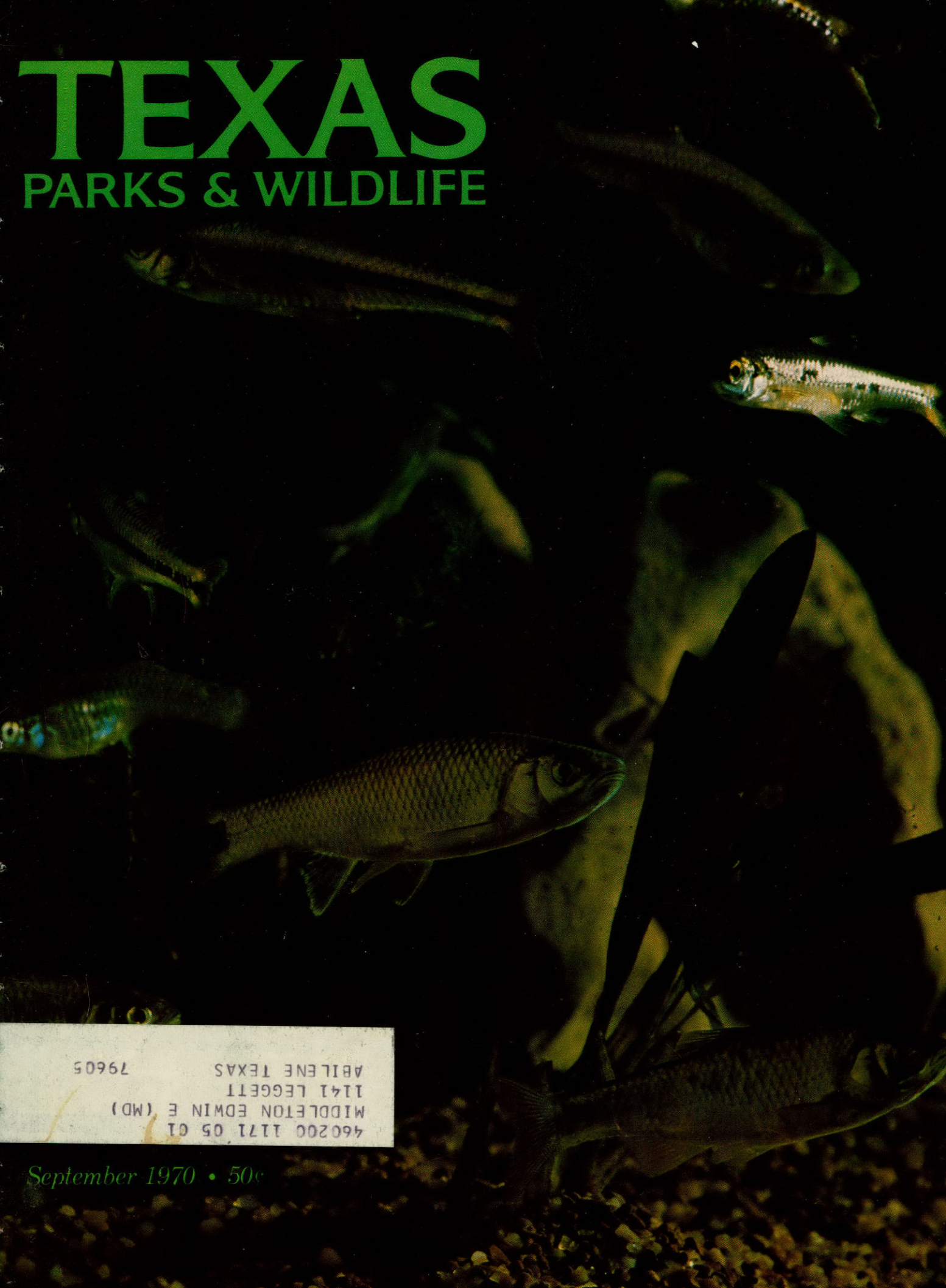


TEXAS

PARKS & WILDLIFE



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September 1970 • 50¢



OUTDOOR NOTEBOOK

Shown in spring blossoms above, and below bearing late summer fruit, is the farkleberry. Also called whortleberry, tree huckleberry and gooseberry, *Vaccinium arboreum* thrives in East Texas. Growing as a shrub or small tree, the farkleberry is valuable to wildlife. Berry pie lovers

must get up early to collect the sweet fruit before the birds, raccoons, deer and opossums. Settlers made tea from the root bark to treat diarrhea. The shreddy bark from the trunk was used in leather tanning. Although now important only to wildlife, the farkleberry has a unique beauty, particularly after spring rains when each blossom is tipped by a raindrop. In the fall the leaves glow with fiery colors. Whether you are berry or beauty hunting,

the farkleberry is a welcome tree to discover.

The bird perched on the bush is the tufted titmouse, *Parus bicolor*. The fun-to-watch acrobat is the only titmouse found in the eastern half of Texas. It ranges west to Decatur, Fort Worth, Austin and to the central coast near Rockport. The titmouse likes woodlands and groves. It nests in holes in trees, posts and man-made bird houses.

— 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.

NEAL COOK.....Editor
DON WALDEN.....Associate Editor
REAGAN BRADSHAW, Photography Editor
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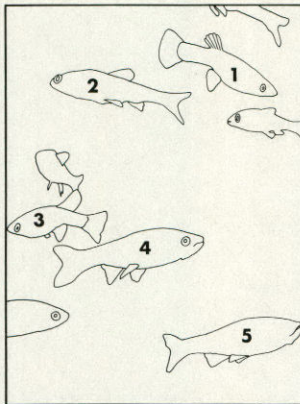
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Engeling Wildlife Management Area in East Texas helps biologists find answers to problems of game management.

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The bald eagle will be only a symbol unless something is done to save it.

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Cover: A group of native fish in a well kept aquarium can be interesting and educational. Keyed to the diagram above, the fish are (1) *Gambusia* sp. or mosquitofish, (2) *Notropis texanus*, a weed shiner, (3) another species of *Gambusia*, (4) *Notropis venustus*, blacktail shiner, and (5) *Notropis lutrensis*, redhorse shiner. Photo by Reagan Bradshaw.

**TEXAS
PARKS & WILDLIFE**





by W. R. Long
Information Officer, San Angelo

ASIAN IMMIGRANT

Chukar Comes to Texas

SO FAR an unsuccessful transplant in Texas, the chukar partridge, *Alectoris graeca*, may still someday provide exciting hunting for the State's shot-gunners.

Wild-trapped by the California Fish and Game Commission and flown by jet to Texas in August 1969, 1,146 of the heavy-bodied species were received by the Texas Parks and Wildlife Department. To avoid the August heat, the birds were shipped as fast as possible and then freed near water in five Trans-Pecos counties — the arid, rugged, semi-barren lands considered best for their survival.

Chukar releases in the United States began in the 1930's as attempts to find an exotic to supplement but not supplant populations of native game birds. They thrived in areas most resembling their native habitats — desert-like hills and wide valleys such as are found in Pakistan and in the foothills of the Himalayas in Nepal. India and China have huge chukar populations in this same type of habitat.

The chukar was introduced into several states in semi-desert areas. California was one of the first states to enjoy survival and reproduction, and Washington, Oregon, Idaho, Utah, Nevada, Colorado, New Mexico, Arizona and Hawaii have also

Leroy Williamson



ASIAN IMMIGRANT

On page four in the top left photo, crates of chukar are unloaded in the Trans-Pecos after being flown from California. Prior to release in their new home, the chukar are banded by biologists with standard game bird leg bands. Migration habits can be studied and other information obtained from the banding. Page five, bottom photo, the chukar's new home — the semi-arid Trans-Pecos counties.





had various degrees of success in introducing the species. Some of these states have had an open chukar season since 1955.

Chukar transplants have failed east of the Mississippi River although other species of red-legged partridge may some day survive in this habitat. In eastern states, the humidity and rainfall probably contributed to unsuccessful releases of the birds whose original habitat was extremely dry.

Releases in Texas have not been successful either. In 1938 a number of the birds were freed, but the attempt to establish them failed. In 1958 the release of 488 birds from Nevada proved to be unsuccessful. The cause of these failures is a matter of speculation — too wet or too dry climate, lack of nutrition, bad weather or any number of other contributing factors could have caused them.

Compared to a mature cock pheasant, the bird is not large, but compared to the 5 to 7-ounce bobwhite, the 19-ounce chukar is a hunter's delight.

From a distance he is drab in appearance, but upon closer examination, the chukar is strikingly colorful. He is a handsome bird with bluish-gray back plumage and a dark band running across the eyes, down the sides of the neck and around to the throat. His cheeks and throat may vary from white to tan and may be bordered by brown or black. The underparts are whitish, lightly covered with buff, but made outstanding by white flanks strongly marked by diagonal bars of black or coppery brown. The legs, feet and bill are carmine red.

Chukars have been known to eat a great variety of foods. Biologists have found the birds grazing like geese on green blades of grass, but they also readily eat wild fruits and berries, an endless list of seeds and insects of almost any variety.

From the hunter's point of view, the chukar's establishment as a game bird would be a great boon. But hunters will undoubtedly have to learn a bit about the chukar's habits. While bobwhite may seek dense shelter, flushing only when routed out by the dog or kicked out by the hunter, the chukar is a fast runner and prefers running rather than flushing to escape. In flight they have a fast wingbeat and are fairly quick. When alerted, they rise and set their wings to glide downhill from danger. It is almost futile for the hunter to start uphill in their direction. The best strategy is to bypass a hillside covey, angling slightly uphill, and then go downhill toward them.

Exotics are always carefully studied before any are released in Texas. As additions to our list of game species, they are desirable, but not if they might displace existing natives. If the birds from California survive and produce a huntable population in the Trans-Pecos, little competition with existing species is anticipated. They may become a new name on the game list, and, if they do, the man with a gun and dog has exciting prospects in store for him. **

STOCK YOUR AQUARIUM WITH

NATIVE FISH

Story and photography by Reagan Bradshaw

FLASHING SILVER, iridescent green and gold, subtle red and yellow — these colorful decorations as enjoyed in the home aquarium are not necessarily the exclusive properties of exotic tropical fish.

Some of our native Texas fish can rival the tropical aquarium imports for unusual and beautiful coloration, and most of them can be enjoyed at virtually no initial cost and with only a little more care than is required by the pet store varieties.

So are the antics of native American fishes as interesting as their tropical kin.

If less graceful, fishes of Texas rivers and streams are perhaps more active than imported fish when introduced to a 10-gallon area of your living room. When photographs were being made for this article, for example, about a dozen fishes of several species were placed in a large aquarium for observation. Visitors were instantly attracted to and fascinated by one blacktail shiner (*Notropis venustus*) which at once staked out its territorial rights in the lower right corner of the tank.

As visitors watched, the minnow swam furiously throughout its chosen two-quart domain, butting away intruders with its head and swishing around species larger than itself until they cleared out. The determined homesteader defended its place hour after hour, pausing only to feed with the same frenzy as it fought.

The feeding habits of sunfishes perhaps astonished some viewers. One hungry little specimen not more than two inches long made one gulp of a darter more than half its own length. It was so big a bite, in fact, that the victim's tail protruded from between the clamped lips for several hours.

Small catfish, as do their elders, like to stay in hiding as much as possible. But they cannot resist exploring the bottom of an aquarium in short excursions between darting under cover.

Many of the stream varieties like to hover near the surface, so that any activity there brings them scurrying to see if the disturbance is edible.

Part of the fun of keeping natives is in capturing



them, learning what types of streams or ponds harbor which species and sorting the common from the unusual.

Occasional surprises, such as the primitive bowfin (*Amia calva*), longnose gar (*Lepisosteus osseus*), sailfin molly (*Mollienisai latipinna*) or Mexican tetra (*Astyanax fasciatus mexicanus*), are prizes for the aquarium; but do not overlook common but interesting minnows and killifish just because they happen to be abundant. Bullhead catfish (*Ictalurus melas*) mosquitofish (*Gambusia sp.*) and the various sunfish, for example, make interesting and, in the case of the sunfish, very colorful specimens.



An ordinary minnow seine is the most effective tool for capturing aquarium-sized fish. It must be remembered, however, that not all fish can be legally kept when captured in a seine. Game fish, generally, must be caught on a hook and line. Since the laws differ in individual counties, it is wise to find out from your local game management officer what methods are legal.

Seining methods can vary, but generally the net is dragged by two people through fairly shallow water and up a shelving bank, trapping the fish and forcing them to swim into the belly of the net. Good use can be made of indentations in the bank or of natural barriers in a stream to trap the catch.

Hand nets, cast nets, lift nets and minnow traps can also be used, and some species can be captured more easily by the latter methods than by using a seine. These methods, too, may not be legal for some species.

Plastic bags are best for transporting the catch home. Fill them with fresh water from the stream or pond where the fish were captured. Fish are sensitive to changes in water temperature and chemical content, and a rapid change can damage them, so it is best to introduce the fish into the aquarium water gradually over a period of one-half hour. Allow the bag, with the fish in it, to float in the aquarium until the temperature is equalized,

NATIVE FISH

and then begin to spoon aquarium water into the bag, eventually allowing the fish to swim freely out of the bag and into the aquarium.

Municipal tap water can be used for aquariums, but it will kill the fish unless the dissolved chlorine is removed. Aquarium dealers sell liquid and tablet preparations that remove the chlorine immediately, or the water can be allowed to "age" for several days until the chlorine escapes naturally. Under no circumstances should fish be introduced into untreated tap water.

For native fish, an aerator and filter are almost essential. Five dollars will buy both of these items at a tropical fish shop. With this equipment, 10 to 15 one to two-inch fish can be kept in a 10-gallon aquarium. Native fish need more dissolved oxygen than do tropicals, particularly just after they are transferred from the wild. An aquarium cover is also essential to keep these lively fish from escaping.

Most native fish can be fed a staple diet of tropical fish food, but occasional live food such as mosquito larvae will help keep them healthy. Finely minced or ground red meat should be given occasionally if live food is not available, and some fish such as mollies and stone rollers, which eat algae, can be fed strained spinach.

Overfeeding is to be avoided. The fish should be fed each day only the amount of food that they can consume within five minutes. Otherwise, uneaten food will drop to the bottom and decay, caus-

ing the water to cloud and poison the fish. A partial change of water once a month will help keep the water clean and clear.

Disease is a greater problem with natives than with tropicals. The most common problems are fungus, which rots the fins, and ichthyophthirius, or "ich," a parasite which imbeds itself in the skin of the fish and causes white "blisters." A teaspoon of rock salt (not table salt) per gallon of water in the aquarium will help control fungus, and "ich" can be treated with preparations obtainable from aquarium shops.

The ideal temperature for native fish is between 50 and 70 degrees, but it is difficult to keep a home aquarium this cool, and the water can get up to about 80 degrees without harmful effects. They will not tolerate constant changes in temperature such as those caused by trying to cool the water with ice.

Once the aquarium is established and the fish have adjusted to their new home, very little care is required. The owner can sit back and enjoy the feeding antics and territorial behavior of his new pets. **

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Collecting native fish is a lot of the fun of having an aquarium. Drag the seine along the creek bottom toward a shelf of the bank. Bring the seine

up the shelf, keeping it against the bottom and walking fast enough to keep fish from swimming out the front. On the shore sort out the fish

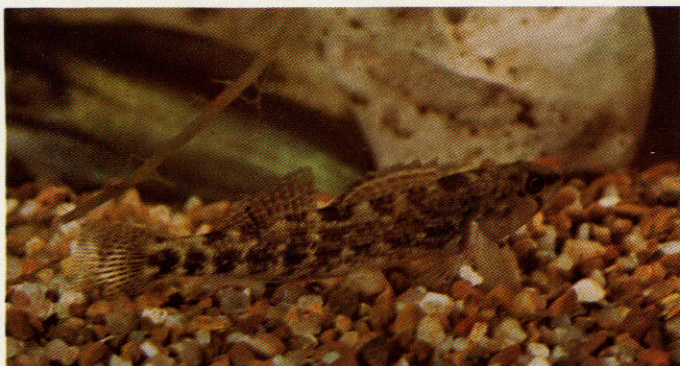
you want, putting them in plastic bags. Handle unwanted fish gently so they will not be harmed and return them to the water.

The waters of Texas yield a wide variety of interesting specimens for an aquarium. Among the most colorful are the sunfish, like the longear sunfish, *Lepomis megalotis*, at the right.

There are extra benefits in collecting, such as the stinkpot or musk turtle, *Sternotherus odoratus*, and the crawfish, lower right, a lobster-like animal that lives in fresh water.

Darters are among the hardest fish to collect. They have no air sacs and cannot hover like other fish. They live in shallows over rocky or gravelly bottoms and seem to walk or hop along the bottom. The one below is the orangethroat darter, *Etheostoma spectabile*.

Young catfish are little replicas of their parents. In the bottom photo a black bullhead, *Ictalurus melas*, is seen with a shiner, a member of the *Notropis* genus. Catfish are a game fish, however, and some species cannot be taken with a seine. Check with a local game management officer before keeping catfish.



Outdoor Books

by Rebecca Welch



THE ONLY EARTH WE HAVE by Laurence Pringle; The Macmillan Co., New York, N.Y., 1969; 86 pages, \$4.50.

With pollution the issue of the day, much of what Laurence Pringle describes is familiar to the American people. Nonetheless, his work is useful in that he has, in *The Only Earth We Have*, marshaled his information in a brief, objective and concise manner. He places blame where necessary and describes the steps that are open to Americans to alter the dumping into our air and waterways and the incredible destruction of our natural resources.

Although the problems of pesticides, smog and waste disposal have been before the public's attention since Rachel Carson's *The Silent Spring*, Pringle capsulizes the problems. He discusses the advantages and disadvantages of electric and steam automobiles and intimates the danger to human beings from pesticides or "biocides" — life killers — as he calls them. He also discusses the necessity for balances in nature, explains simply the biological reasons for pollutant contamination, suggests who must initiate change and how and offers concrete reasons for the maintenance of endangered species.

Texans are still blessed with relatively open spaces and clean air and water. Like those generations before us, we tend to presume upon our natural resources, to take them for granted, to assume these problems occur only in northern, more crowded and industrialized areas. Unfortunately, we are far from immune to the life-killing waste and pollution of the environment. Pringle, in discussing smog, points out that sunny climate and nearby mountains cause the serious air pollution in Los Angeles and that "this sort of air pollution can happen anywhere but is most common where there is lots of sunshine." Such statements should be clear warning to the Southwest.

Pringle is not a prophet of doom, however, for he both hopes for improvement and presents his material in an unemotional manner. The book is written for comprehension by high school students, although adults will find it attention-holding as well as disturbing. Accompanying the written material are photographs and drawings which reinforce

the dangers of pollution, add humor and hope and portray the beauty still remaining for man if he cares to retain it.

EAGLES, HAWKS AND FALCONS OF THE WORLD by Leslie Brown and Dean Amadon; Sponsored by the National Audubon Society; McGraw-Hill, New York, 1968; 2 Volumes, 945 pages, \$59.50.

Conservation concern and great regard for all aspects of the natural world exhibited by the Audubon Society in all their endeavors is evident in this lavish but tasteful definitive work on the birds of prey. Included in the two volume edition is comprehensive general information on all aspects of field habits, including taxonomy, morphology, mating and care of the young, migration, hunting methods and a thoughtful chapter on hawks and man.

Following the introductory chapters outlining general patterns of the birds of prey, are keys for field identification of the species and genera. These descriptions include information on range, physical appearance, field characters, general habits, food, voice and breeding habits.

The information is in easily readable form, aimed at the nonprofessional. Accompanying the descriptions are references to maps indicating geographical distribution, 311 illustrations, 166 of which are specially commissioned paintings, drawn and colored by some of the most noted names in ornithology such as Roger Tory Peterson, J. C. Harrison and D. M. Henry.

Birds of prey elicit more interest in the layman than perhaps any other group. Although they are majestic birds, capable of elegant displays of aerial dynamics, fierce, aggressive, yet symbolic to Americans of pride, grace and beauty, they are greatly misunderstood and misrepresented. They are thought to be dangerous to livestock, and wholesale killing of various species has occurred because of predation on chickens. The desire for feathers for women's fashions has greatly decreased the numbers of several species. These volumes, along with recent material on birds of prey, should erase some misconceptions.

Americans have been alerted to the value of endangered species, and attempts have been made to save, for instance, the great Golden and American eagles. The authors of *Eagles, Hawks and Falcons* conclude, in the introductory section:

Fortunately for eagles, there is an increasing number of people who experience some of this satisfaction when they see one. We would like to think that knowledge of the behavior and habits of birds of prey will be increased by this book, and that with knowledge will come a greater tolerance towards one of the most interesting and beautiful of all groups of birds.

The authors are well-known authorities in ornithology. Birds of prey are Leslie Brown's specialty, along with his internationally known work on African ecology and wildlife. Dean Amadon is the Lamont Curator of Birds and Chairman of the Department of Ornithology at the American Museum of Natural History in New York and has contributed work on the classification and evolution of birds.

Should the amateur not be able to sustain the cost of such an admirable but expensive book, it is highly recommended that it be consulted and enjoyed in a library. The prose is clean and flows in an enjoyable as well as informative fashion, and in combination with the magnificent plates, field observation charts and maps, is the most up-to-date and comprehensive work on birds of prey currently available.

LOST HERITAGE by Henry Savage, Jr.; William Morrow and Co., New York, N.Y., 1970; 329 pages, \$10.00.

Lost Heritage satisfies the reader's taste for biography, natural history and ecological and conservation issues. It also conveys a sense of America's past and her present heritage. It consists of the biographies of seven naturalists, spanning the years 1700 to 1800.

Moments reproduced in the book may bring a thrill to the reader as he sees before his mind's eye, for instance, the great flights of passenger pigeons sighted and described by one of the naturalists. The major part of the text is concerned with exploration of the new land, description of the beauties of that land, the hardships of the country and the special qualities of wonder and courage the early naturalists brought to their tasks.

The chronicle of each man draws heavily from diaries and journals, letters and material from published works. John Lawson, Mark Catesby, John Bartram, William Bartram, André and Francois André Michaux and Alexander Wilson are the figures with which *Lost Heritage* deals. Although differing in personality and success during their

lifetimes, these men had an uncanny number of traits and experiences in common. In every case it was the fascination with the land and its loveliness which sustained these men, since all suffered frustration, lack of financial support and loneliness.

The book is not a conservation polemic. However, the title, *Lost Heritage*, gives away much, for in depicting a fruitful, clean, challenging wilderness, the obscenity of much of the landscape as we now find it is brought sharply home.

SECRETS OF PLANT LIFE by Marcel Sire; The Viking Press, New York, N.Y., 1967; 239 pages, \$19.50.

Marcel Sire's camera probes into the depths of the flower organism, and what is revealed is plant life in peerless form. He has captured on film what no words could convey. He has transformed the breathlessly beautiful into an unimpeachable record of that most wondrous process — developing life.

Sire has chosen common plants, magnifying the delicate parts of each with his omniscient camera eye and accompanying the photographs with brief captions concerning the form and mechanism at work. Attendant to text and photography are numerous quotations from 20th century poets and novelists on the wonder and multiplicity of these magnificent natural creations. These quotes embellish the photography, leaving the text free to explain the growth process.

Aside from its informative nature, what is presented is nearly an art book. The reader must be struck time and again with the textures and forms of the plants, and the photographs often stand alone as bizarre but beautiful abstract pieces. The result is not the fairly common artistry of a collection of lovely flowers photographed, but a unique and aesthetic record of bursting, dynamic creation.

The magnified photographs cause the flowers to resemble a number of non-flowerlike forms, such as vegetables or human organs, and the similarity in life-forms is astonishing. Goat willows appear as soft, gray-blue caterpillars; pinecones at close view are jeweled crystals; magnolias, ripe banana clusters. The best analogies are supplied by the poets included in the book:

Lilies of the valley, whose
buds, blonde and tight
Seem curls of little school-children.
Edith Sitwell

The secrets Sire shares enrich our perceptions of the flower world. The organisms depicted are basically practical — they are the mechanisms which allow reproduction of the flower species. Yet the photography presents them not only as utilitarian to the plant but also a feast for the eye and understanding of the reader.

Long Shots, Short Casts

compiled by Neal Cook

Line Laceration: Fishermen often take their line for granted, and when they do, they had better be ready for some lost fish. Friction on the line from casting and retrieving lures, dragging the line over rocks and shell bottoms, pulling lures out of trees and other regular usage will cause the line to deteriorate and weaken. Every time you go fishing it is best to break off the last few feet of line before starting to fish. Change the entire line at least every year, or more often if you fish often, to keep from having weak spots.

Flying Mammal: The only member of the mammal family which can truly fly is the bat. Others, such as the flying squirrel, appear to fly, but can only glide.

Dangerous Toy: The fatal accident rate for snowmobiles last winter in Ontario, Canada, equalled the automobile fatality rate for the entire year, according to the Ontario Department of Lands and Forests. With over 60,000 snowmobiles registered, Ontario listed 31 snowmobile deaths; 17 on public roads, 7 in off-the-road accidents and 7 by drowning.

Pesticide Ban: A new policy banning the use of 16 types of pesticides on lands managed by the Department of the Interior has been announced by Secretary of the Interior Walter J. Hickel. The department, which administers about 70 percent of all federally owned land, has banned the use of DDT; Aldrin; 2,4,5-T; Dieldrin, Endrin, Heptachlor, Lindane and Toxaphene. Also on the list are Amitrol arsenical compounds (inorganic), Azodrin, Bidrin, DDD (TDE), mercurial compounds, Strobane and Thallium Sulfate.

Nene Comeback: The nene goose of Hawaii is a good example of what man can do when he finally begins to care. In 1949, there were 50 nene in the world. Today, they have reached such population densities that their extinction is no longer feared. The nene is Hawaii's state bird, and it is believed to be a descendant from Canada geese that became residents on the islands during the Pleistocene Era.

Know Your Game Management Officer

During the hunting season hunters and landowners will have questions about hunting regulations, and interested citizens will want to report suspected violations. The best men to contact in these instances will be game management officers, and we are publishing this list of officers' names, addresses and telephone numbers to enable people to direct questions to them.

Counties are grouped by regions and arranged alphabetically within the groups. Consult the map to find out which region a county is in.

LAW ENFORCEMENT COORDINATOR
Robert L. Cross, John H. Reagan Building
Austin 78701 A.C. 512, 475-4284

Region I

LAW ENFORCEMENT SUPERVISOR — REGION I
N. E. Glover, P. O. Drawer 1590,
San Angelo 76901
A.C. 915, 653-3301 or 949-4774

GAME MANAGEMENT DISTRICT SUPERVISOR — DISTRICT I
Weldon Fromm, 3802 Bowie, Amarillo 79110
A.C. 806, 355-9246 or 355-2877

GAME MANAGEMENT DISTRICT SUPERVISOR — DISTRICT II
Ted F. Wheelis, Jr., 4821 Avenue Q,
Lubbock 79412
A.C. 806, 744-6847, 744-0213 or 744-4197

GAME MANAGEMENT DISTRICT SUPERVISOR — DISTRICT III
Edgar Sturdivant, 1142 Geronimo Drive,
El Paso 79925
A.C. 915, 778-0191, 778-7927 or 598-6083

GAME MANAGEMENT DISTRICT SUPERVISOR — DISTRICT IV
Frank Dickerson, 110 North Pierce Street,
San Angelo 76901
A.C. 915, 949-6263 or 949-5654

ANDREWS COUNTY
Terry Lloyd, 603 S.W. 13th Street,
Seminole 79360

ARMSTRONG COUNTY
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A.C. 806, 874-3807
Stanley McDonough, 2405 12th Street,
Canyon 79015
A.C. 806, 655-3675

BAILEY COUNTY
Pat Donnelly, P.O. Box 149,
Littlefield 79339
A.C. 806, 385-3782

BORDEN COUNTY
David Palmer, P. O. Box 522, Snyder 79549
A.C. 915, 573-9981

BREWSTER COUNTY
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Alpine 79830
A.C. 915, 837-3486
Eugene O. Willmann, P. O. Box 996,
Alpine 79830
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Shamrock 79079 A.C. 806, 256-1708

CONCHO COUNTY
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A.C. 915, 732-4218

COTTLE COUNTY
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GUS ENGELING
WILDLIFE MANAGEMENT AREA

OUTDOOR LABORATORY

by

Robert L. Sinclair
Information Officer, Tyler

Photography by Leroy Williamson

NOW 20 YEARS OLD, the Gus Engeling Wildlife Management Area is a veritable wildlife paradise. Here one may observe most of the more common wildlife species, or stand awed and perhaps a little frightened at a bull alligator's thunderous roar vibrating through the dampness of a foggy spring morning.

Located in Anderson County 18 miles northwest of Palestine on U. S. Highway 287, the Engeling Area encompasses nearly 11,000 acres of post oak woodlands, swiftly flowing streams and large expanses of marshy habitat. The variety of plant and animal life found on the area is quite impressive. Photographers, botanists, ornithologists and other nature students are enthralled with the highly interesting plants and animals.

Abundant aquatic life in flowing streams and picturesque ponds provides fishermen and herpetologists an opportunity to pursue their favorite activities. Strategically located, primitive camp grounds and rustic shelters provide an excellent place for harried city dwellers to get away from it all.

During public hunts conducted periodically at the Engeling Area, hunters meet with exceptional success, with fine deer and fat bushytails the rule rather than the exception.

The woods in the area are dense stands of oak-hickory foliage with an associated understory of yaupon, dogwood, elm, huckleberry, hawthorn and honeysuckle. Here are found armadillos, bobcats, coyotes, cottontail rabbits, fox squirrels, both red and gray fox, flying squirrels, raccoons, white-tailed deer and an occasional ringtail. Adjacent to Catfish Creek, which flows for several miles through the area, and along the many smaller creeks and branches, beavers, minks, gray squirrels

and swamp rabbits can be regularly observed. In or near the many bogs, sloughs and marshes, one may see or hear a lonesome alligator or active beaver.

A variety of waterfowl are seasonal visitors; mallards and wood ducks are most commonly seen. Egrets, herons, hawks, owls and large numbers of songbirds can be observed throughout the year on the area. Two small lakes, numerous springs, small branches and Catfish Creek offer protection to many amphibians, reptiles and fish. Bobwhite quail are present over most of the area, but because of changing land use they are not as plentiful as in the past.

Visiting the Engeling Area during daylight hours is encouraged. Observers will find a good system of all-weather roads marked with numerous directional signs. Many people see their first deer, coyote or other species of wildlife while enjoying a scenic drive through the area.

While the previously mentioned recreational and nature study opportunities are varied and numerous, they are secondary benefits and are not the objective of the Engeling Wildlife Management Area. Named in honor of Gus Engeling, a wildlife biologist who was killed by an illegal hunter during the early stages of the area's development, the Engeling Area was selected for long-term experimental wildlife management research and to demonstrate its results. Often thought of or referred to incorrectly as a wildlife refuge or game preserve, the area is actually an outdoor laboratory and proving ground where wildlife research is conducted and management techniques are tested, demonstrated and refined.

Intense research on wildlife requires complete control of the land. Recognizing the need for sus-



OUTDOOR LABORATORY

tained investigation on various species of wildlife common to the Post Oak Region of East Texas, the Texas Parks and Wildlife Department purchased the initial tract of what was to become the Engeling Area in 1950. Subsequent additions were made through 1961, at an average cost of only \$25 per acre.

At the time of initial land purchase and during the early stages of area development, the typical land use or agricultural pattern in this portion of the State was small farming activities with many cultivated croplands. Over the past 20 years land use has changed from small farming operations to beef cattle production on improved pasturelands. Wildlife researchers on the area have recognized this change in land use and have adjusted their programs accordingly for greater applicability to the region.

Control of livestock grazing pressure is one aspect of wildlife research. In an attempt to maintain the Engeling Area as a unit reflecting typical land use for the region in which it is situated, a beef cattle producer is permitted to operate on the area under long-term lease arrangements. Grazing pressures and stocking rates are determined by area personnel and are adjusted periodically according to research requirements. Regional cattle producers interested in both beef and deer production on their lands should substantially benefit from investigations presently being conducted along these lines.

Another program concerns control of game populations. Although the Engeling Area was not purchased as a public hunting area, both white-tailed deer and squirrels have been regularly harvested as surplus populations of these game animals occur. The harvests provide a tool for measurement of production and for gaining valuable information otherwise unobtainable. Hunting on the area is by permit only and is well publicized, with hunter selection made in a fair and impartial manner. Deer and squirrels harvested are brought to a centrally located check station where area personnel obtain biological data including age, weight, body condition and sex ratios.

Numerous wildlife investigations have been carried out at the Engeling Area over the years. One of the most significant is a vegetative study aimed at gaining a better understanding of the interrelationship between deer and cattle on native woodland ranges. Analysis of the effects various land use practices have upon wildlife and livestock will allow wildlife technicians to make recommendations for a sound multiple-use grazing and management program.

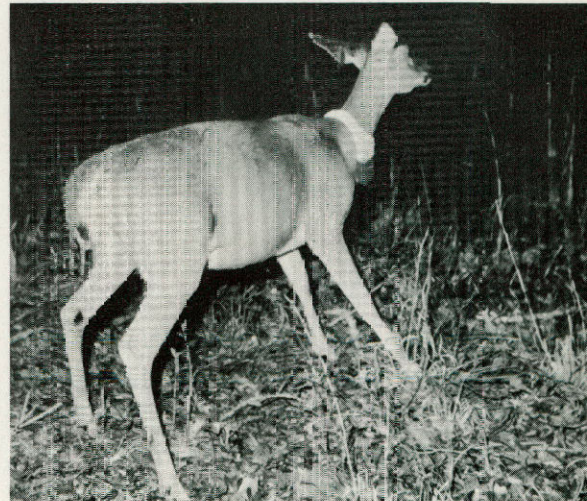
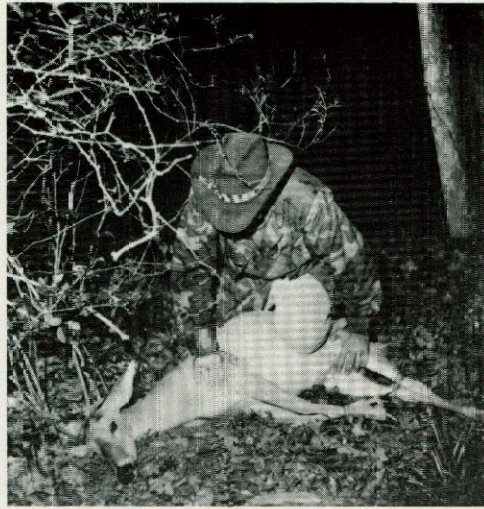
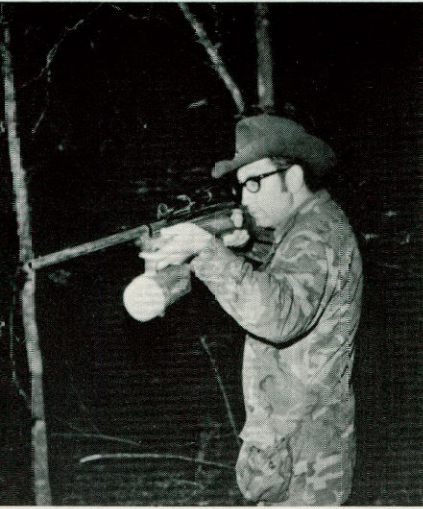
The overall effect on game populations from habitat improvement by use of controlled burning and selected clearing is being carefully measured. The determination of wildlife population trends is essential for use in setting open seasons and bag limits both on the Engeling Area and other land units with comparable physical characteristics and land use practices.

Other important studies at this outdoor laboratory include radio telemetry of deer to determine home range, with its very important management implications, and an economic comparison between the net profits derived from cattle production and from the leasing of hunting rights for deer and other game species.

Wildlife has always been a valuable natural resource, although only in the last few years has it been so recognized. Human populations continue to explode while wildlife populations are struggling to hold their own against ever increasing hunting pressures, continually diminishing habitat, indiscriminate use (direct or indirect) of pesticides and other potentially harmful chemicals, and other depleting factors. Wiser management and utilization of our wildlife resources is imperative.

The Texas Parks and Wildlife Department, through research at its wildlife management areas, will continue to develop sound conservation practices. These practices are aimed at assuring us and future generations the opportunity to enjoy the outdoors. To this purpose, the sprawling outdoor laboratory which is the Gus Engeling Wildlife Management Area is dedicated. **

At Engeling Wildlife Management Area, deer are traced with radio equipment. In the top left photograph, a biologist aims a Cap-Chur gun, which fires a shell that will inject a dose of nicotine into a deer and immobilize it. A collar containing the radio transmitter is put around her neck. She is then tagged with ear clips, and records are made of the location of her capture, sex, condition and the transmitter frequency. The biologist then checks to make sure the transmitter is functioning and unties her. She is wobbly for a while and unable to leave the area, so the biologist stays to protect her from predators. In the bottom photograph, the biologist listens for the deer's transmission the next day. Two such stations record the frequency transmitted by the same deer, and the resulting coordinates indicate her movements up to several months until the transmitter battery runs down. This experiment provides important information about the type of cover deer prefer, the density of the cover and deer populations and if weather affects movement of deer.



DOUBLE EAGLE

by Clarence Beezley
Information Officer, La Porte

NOBLE, COURAGEOUS and eternally vigilant—these qualities symbolize a great nation and are attributed to the United States national emblem, the bald eagle.

But, the bald eagle, *Haliaeetus leucocephalus*, symbol of our nation, is on the brink of extinction.

Where once there were thousands along the Texas coast, only five or six pair remain, according to the National Audubon Society. There are 12,000 to 15,000 in the United States, 10,000 of them in Alaska.

When we lament the passing of the bald eagle, we will lament the symbolic eagle, which represents our highest ideals of what is good and fine. The real life bald eagle has qualities falling far short of our ideals.

Arthur Cleveland Bent in his *Life Histories of North American Birds of Prey* says of the bald eagle, "Its carrion-feeding habits, its timid and cowardly behavior and its predatory attacks on the smaller and weaker osprey hardly

inspire respect and certainly do not exemplify the best in American character."

These characteristics moved Benjamin Franklin to campaign for the wild turkey as a national emblem to symbolize a bountiful America, but the bald eagle won out in 1782.

As Bent says, "Eagles have always been looked upon as emblems of power and valor, so our national bird may still be admired by those who are not familiar with its habits. Its soaring flight, with its pure white head and tail glistening in the sunlight, is really inspiring; and it adds grandeur to the scene as it sits in a dignified pose on some dead tree, its white head clearly visible against the dark green of the forest background."

The bald eagle, to be sure, is not a paragon of our nation's virtues. It is, however, one of our most interesting wildlife species.

Life begins for eagles in late fall after the parents, which have probably mated for life, perform their courtship ritual in October and November.

In most cases, both mating birds will be adults (about 7 years old or older with the classic white heads and tails). They will circle, soar and chase. Since they are large birds, with seven-foot wing spans, the dance seems to be in slow motion. Finally, they meet, clutch talons and spiral downward in pinwheel fashion. Afterwards, they mate.

The normal clutch for a bald eagle is two eggs. These are dull or bluish white with a rough texture. The eggs are about the size of a premium chicken egg—rather small for a bird that weighs up to 12 pounds.

After a 35-day incubation period, newly hatched eaglets must endure the hardships of winter. The early nesting season has an advantage, however, because bald eagles are basically hunters and the period when they are required to do the most hunting is at a time when food species are at their peak population and when there



is the least protective cover.

Eaglets are protected from other dangers by the height of their nests, which may be constructed 20 to 30 feet above ground. Most are massive structures which may measure 8 feet across and 15 feet deep and weigh several hundred pounds. Sticks are the main building material for the bulk of the nest, but occasionally an eagle will incorporate other items. Empty bottles, shoes, gunnysacks and old magazines have been found as parts of eagle nests.

The nests are lined with feathers for the protection and comfort of the young, which must remain in the nest for three months.

The main hardships for eaglets in their first winter is food, which they consume at fantastic rates. Studies of remains found around nests indicate eaglets eat much the same food as adults. Fish, small mammals of all descriptions and many varieties of waterfowl fall victim to the eagle.

It is the feeding habits of the eagle that are mentioned when detractors question its suitability as a national emblem. When the young are hungry, anything goes. The eagle thinks nothing of bullying an osprey until the poor bird drops a freshly caught fish, which the eagle catches in midair. The eagle eats carrion of all sorts. It will drive vultures from their meal and even chase the vulture until it disgorges what it has eaten.

In Texas, waterfowl provide eagles with the bulk of their food. Native eagles along with eagles from more northern areas follow the flocks of waterfowl, particularly snow geese, preying on inexperienced and weak birds.

The eagle takes much of his food on the wing. In normal flight he labors like a winged elephant, but when the need arises the big bird becomes surprisingly agile. He is able to pursue an osprey, turn over on his back and pluck a fish from the osprey's talons.

The bald eagle can also pick fish from the surface of water or

snatch a hunter's freshly shot bird from the air before it hits the ground.

If food holds out in their territory and if no disaster befalls the vulnerable eaglets, by late spring they will be as large as their parents and ready to solo. At first they will remain away from the nest for only short periods, and the parents will continue to assist with their feeding. But as flight training continues, they will, with



the help of the adults, learn to acquire food for themselves.

A month or so after their first flight, they are on their own, and the adults will chase them from the territory. Since they have no territory of their own, young eaglets are fairly nomadic, often heading for Canada just after leaving the security of their nests.

For the first four years after he is hatched, the bald eagle is not "bald"; that is, he does not have the snowy white head which is his trademark. He resembles, instead, the golden eagle with its generally brown plumage, but the two species are distinguishable by the length of their "pants." These tufts of leg feathers extend to the end of the drum-

stick on the bald eagle and to the toes on the golden eagle. The head and bill of the bald eagle are more massive and in flight project farther forward than those of the golden eagle.

The natural history of the bald eagle may be a moot point in a few years because according to biologists, this bird may soon be extinct. The eagle's enemies in the wild are many, but men with bulldozers, guns and chemicals are even more dangerous.

The bald eagle could probably survive bulldozers and guns if it weren't for a more insidious creation of man — chlorinated hydrocarbon pesticides such as DDT, dieldrin and endrin. Because of these chemicals, Americans may be looking for a new — and living — national emblem in just a few short years.

The bald eagle, as with most birds of prey, is positioned at the end of a food chain which guarantees a full dose of poison with practically every meal. For some birds of prey, such as the golden eagle, which feed mostly on mammals, the end will not come as quickly as it will for others which feed on birds and fish as does the bald eagle. Pesticides seem to magnify themselves more easily in birds and fish than they do in mammals.

In some cases bald eagles have been killed outright when DDT and dieldrin accumulated in their brains. But the bald eagle will probably find his way to oblivion in a less dramatic way than dying. He won't reproduce. DDT and dieldrin affect calcium metabolism, and this affects eggshell thickness. The shells are so thin that parent birds break them while nesting and then eat them.

Biologists say chances for saving the bald eagle may already be beyond our powers since pesticides do not break down in the environment for several years. So, soon we may only have its image — on the tops of flagpoles and on dollar bills — as a reminder that once the bald eagle was America's great bird. **

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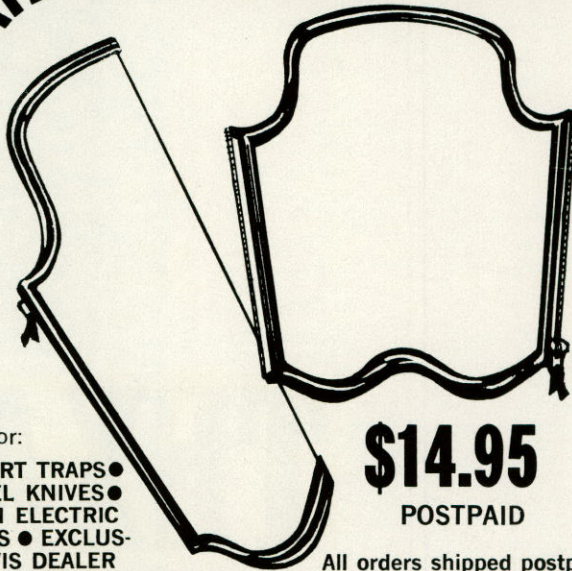
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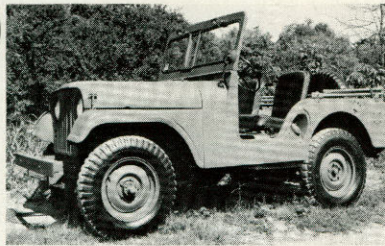
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TEXAS PLAINS

THE SOUTHEASTERN EDGE of the Great Plains province is an escarpment in the Texas Panhandle. The Plains area extends west to the foot of the Rocky Mountains and north into Canada, and it is essentially flat over the whole area, except for occasional canyons.

At one time, the Plains were covered by tall grass and were the lands of the buffalo and later cattle. Today they are essential to America's economy, producing grains, oil, sulfur and other chemicals.

Travelers can sample the area on Texas' Plains Trail, a 739-mile-long trail in the Panhandle. The trail goes through two major cities, Amarillo and Lubbock, a spectacular State park and by one of Texas' walleye fisheries. It will acquaint the traveler with the wildlife of the Plains and with the interesting history of the Plains Indians and the cattle industry.

A good way to get an introduction to the Plains is to approach from the Southeast. Most Texans traveling from the south or east will see the escarpment along the line on the accompanying map. The town of Post sits on the edge, and Silvertown sits on the caprock itself, overlooking the lowland to the east.

A most spectacular area on the Plains Trail is Palo Duro Canyon State Scenic Park. "Palo Duro" means "hard wood," as the canyon was named for the juniper trees which grow there. It was carved by the Prairie Dog Town Fork of the Red River through 90 million years of erosion.

It is one of the most spectacular and educational slices in the earth's crust. In one peak, three eras are revealed by erosion, and throughout the park there are classic illustrations of erosion's work. The resulting shapes are named like formations in a cave: Capitol Peak, the Lighthouse, Santanta's Face, Spanish Skirts, Devil's Slide, the Sleeping Indian, Devil's Tombstone.

The canyon is also the location of several important events in history. One of the last battles of the Plains Indians was fought in the canyon. Although only four braves were known to have been killed, General Ranald Mackenzie accomplished something far more devastating: he captured more than 1,400 ponies and destroyed the Indian camp, leaving them with no choice but to go to a reservation.

With the defeat of the Indians, the white man moved in. One of the first to come was Charles Goodnight, bringing 1,600 head of longhorn cattle. A herd of longhorns still lives in the park, and there is a small log and mud cabin, a replica of the one Goodnight lived in when he first came. During the summer, the historical musical drama "Texas!" is performed at an amphitheater in the canyon, telling the story of the early settlement of the Panhandle by the white man.

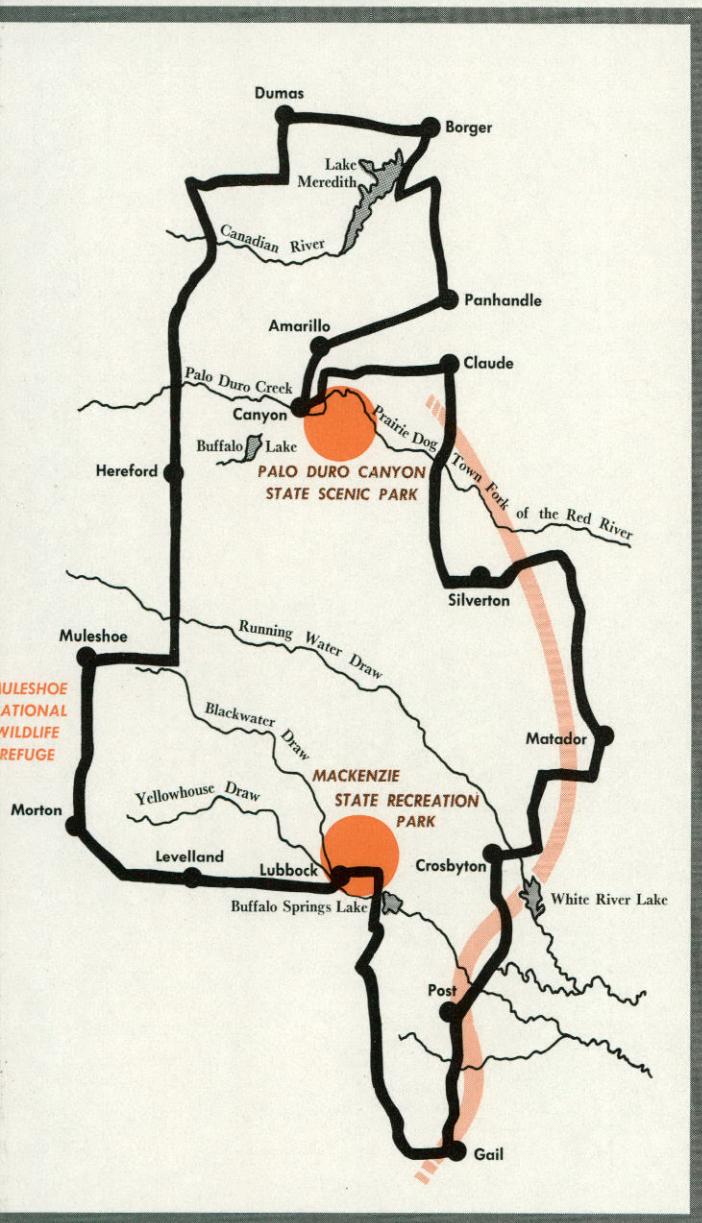
Camping and picnic areas are available. A skyride, rent horses and a train with a guide on board are provided so that visitors can see more of the canyon.

For those with more interest in the history of the Panhandle, there is the Panhandle Plains Historical Museum in Canyon. The doors are ornamented with cattle brands, and the museum contains artifacts of the Plains — guns, a chuck wagon and fossils, including prehistoric animals and humans.

Wildlife on the Plains is not scarce, but it is inconspicuous. There are many small ground burrowers, many of which come out only at night. Of course, one of the best known animals of the Plains is the prairie dog. There are prairie dog towns in Palo Duro Canyon State Scenic Park and Mackenzie State Recreation Park. There these little animals can be seen sitting beside their burrows barking at their neighbors. Mackenzie State Recreation Park also contains picnicking and playground areas.

TRAIL

by Don Walden



West of the trail, Muleshoe National Wildlife Refuge is the most convenient place to observe Plains animals, and the area around it provides good hunting for waterfowl in season.

It is one of a series of refuges along the Central Flyway, and around 700,000 birds winter in the area. The refuge and the area around it are known for the sandhill cranes which winter there. Sandhills begin arriving in September, and by winter the largest flock of sandhills in the Nation is at the Muleshoe Refuge.

The more typical Plains animals, such as rabbits and prairie dogs, coyotes, badgers and skunks stay the year around. Migrating golden eagles arrive in December to join resident eagles, and several varieties of songbirds winter there.

Picnic tables and areas for camping are available. Photography is permitted, but photographers must get permission to build a blind. There are good roads in the refuge.

There are some special treats along the trail for the hunter. At the turn of the century, pronghorn antelope were nearly extinct, but now they are plentiful enough to hunt. Hunting pronghorns requires patience, good eyes and superb shooting skill.

Aoudad or Barbary sheep provide a different kind of hunting. Aoudad are rather large sheep from the landward side of the Atlas Mountains in northern Africa. They have hairy "chaps" on their front legs and a long, stringy beard. They were stocked in Palo Duro Canyon because it resembles their native environment. Hunters must make a rough trip down perpendicular cliffs, across ravines and through scraggly juniper trees to get a shot at these sheep. The animals are protected, and they can be hunted on a permit basis only, with permits being issued to the landowners. Information on the hunt can be obtained from the Parks and Wildlife Department.

PLAINS TRAIL

There are several good fishing spots, including one that has been stocked with walleyes — Lake Meredith. In the 1960's Sanford Dam was built across the Canadian River, creating Lake Meredith and filling a void in the fishing in the area. It is the largest lake in the Panhandle and South Plains. Walleyes are members of the perch family, but they are long and pointed like pike. They have a spiny dorsal fin in front of and separate from their fleshy dorsal fin, and their distinguishing characteristic is large, moon-shaped eyes.



Bill Duncan

Leroy Will am



Walleyes stay deep, so to fish for them the angler must use deep rigs. These fish are predacious, and minnows are about the best bait for them, but lures, trolled deep, work too. Walleyes have sharp teeth, and a wire leader is necessary to keep them from cutting the line. Walleyes are schooling fish, and they congregate over gravel or rock bottoms and near drop-offs. They may come into shallow water at night to feed. Once they are hooked, they are good fighters. To protect this popular fish, there is a daily bag and possession limit of five.

The Plains are changing drastically. Animals which once roamed free are almost extinct, and animals never in Texas before have been introduced and are thriving. The grass that grew "stirrup high" has been reduced to short grass, and much of the land is farmed. But for the selective traveler, there is still much of the old to see and appreciate, and for the hunter or fisherman, there is much to do along the Plains Trail. **

The Plains Trail provides the alert traveler with a wide variety of things to see and do. On the far left a prairie dog peeps out of his burrow, ready to scramble down to safety if a hawk or other predator approaches. An aoudad sheep, something new in the Panhandle, watches the photographer. The drama "Texas!" is performed in the summer, when nights are mild in Palo Duro Canyon, but just a few months later winter grips the area, continuing the weather erosion that has carved the canyon's landmarks. Below, a pronghorn watches a movement in the distance with eyes that are known to be some of the sharpest on the Plains. On the right is a parking lot and boat ramp at Lake Meredith, the home of the walleye. In the bottom photo, sandhill cranes march across their winter home near Muleshoe.



gan Bradshaw



Bill Duncan





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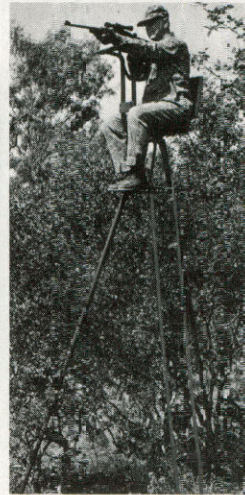


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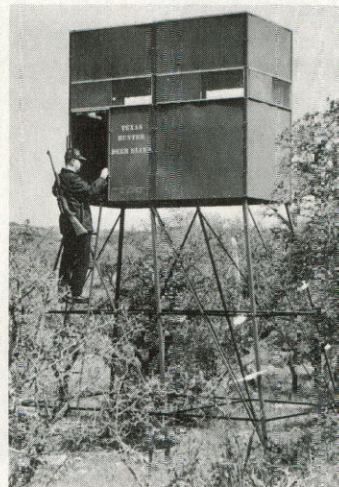
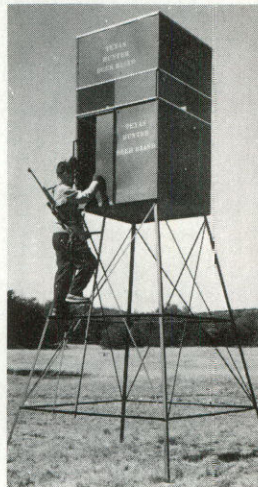
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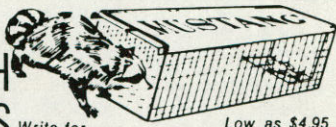
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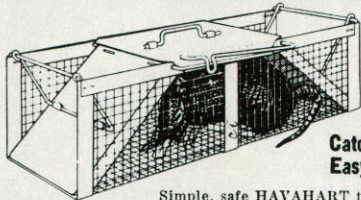
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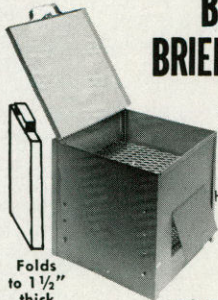
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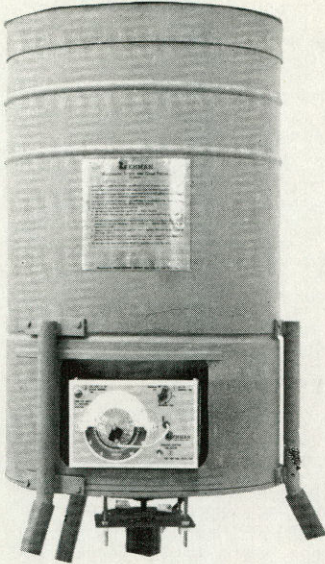
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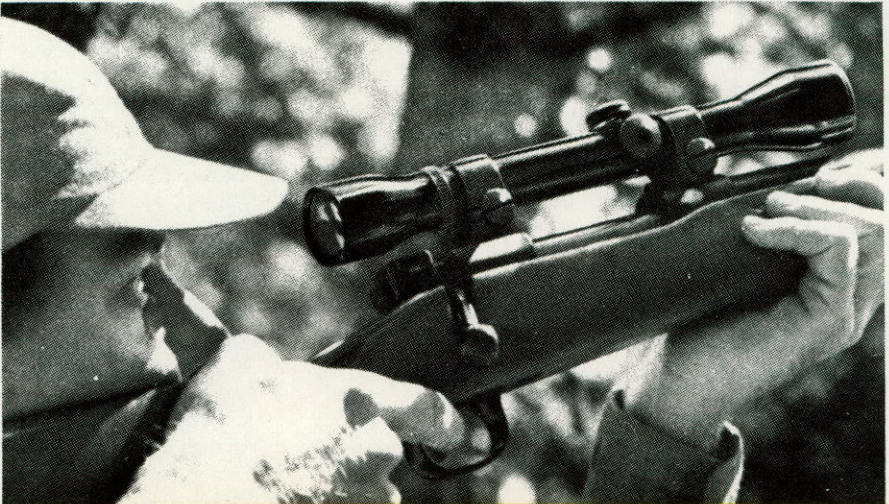
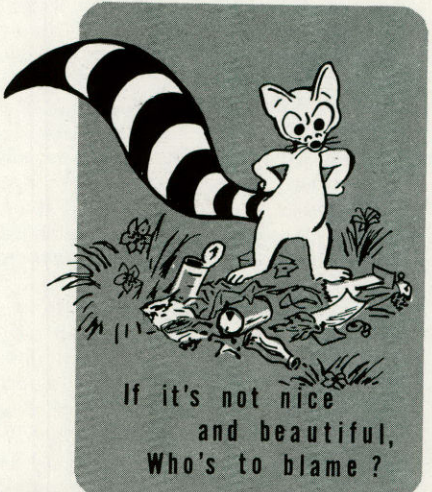
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Letters to the Editor

Shrimp Sizes

After reading a recent issue of *Texas Parks & Wildlife*, I began to wonder about the relative sizes of Gulf shrimp and bay shrimp. This brought up quite a discussion in the office, and the statement was made that a shrimp had been caught in the Gulf several years ago that weighed approximately 1½ pounds. This sounds like an extremely large shrimp, but I would like to know if one has been caught in this size range. All information will be greatly appreciated.

W. B. Wood
Friendswood

The largest penaeid shrimp (the brown, white and pink shrimp) that we have seen or have heard of did not exceed ¼ pound. There are other varieties of crustacea along our coast which do reach a larger size; however, we are not acquainted with any of the three above mentioned species reaching a size of 1½ pounds.

Pet Turtles

I have been studying turtles for about three years now and am troubled by the fact that the government still allows some pet companies to sell so-called "turtle food" with the directions: feed

a few grains daily to your turtle and place the food in his water. The results are that if a turtle is fed on nothing but this food for about three months, he will get a soft shell, then go blind and finally die. The government, I think, should at least make them change the directions to: feed a few grains weekly with raw meat, except pork, and also with a good fresh piece of lettuce.

Nancy Ellis
Houston

Your statements are quite valid in that something should be done to protect pets from foods that are not healthy for them. We recommend that people buy the books that are sold telling about the keeping of turtles as pets so they avoid these problems. These inexpensive books almost always recommend that turtles be cared for with supplemental feeding of the types you recommend.

You're Welcome

Just received our May 1970 copy of *Texas Parks & Wildlife* magazine. When you are this far from home you sure appreciate some good English literature. I imagine this magazine will be enjoyed by many. Thank you.

Mrs. Leonard Hranicky
Sao Paulo, Brazil



We'll Try Harder

Texas Parks & Wildlife won second place in competition for an international award for conservation magazine excellence. The award was given in June by the American Association for Conservation Information (AACI) at its conference in Cody, Wyoming.

The magazine placed second behind the New York State Conservation Department by one point. There were 26 entries from the United States and Canada. The magazine compiled 577 points from a possible 600; New York garnered 578.

Judging by the AACI was based on fulfillment of the magazine's purpose and effective presentation of material. Scoring criteria were overall appearance: art, photography, layout and printing; editorial content: readability and editing.

Texas also won a second place in the radio category for "L. D. Nuckles from Rockport," a weekly radio program from the Regional Information & Education Officer in Rockport. In the miscellaneous publications category, Texas won a third place for its "Annual Report 67-68." The report is a 219-page document on the structure and operation of the Texas Parks and Wildlife Department for the fiscal year 1967-1968.

The AACI is a professional organization devoted to the advancement and improvement of conservation information programs throughout the North American continent. Membership includes 45 states and 5 Canadian provinces.

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BACK COVERS

Inside: Open, upland forest provides the best habitat for fox squirrels. They generally build nests in hollow trees, and the feeding area of one may be 10 acres or more. Photo by Bill Reaves.

Outside: An aquarium can hold more than fish. Here the stinkpot or musk turtle, *Sternotherus odoratus*, swims across the view. For help with your aquarium, see page six. Photo by Reagan Bradshaw.



