a must. It is well arranged, for quick field identification, yet is complete and comprehensive. The author has obviously had much experience as an avian follower in Mexico and seems to know just where to look for the most profitable bird excursion "down south."

—Jeanette Hunt



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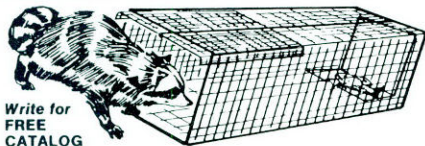
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Long Shots, Short Casts

compiled by Neal Cook

Mistreated Insects: It is estimated that there are three million species of insects in the world. Of these species there are so many insects alive at one time that their numbers are expressed as 10^{18} . Out of this great mass of insects only about one tenth of one percent are harmful to humans or their crops. The rest are either inoffensive, beneficial, or, like the flower pollinating bees, vital for human welfare.

Welcome Wolves: Personnel at Yellowstone National Park report that wolves that were previously believed no longer in the area may be returning to the park. At least six wolves have been sighted in the park and it is hoped that they will continue to increase in order to control the growing herds of elk in the park. These elk have been protected from hunters and without predators to control their numbers they become too numerous for the amount of forage available.

Fishing Tip: Here is a suggestion for live worm fishermen. Cut both ends off a coffee can and cover both ends with the plastic lids that come with many brands of coffee. Cover one end of the can with a plastic lid and then fill the can with your favorite mixture for storing worms. Cover the other end. Since worms tend to work their way to the bottom of the can, all you have to do is turn the can over, remove the other lid, and your bait is now at the top of the can.

Light's Attraction: Guided by some unknown instinct, baby sea turtles head directly toward water upon hatching. One theory on what guides them to the water is that they crawl toward the most intense light source in the area. This light source may be the sun or moon reflecting off the water surface.

Snake Teeth: The teeth of snakes are pointed backward into the snake's mouth and thus prevents the escape of animals caught for food.

Sole Survivors: Higher than average levels of radiation bombarded on a 20-acre tract of land in southern Nevada for five years have yielded evidence that reptiles may be the only survivors in case of an atomic war. University of California biologists studying the tract have found that animals other than reptiles stop successfully reproducing after several generations have been subjected to radiation.



LEROY WILLIAMSON

Common sense dictates that poor swimmers and non-swimmers should always wear lifesaving devices when swimming or playing around any body of water.

Water Sports Demand Safety

by Neal Cook

DEATH BY DROWNING was the verdict in 489 deaths in Texas during 1968. The vast majority of these deaths could have been prevented if parents had more strictly supervised children playing in or near water and if all non-swimmers and poor swimmers had worn life preservers when around water.

Of the 489 drownings, 96 of the victims were 10 years old or younger. In too many instances these children drowned in backyard swimming pools, drainage ditches, or farm ponds near their homes. Parents must remember that almost any body of water is a hazard and children must be warned of the danger and kept under close supervision.

Many of the other 393 persons who drowned might have been saved had they worn lifesaving devices when common sense dictated. Non-swimmers and poor swimmers should always wear some type of life preserver when playing in the water or riding in a boat. Persons who are good swimmers should

also wear life preservers when in rough water or working in a hazardous position near water.

Men working on offshore oil wells, tugboats, or barges know the dangers of falling overboard or having their boat sink. They wear life vests at all times. If these men can see the dangers, shouldn't the weekend boater try to save himself or his family grief by following the professional's example?

The Texas Water Safety Act requires one life preserver on board for every person on a boat. But in many instances—every boater should ask himself if this applies to him—the life preservers are stored far out of reach under the bow of the boat. If the boat were swamped by a wave, these life preservers would be of little use.

There are three basic types of lifesaving devices that are approved by the United States Coast Guard for use in boats of various classes: life preservers, buoyant vests, and buoyant seat cushions.

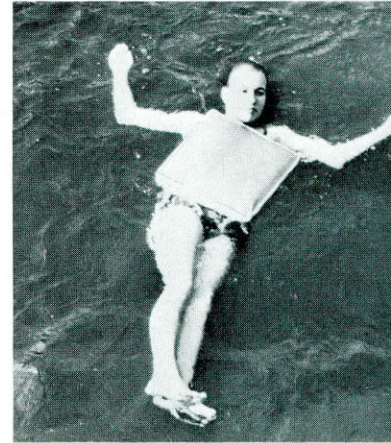
The best of the three are life preservers. These





Buoyant seat cushions should never be worn on the back.

PHOTOS BY REAGAN BRADSHAW



Water Sports Demand Safety

are made of pads of kapok, glass fibers, unicellular plastic foam, cork, or balsa wood, enclosed in tough plastic bags. These bags are then enclosed in a cloth jacket with straps to hold the preserver across the chest and between the legs. Life preservers are approved for all classes of vessels. Since 1949, all have been Indian orange in color.

This type of life preserver will hold the head of an unconscious person above water and will float for a long time. But they are bulky and people won't wear them all the time.

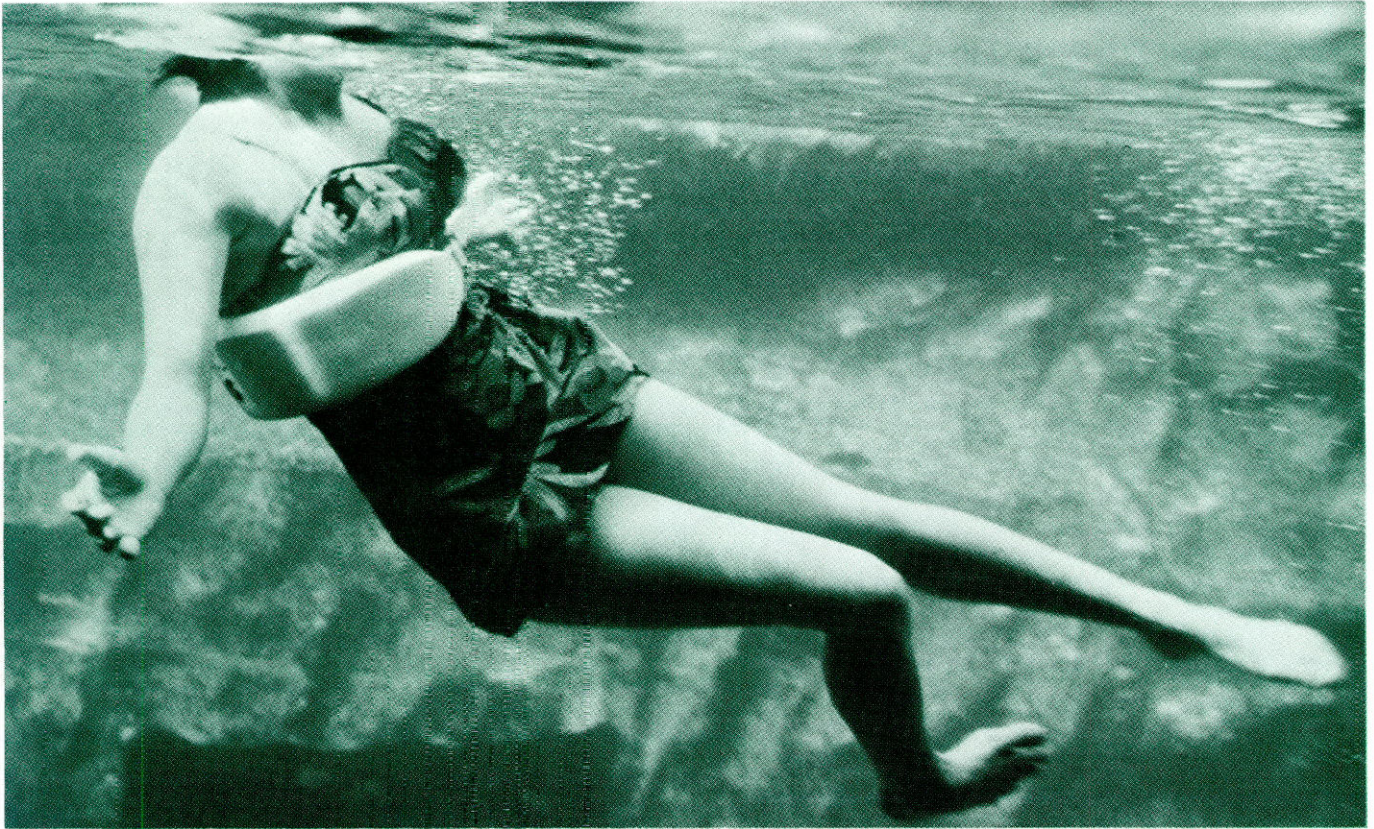
Because of this, the Coast Guard also approves buoyant vests for boats under 40 feet that do not carry passengers for hire. These vests are basically the same as life preservers, but they don't always have the crotch strap and are often in colors other than Indian orange. The biggest difference between life preservers and buoyant vests is their buoyancy. Life preservers meeting the requirements for all

boat classes provide about 22 pounds of buoyancy while buoyant vests offer only 16 pounds.

Buoyant vests are easy to work or play in and are less expensive than life preservers—but they are not as safe. They will come off easier and may not keep an unconscious victim's face out of the water. They do work though and in most instances are efficient enough to save lives.

Another type of Coast Guard approved lifesaving device for boats under 40 feet that don't carry paying passengers is the buoyant seat cushion. These are usually made of kapok or other filling, covered with plastic and enclosed in heavy plastic or cloth. A strap or handle is attached to each end. These cushions are good because they can be kept handy and thrown to a person in trouble.

However, buoyant cushions present some problems. They won't always keep an unconscious person's face out of water, and the buoyant material



Ski belts are not Coast Guard approved lifesaving devices.

sometimes becomes waterlogged and compressed from long use as a boat seat.

Buoyant seat cushions must **never be worn like a backpack**. The best way to wear one is to put one arm through one strap and the opposite leg through the other strap.

Many water skiing enthusiasts will not wear life preservers because of their bulk, choosing instead to wear a ski belt—a ring of buoyant material that is buckled on like a belt. Ski belts are not Coast Guard approved because they will not keep an unconscious person's head out of the water and often tend to force it under water. However, they do help a conscious person tread water.

Some of the newer buoyant vests made of unicellular foam are Coast Guard approved for boats under 40 feet and are becoming more and more popular with skiers who realize the danger of being knocked unconscious in a bad fall. These vests are

about three times more expensive than ski belts but are well worth the extra money.

Life preservers, buoyant vests, and seat cushions must receive proper care and storage to remain effective. They must be hung up to dry and checked to see that buckles and straps are not broken or rusted shut. The plastic bag enclosing the buoyant material in lifesaving devices will sometimes be punctured through normal usage so they should be checked before every boating trip.

Coast Guard approved buoyant vests for boats under 40 feet can be bought for children for about \$4; for adults, about \$5. These can be easily buckled and worn while swimming, fishing, or riding in a boat. More expensive ones are approved for all boats.

Wouldn't it be worth \$5 and the time of fastening a couple of buckles to save your life or the lives of members of your family? **

STARTING FROM SCRATCH, the wild berry jelly maker must begin in the woods. Gathering the fruit is half the fun and when the project is finished the cook can brag not only on her culinary skills but also on her wilderness expertise.

Besides, berry picking is an excellent excuse for a family outing in which all members can participate without any specialized outdoor aptitude or equipment. The only prerequisites are an abundance of energy and several tin pails or kitchen pots.

Texas offers a large selection of wild berries that make delicious and unique jellies and jams. Some sort of fruit can be found ripening practically every season in some part of the State. Such things as hackberry, mulberry, loquat, pawpaw, prickly pear, agarita, and choke cherry are all edible and would make interesting additions to one's shelf of preserves. But if the cook does not feel secure in identifying berry bearing plants, it is better to concentrate on the more popular fruits, blackberry, plum, cherry, dewberry, and grape.

Mustang grapes are especially good to pick because they are easily identified and widespread throughout the State. Found in most parts of Texas except out west, the berries mature June through



PHOTOS BY JOHN SUHRSTEDT

a taste of

by Suzanne Winckler



Clean and wash fruit thoroughly.



Mash berries while cooking.



Pour into colander.

August and often until late autumn. The blue-black berries hang in clusters from a twist-and-tangle vine among broad, sawtooth-edged leaves. Often, the berries are hard to spot because they hang hidden in the shadows formed by the brambles. The best method of searching out the fruit is to be familiar with the rich green, saucer-shaped leaves of the mustang vine. Growing rampantly, the vine will often dominate other plants by forming a great bushy tent over and around them. An old vine can obtain lengths of 40 feet.

Berry picking clothes should be woody—substantial and used to abuse as they can be torn, pulled, and stained. They should also be protective and comfortable since the wearer will be tromping in berry brambles and other thorny bushes in addition to stretching and bending. Sandals are out.

Often the acid in the berries will irritate the hands causing an itchy, burning feeling. This is not harmful, but old gloves could be worn for protection.

Select firm berries just a little underripe as they make the best jellies. The juices are thicker and jelly better while overripe fruit is often infected with germs of mold and decay. To sample the fruit while picking, it is advisable to squeeze the grape meat

from the skin and discard the covering which is tough and has a bitter taste.

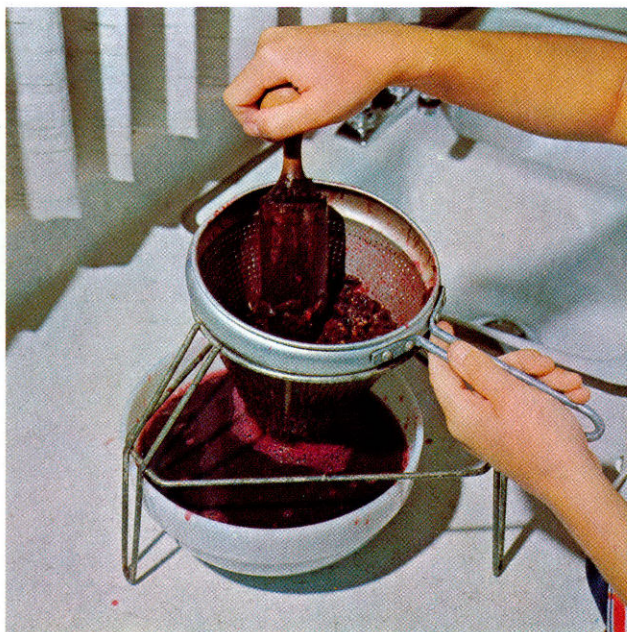
Once home with the pickings, the jelly maker can begin. Glasses and lids should be prepared first—scalded and drained—to be ready when the jelly is completed. Utensils should be metal or glass since grapes will leave an indelible mark on plastic kitchenware, not to mention aprons, towels, and hotpads.

The berries should be picked-over carefully and washed and drained to remove dust, dirt, lose stems, and bits of leaves. The fruit is then boiled in a large kettle or saucepan with as little water as possible. While simmering, the berries should be mashed with a large spatula or spoon to release juices and separate the skins from the fruit. Cook for about 10 minutes or until the juice is flowing freely and the fruit is thoroughly cooked.

Now the fruit and juice is squeezed through a jelly bag or colander lined with dampened cheesecloth. Or the grapes may be mashed through a special colander that is finely porous and requires no cheesecloth lining.

At this point, two alternate methods can be used to complete the jelly making process—the old

f the wild



Strain, then measure 4 to 5 cups juice.



Boil, remeasure, and add sugar.



To make jelly by natural method test for the "jelly point." When the syrup runs from a spoon in a continuous string or sheet it is ready. Skim off foam and pour into sterilized glasses. Jelly will stiffen as it cools.

a taste of the wild

fashioned boil-and-test way and the short-cut commercial pectin way. Both are effective if instructions are followed. Jelly makers will find step by step instructions included in packages of commercial pectin so this method will be dispensed with.

For the boil-and-test method, the prepared juice is measured—it is best to cook only four to five cups at one time—and placed in a saucepan. (Any leftover concentrate can be saved to make a tangy grape drink by mixing about two tablespoons of juice, and equal amount of sugar, with water in a 16-ounce tumbler.)

Now, boil the juice vigorously for 20 to 30 minutes to drive off excess water. Remeasure the juices and add an equal amount of sugar. Boil for five minutes. Ideally, the juices will begin to jell during this time. To test the "jelly point" dip a large spoon into the juice and let this liquid run back into the pan. If the juice runs from the spoon in a sheet or string, the jelly is done—if not, boil longer. After 15 minutes, if it still does not jell, it will be necessary

to add sugar and boil longer. However, such jelly boiled for a long period will not be as tasty as that which jells quicker since it tends to become gummy and stringy.

When the syrup has jelled, remove from the heat, skim off any foam, and immediately pour into the sterilized glasses with a small pitcher or dipper. Cover tightly and stand glasses upside down while cooling to help seal the lid. The jelly will stiffen as it slowly cools which often requires two to three days.

With the jelly put up, the cook and crew—if she had any berry helpers—can anticipate a delicious future of breakfast biscuits, peanut butter sandwiches, and dinner rolls enhanced by wild grape jelly. Of course, the time and energy expenditures are greater than those exerted in a trip to the grocery store, but dividends return when the cook can push her cart past the preserves at the supermarket knowing her homemade variety is on the shelf at home. **

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will mark you as a member of an organization in which you can take great pride. Stewart Udall wrote to the Society: "Best wishes for continued success with this splendid project and your endeavor to share your unique story with other communities." Sen. Everett Dirksen said, "Anyone who cares about the next generation should read what this generation of Griggsville citizens is saying."

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By acting now to join America's fast growing nature organization, the Griggsville Wild Bird Society, you can acquire at the special price of \$5 a beautiful 11x14 reduction of the great new collector print of purple martins by Richard Sloan. This 11x14 print, worth several times this price if it were offered for sale in a gallery, is not available in any gallery or art store. It is available only to members of the Griggsville Wild Bird Society.

The original of this painting was done by Mr. Sloan after he was selected in a nationwide search for the greatest artist available to do a classic vignette of purple martins, a bird that has gained great national popularity, but had been largely neglected by artists since John James Audubon's classic painting done in 1822. The new Sloan classic is making wildlife art history.

National response to that painting led to the publication of a limited edition and the beginning of a series of limited collector editions of other Sloan bird paintings.

Each of these collector prints represents an outstanding investment opportunity as well as a magnificent work of wildlife art. The talent of Mr. Sloan and the growing national interest in wildlife art assures that these prints will increase in value. In addition, our Society has in its publishing of Mr. Sloan's art the continuing advice of J. L. Wade, the man who promoted the purple martin to national popularity.

Many persons will want to acquire an entire set of the prints of this great American artist.

Mr. Sloan and Mr. Wade, owner of the original of this painting, asked that a special 11x14 edition of this particular painting be done for the Society because of the contributions of our members to this species of bird in America. The print was done on the same paper and of the same general quality as the collector print, and is now available. We are pleased to be able to offer to members this work of a great artist at a price anyone can afford.

* Collector prints available at selected galleries and direct from Society include: Plate I, Purple Martin, 5,000 22x28 prints, each signed by artist, plates destroyed; Plate II, Eastern Bluebird, 5,000 22x28 prints, each signed by artist, plates destroyed. When ordering from Society, include \$30 plus \$2 postage, packing and handling for each print. If edition is sold out when order received, entire payment will be refunded immediately.

Dr. Emmet Blake, nationally respected curator of birds at Chicago's Field Museum of Natural History, said of Sloan, "Under Sloan's sympathetic treatment, each bird comes alive, as does the vegetation and countryside of its portrayed habitat. The artist's mastery of both color and detail must be seen to be appreciated. Certainly, we shall hear much more of Dick Sloan and his superb art in the years ahead."

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Griggsville, Illinois 62340

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- I wish to become a member of The Society and enclose check for \$3 for next 12 months membership.
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by Clarence Beezley Information Officer, La Porte

DON'T MOVE FAST, stay close to home, mind your own business, and have a hard shell is the code of the box turtle.

It has been a good system. The box turtle's personality has made the word "turtle" a warm name for a cool animal. Unlike the words "snake" and "alligator," just about everyone has a friendly feeling for the "dryland tortoise"—Texan for box turtle.

Turtles—which have been around for 170,000 years or so—perfected the first mobile homes. Box turtles have carried the process one step further. They live in

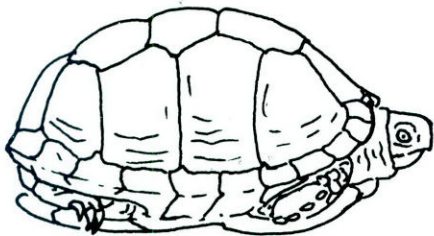
mobile castles. They have a mobile home equipped with drawbridges for added protection.

Being adapted to spend most of their time on land, box turtles in addition to a shield-like back shell (carapace), have a hinged lower shell (plastron). This provides a drawbridge for the front two legs and telescoping head, and a drawbridge for the stern works—two legs plus a tail.

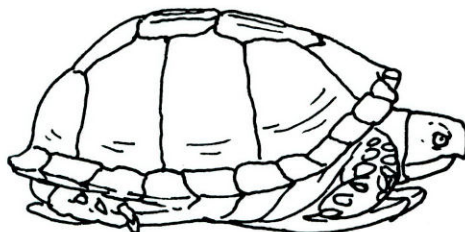
When threatened, the box turtle retracts its legs, withdraws its head, folds the tail, and raises both drawbridges. This literally seals all unprotected parts within

the shell and the box turtle is ready for siege from just about any natural enemy.

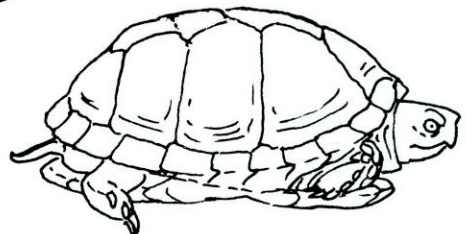
Female Texas box turtles have eyes that are dark red, purplish gray or dull brown while the male's eyes are pink or bright red. These reflect a warm coal of passion. Male box turtles are notorious Don Juans, and where ranges overlap, turtles may be found that show characteristics of more than one species. For example, the true three-toed box turtle usually has three toes on each hind foot, but sometimes three-toed turtles will be found



*Three-toed box turtle
(middle on facing page)*



*Gulf Coast box turtle
(top on facing page)*



*Ornate box turtle
(lower on facing page)*

with four.

When you find a box turtle and wish to identify it, more than one key characteristic should be used. Location is one. If you are along the upper Texas Coastal Prairie, your turtle is most apt to be the Gulf coast variety, *Terrapene carolina major*; if you are in the eastern third of the State, it is likely to be the three-toed box, *Terrapene carolina triunguis*. The ornate box turtle, *Terrapene ornata*, is found in all parts of the State except the Trans-Pecos region and the eastern one-fourth of the State.

The Gulf Coast and three-toed turtles prefer lightly wooded areas; the ornate, open country. The ornate is adapted to dryer situations and is less likely to be found in or around water.

Only one of the three is distinctively colored—the ornate box turtle. It has a pattern of yellow or orange rays on a black background on the upper and lower shells. The lower shells of its relatives are plain. The upper shell of the Gulf Coast turtle may be solid black or horn colored or may have an orange or yellow pattern which resembles colored ink blotches. Three-toed box turtles' upper shells may be plain horn or olive colored. When colored, the shell may be speckled with a yellow flower-like pattern. The three-toed box turtle will have an orange throat while the Gulf Coast turtle will have orange and black around its head and throat.

Taxonomists have given turtles scientific names, but people have their own local names for turtles which vary from one area to the other. This sometimes makes talking turtle confusing. *Terrapene*, the genus name for the box turtle comes from Latin and describes the turtle's habits—*terra*, meaning land; and *pene*, meaning almost.

Laymen speaking of box turtles often use the term "box terrapin" or "dryland terrapin." But taxonomists have given the name "terrapin" to some brackish water turtles (diamond back terrapins).

Other people use the word "tortoise" when referring to box turtles. This word came from Europe where turtles are sea turtles and everything else, including box turtles, are referred to as tortoises. However, text books give tortoise as the accepted name for dryland turtles. South Texas has one representative, the Texas tortoise, *Gopherus berlandieri*. Because it is in danger of extinction, this tortoise is protected and illegal to take for sale. The Texas tortoise is easy to tell from the box turtles because it does not have a hinged lower shell. It also has stumpy feet and its shell has a knobby appearance.

The box turtle is slow but not very steady. It could hardly qualify as the hero of the "hare and the tortoise" fable. Speed has been sacrificed for protection and conservation of energy. A box turtle is estimated to have a cruising speed of about one mile in 9½ hours. Being reptiles, the tortoises are affected by the weather. During the winter they hibernate—often in leaf mold or other litter. During drought they hibernate underground. They are normally active only during daylight hours, and they rest a lot, particularly during summer months.

Box turtles stay close to home. A biologist who studied their range found that while a few may travel as far as one-half mile, most spend their life within a very small area—on the average about 10 acres.

Home life agrees with them. In 1905, a romantic boy cut his and his sweetheart's initials on

the lower shell of a box turtle. It was found again in the same place, 46 years later. Another example occurred in 1961 when a turtle was found for the fourth time in the same five-acre field where it had first been marked in 1887. Some box turtles are believed to live over 100 years.

Humble as his territory may be, to the box turtle it is home. It knows where home is and if moved, will make every effort to return.

Nature gave the box turtles navigational instincts apparently as good as those possessed by birds, and their homing ability, like that of birds, is thought to be based on celestial navigation. Since turtles are active during the daytime, the sun is their check point. When a mirror is held to reflect the sun into the eyes of a homing turtle, the animal will change direction. In experiments, turtles released on cloudy days had directional problems. They would just walk around and around in small circles.

Box turtles eat many different things—more than 130 different kinds of food were recorded in one study. Insects, snails, seeds, and fruit are important food items and even carrion is eaten. Whatever is available seems to determine the diet. In captivity, box turtles have done well on dog food with an occasional drop of cod-liver oil added for vitamins. They are especially fond of berries and have been known to be a nuisance in strawberry patches.

The meat of some box turtles

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is thought to be poisonous and there is at least one recorded instance of people getting sick after eating it. It is believed that the turtles had eaten poisonous mushrooms, and while they were immune, they passed the poison on to people who ate the meat.

Sometimes box turtles get more than they need to eat and become fat. When this happens they lose part of their protection because they are unable to completely close both drawbridges. This leaves members at one end or the other exposed to an attack from a dog, skunk, or rat. If a box turtle lives to be five years old, it has a good chance of becoming an ancient turtle. But the span from egg to five years (about a five-inch turtle) is a difficult one.

From three to seven eggs are laid in a clean-cut hole, about two inches deep dug with the mother's hind legs. Without ever seeing her eggs, she packs the dirt and leaves the eggs, to incubate by themselves. A box turtle's egg is about 1 1/4 inches in length and 3/4 of an inch in diameter, with a white, leathery shell. Incubation normally takes 80 to 100 days depending on temperature. Wet weather may destroy the hatch or the eggs may be found and eaten by crows, raccoons, dogs, or skunks.

Once hatched, the baby turtles, which are about the size of a quarter, have one problem—staying alive. Their drawbridges are not developed and if they were, would offer little protection. Since the little fellows are bite-size for many predators, the babies make themselves just as inconspicuous

as possible. For this reason, few people ever see a small box turtle.

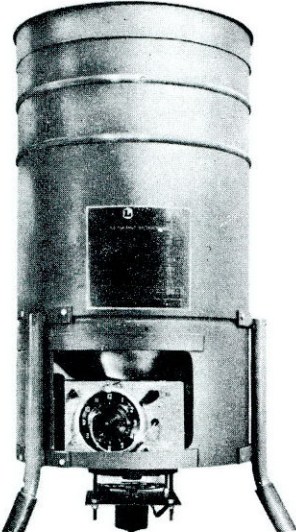
Chiggers, screw worms, plus some specific turtle parasites, keep adults from living an ideal existence. But today box turtles face a problem completely unknown to their ancestors—man. Man has not been a very good neighbor. He has often wrecked the turtle's habitat. Ever since fire was discovered, man-made fires have killed many box turtles.

Now man has a new toy, the automobile, which is probably as great a hazard as turtles have faced in their millions of years of existence. The box turtle's shell

does not protect it from the weight of a car, yet highways bisect almost every tortoise's territory. Too often the result is disaster.

Picking up a box turtle from the highway may be the one exception to the rule against taking a wild animal home. They make good pets and will not cause many problems. All they need is a box with a dirt floor, some litter to crawl under, water to drink, and occasionally some food.

Box turtles are the prized possession of many young boys, but they are also the object of much adult curiosity. **



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1-c	3-d
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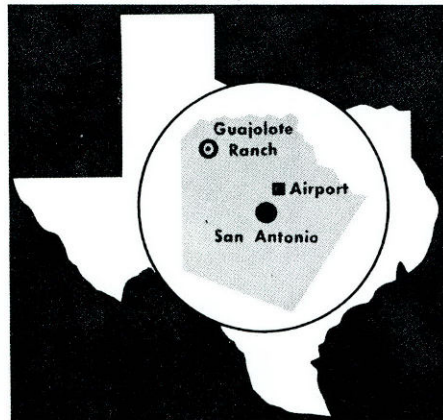
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▲ SPIDERWORT AND COREOPSIS BY REAGAN BRADSHAW

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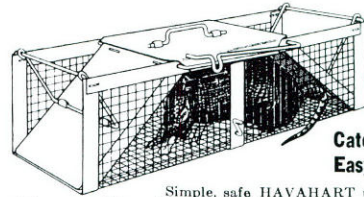
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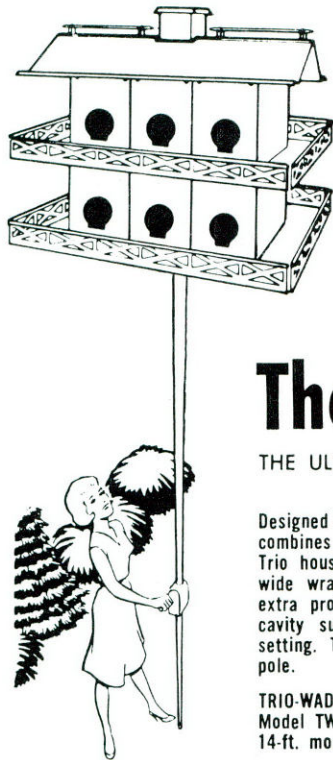
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ALUMINUM has made the wooden martin house obsolete. Heat reflective aluminum is cooler; it is more attractive and maintenance free; it is lightweight and makes raising and lowering a house easy; its shiny interior surfaces repel starlings; and its smooth surfaces will not harbor parasites. Eliminate starling and sparrow menaces by erecting a Trio aluminum house. The martins will love you for it.

WORLD'S MOST COMPLETE MARTIN HOUSE LINE!

THE ORIGINAL TRIO-MUSSELMAN, World's most popular, developed and used in Griggsville's famous insect control program; 12-cavity; green and white baked enamel finish; other standard features listed above (*); in easy to assemble kit form.

Model M12K house \$24.95
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24-FAMILY TRIO-CASTLE, The elite model of a great line; beautiful in any setting, designed for building a large colony. (*See above list for standard Trio features.) Complete with deluxe crankup pole with dual braking action and ratchet locking device for child-safe operation of winch.
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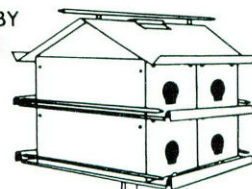
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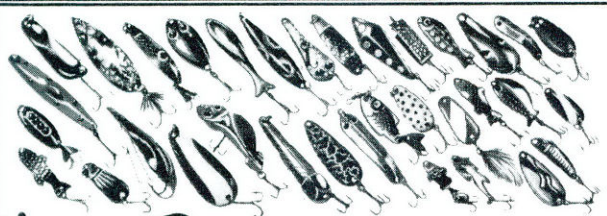
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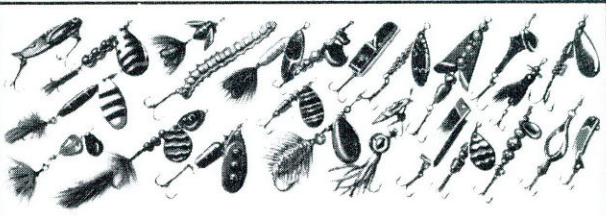


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Junior Sportsmen

by Suzanne Winckler

*"The wind in one's face
makes one wise."
—George Herbert*

SWIRLING around us everywhere is the wind. It is air in motion. The sun's heat, the spinning earth, and the fact that the earth isn't level, all cause air to be wind. Gentle breezes that ruffle trees, hurricanes that roar in from the Gulf, lake winds that push a sail boat, and twisters that lift and flatten houses—Texans enjoy and endure all kinds of wind.

Coming from 93 million miles away, the sun's rays hit our earth. The earth absorbs this light converting it to heat waves. These waves heat air. The air molecules move faster and faster and push apart—air expands and rises. Cooler, heavier air rushes in underneath to take the vacant spot left by the rising air. Then the same thing happens to the new cool air in contact with the warm

earth. It warms and rises. Can you visualize the huge conveyor belts of warm and cool air cycling around and around in our atmosphere? This continuous circular movement of air is called **CONVECTION**.

Geography and Rotation

If the earth were a smooth sphere and did not rotate, two large convection currents would rise up from the tropical equator and move toward the north and south poles. Sinking as they cooled, these currents would replace cold polar air shoving toward the equator to be warmed.

But the earth is made of mountains, valleys, land, and water. Most convection currents result from regional exchanges of warm and cool air, such as sea-land breezes which coastal residents

enjoy. Land warms and cools faster than water. During the day, warmer air on land rises and moves out over the water while lower cooler air moves inland. The result? Sea breezes. The cycle is reversed at night since water will stay warmer than land. Occurring throughout the world, these coastal winds have special names in different lands—the *virazón* of Chile, *datoo* of Gibraltar, *imbat* of Morocco, and *kapalilua* of Hawaii.

THERMAL SLOPE winds, similar to land-sea breezes, blow up from the cool valley during the warm daylight when air rises off the warm mountainside. During the day the slope is exposed to more sunlight but at night it cools faster than the valley. Air heated by the warmer valley rises at night and the direction is reversed—winds blow down from the slope to fill the vacancy made by the rising valley air.

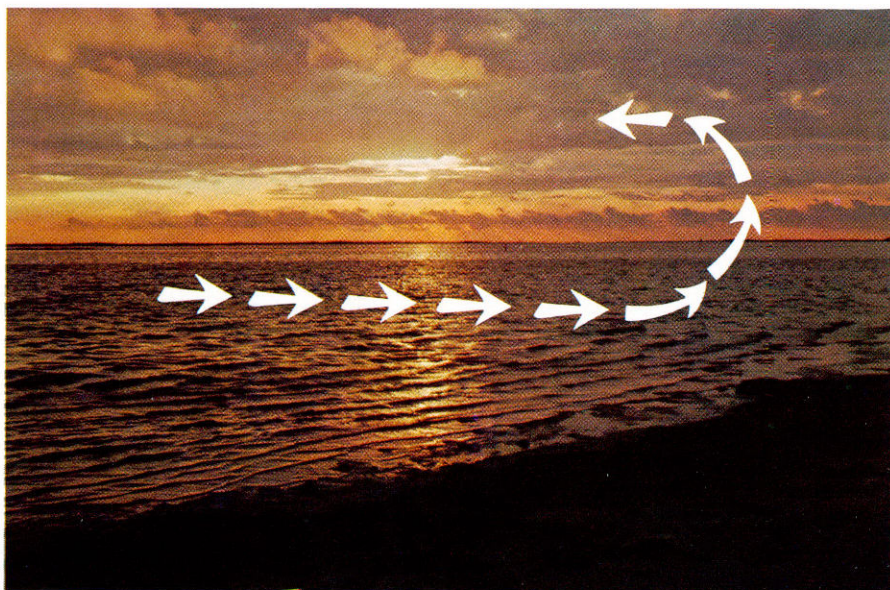
Not only is the earth rough-hewn—it is also constantly whirling around. As it spins from west to east, it causes air currents to veer off the north-south course they would follow if the earth stood still. This swerving is called the **CORIOLIS** effect after the mathematician who first described it. Drag against the earth's surface and the earth's rotation set up a system of **PREVAILING** winds that blow eastward and westward in different areas of the northern and southern hemispheres.

Global Wind Patterns

Wind is very temperamental but general paths of air can be mapped on our globe. The directions of these prevailing winds are interesting to examine especially when we remember the important part they played in exploration and trade during the era of great sailing vessels. Let's look at these major belts of air as they react to the earth's rotation:

EQUATORIAL DOLDRUMS—At the equator where the sun's heat is powerful most air lifts straight up. There is very little horizontal movement to create breezes. Sailing ships avoided this region whenever possible.

LEROY WILLIAMSON



Wind moves inland during day on Texas beaches. Warm earth air rises and is replaced by cool sea air. After sunset, the cycle will reverse.

HORSE LATITUDES—Sailors avoided this path as it was named for dead horses which had to be thrown overboard when ships sailing to the Indies were stalled in these still waters. Part of the air traveling from the equator to the poles drops at about the 30th parallel. Where it vertically descends a relatively calm area occurs.

PREVAILING WESTERLIES—The remaining portion of air from the equator that split with the horse latitudes continues to the poles. This is the major air current over the United States. These winds, moving from slightly southwest to northeast would be fairly steady were it not for our mountain ranges and the movement of cold polar air.

TRADE WINDS—After descending, the horse latitudes also divide sending drafts to the poles and the equator. Those returning to the equator form the trades—the famous winds that blew Columbus to the West Indies.

POLAR EASTERLIES—Generated by the frigid temperatures of the poles, this heavy, cold air rumbles toward the equator veering somewhat because of the Coriolis effect. Blowing southwestward, this prevailing current struggles with our westerlies. A practically constant battle results causing much of the bad weather in the United States. **

Books to tell you more about wind and weather:

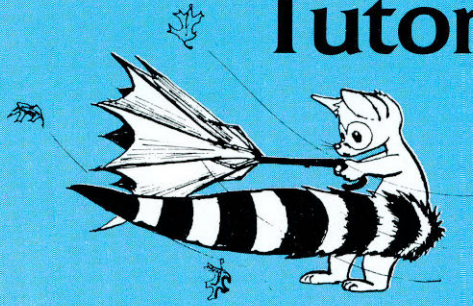
The Ways of the Air, Roger Pilkington, Criterion Books, New York, 1962.

Weather, by P. E. Lehr, R. W. Burnett, H. S. Zim, Golden Press, New York, 1963.

Weather, Phillip D. Thompson, Robert O'Brien, LIFE Science Library, Time, Inc., New York, 1965.

The Wind, Jeanne Bendick, Rand McNally and Co., New York, 1964.

Tutor Topics



Observe the Coriolis Effect:

Make a cardboard disc about the size of a long playing record or use an old record if you have one. Place it on your record player. Imagine that the hole is the North Pole. With a pencil or piece of chalk, draw a straight line from the hole to the outer rim of the disc. This is the way the wind would blow if the earth *did not* rotate. Now, with one hand begin turning the disc counterclockwise. This is the west-to-east way in which the earth rotates. Again with your pencil or chalk begin to draw a straight line toward the outer rim just like you did while the disc was not being turned. What happens to the line this time? It curved in the opposite direction of the way the disc was moving. This is what happens to air as the earth whirls around.

Another air current—the jet stream:

During World War II when B-29's were flying at higher altitudes than any plane before, pilots made an amazing discovery—on certain paths their normal ground speed of 350 mph was slowed to 200 mph by strong winds at high altitudes. After charting these "jet streams," it has been determined that they move around the earth from west to east and seem to occur over areas where cool and warm air collide. The North American jet stream is a strip of wind about 300 miles wide and four miles deep that moves from 20,000 to 40,000 feet over the United States. In its core a jet stream may reach speeds of 250 to 300 mph during winter when temperature contrasts are greatest.

Pick the proper definition for the terms:

1. CONVECTION currents
2. THERMAL SLOPE wind
3. CORIOLIS effect
4. PREVAILING winds
 - a. wind that blows up mountains during the day and down into valleys at night
 - b. general circulation of global winds like the Equatorial Doldrums
 - c. conveyor belts of warm and cool air
 - d. veering of prevailing winds off north-south course due to earth's rotation

(See page 23 for answers)

Letters to the Editor

Poisonous Mushroom

The photograph on the front cover of the January 1969 issue is beautiful. However, the mushroom illustrated is either one of the Amanita family or, at least, closely resembles one. In any event, the uninformed should be warned to carefully avoid picking for eating any mushroom that even remotely looks like the cover photograph. I am sure you are aware that several of the Amanita group are deadly poisonous and have caused many human deaths. I hope you will receive this comment in the spirit offered—not criticism, but an effort to avoid a possible tragic event.

J. S. Stein
Fairfax, Virginia

Red-legged Partridge

In Roger Tory Peterson's *A Field Guide to the Birds of Texas*, the section about rare and almost extinct birds says about 400 red-legged partridges were brought from Spain and released in West Texas, but the release was not a success. About six weeks ago a male red-legged partridge suddenly appeared on our driveway and has been here ever since. I feed it about twice a day and it drinks out of our birdbath. We

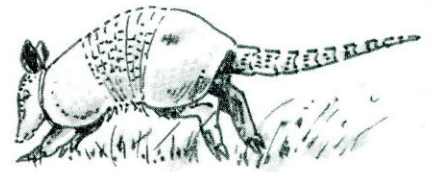
thought you might be interested to know that there is at least one red-legged partridge in Texas.

Ruth M. Cleaver
Dallas

Since the 400 red-legged partridges from Spain were liberated a great many years ago in the Panhandle of Texas, I believe the bird which showed up in your driveway probably escaped from some game breeder's farm or some bird fancier's pen in the vicinity. There are many species of partridge or chukar which look like the redleg. By this, I mean the French, Indian, Barbary, Turkish, and Greek chukars.—P. B. Uzzell, Wildlife Restoration Coordinator, Wildlife Division.

Pet Armadillo

To answer Jeff Terry's question in the January 1969 issue concerning pet armadillos, my boyhood experience might be of some interest. Because of his vehement objections to baths, my pet, Elmer, made his home under our house. I petted, loved, carried, and fed that animal with as much love as any mongrel pup ever received. Mine (and his) downfall was in allowing him to run free, for the last time I saw Elmer



a man was placing him in the trunk of his automobile and driving away. Be careful, Jeff, for one boy's pet armadillo may make another man's stew.

Jack H. Sanders
Houston

Birds' Names

We are interested in the flora and fauna presented in your magazine, but I think someone really goofed in the February issue. It is frustrating to look at the various pictures and be in the dark as to the identity of the plants and animals.

Mrs. V. C. Jung
Austin

The mystery birds in the "What Not to Potshot" article have been identified as: page 2—male pyrrhuloxia; page 3—(upper left) mallard drakes, (lower left) scaled quail, (right) long-billed curlew; page 4—(upper) young laughing gull, (lower) brown towhee; page 5—(left) black-necked stilt, (right) young horned owl. Thank you for the criticisms. We always appreciate readers' suggestions.—Editor.

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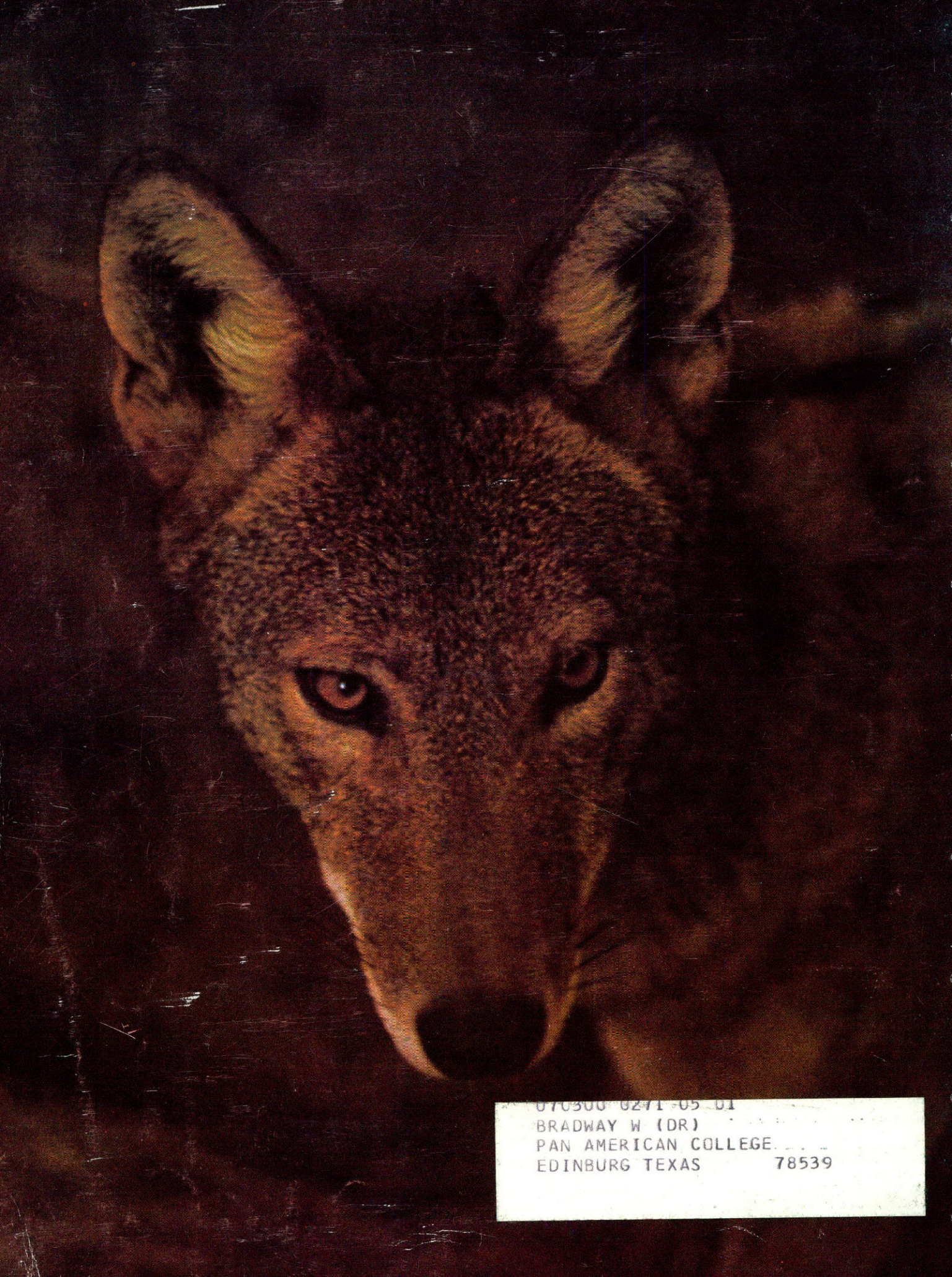
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BACK COVERS

Inside: "Remember the Alamo" was the cry that eventually led to Texas' independence. The inside of the Alamo in downtown San Antonio has many mementos of this period in Texas history. Photo by Leroy Williamson.

Outside: Biologists do not agree as to whether pure red wolves remain in Texas today. Many animals seen and called red wolves are really crossbreeds of wolf and coyote, wolf and dog, or other combinations of these animals. The animal on the cover appears to be a red wolf, but only a study of its skeletal system would reveal its true identity. Photo by Reagan Bradshaw.



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