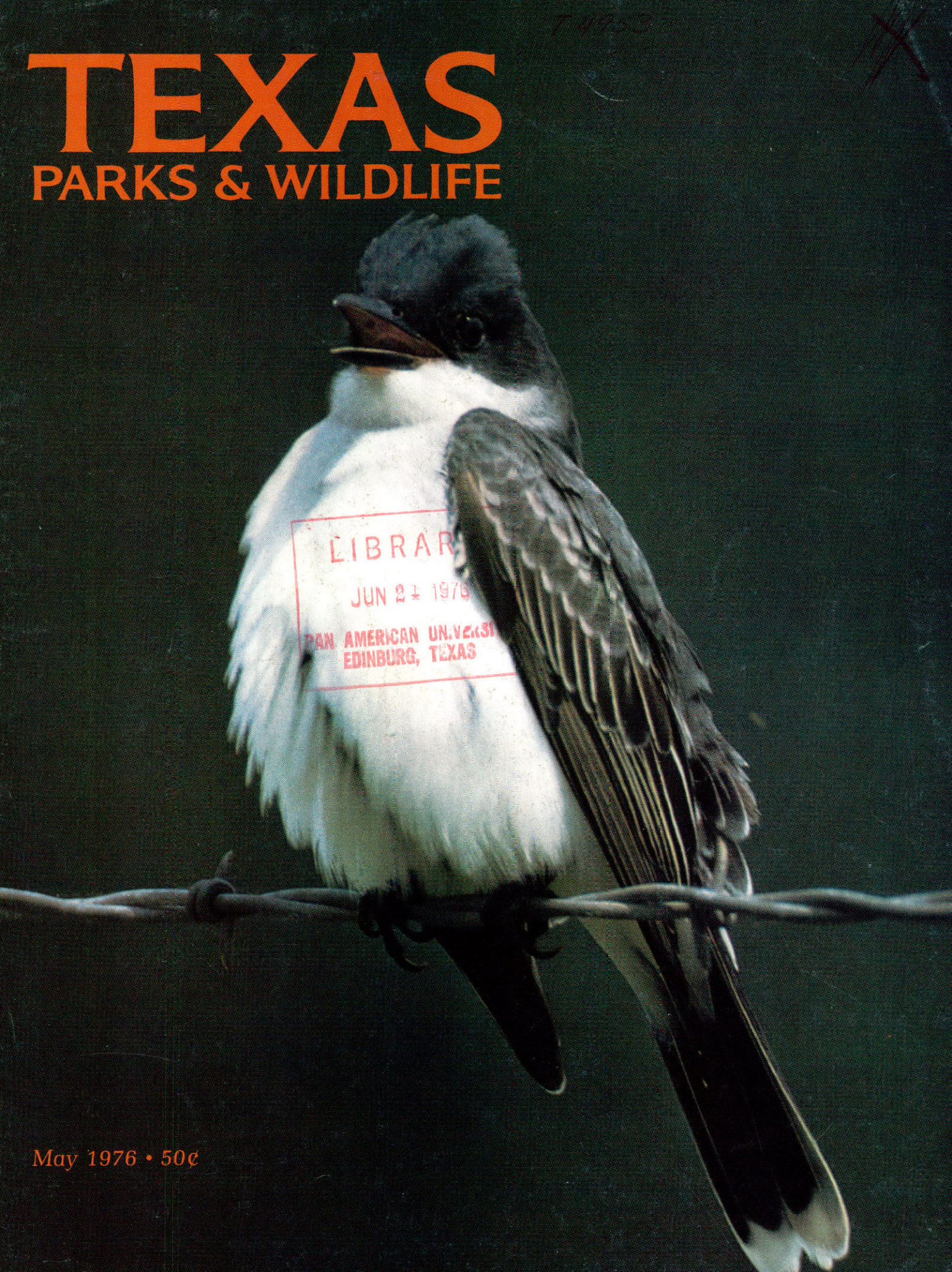
TEXAS
PARKS & WILDLIFE



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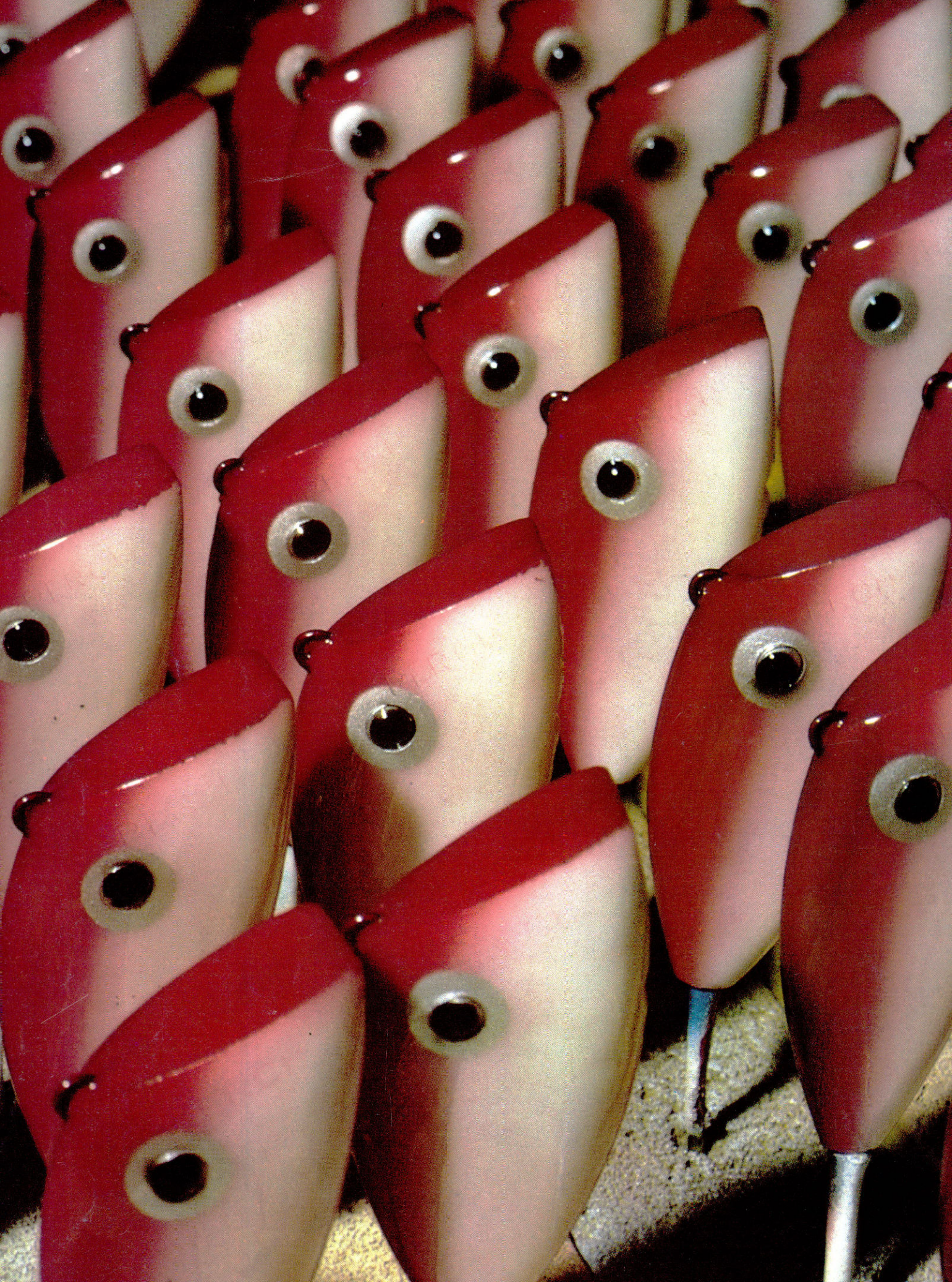

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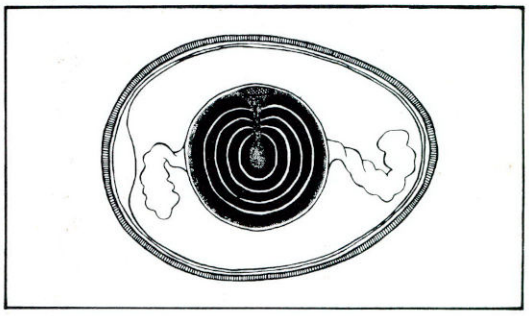


TEXAS PARKS & WILDLIFE

Front Cover: The eastern kingbird, a member of the flycatcher family, can often be seen perched along the roadside on telephone wires or barbed wire fences. From this unobstructed vantage point the bird guards its territory or looks for insect prey. Photo by Neal Cook.

Inside Front: Like soldiers in formation, these lures stand on their drying racks awaiting the next step in production. Photo by Martin T. Fulfer.

Stanley Zbylot D.V.M.

To Save an Eagle

by J. Shawn Ogburn

Effortlessly, the golden eagle lifted from the ledge of a rocky West Texas mountainside. She had migrated from her nesting grounds in northern Canada to winter in the milder Texas climate, and the 2,500-mile trip had reduced her weight considerably.

Her large taloned feet and strongly hooked beak identified her as a fearsome predator; however, she was hungry enough at this stage to dine on anything, including road-killed animals.

Within minutes she spotted a small dead sheep. The sheep, born with a deformed left front leg, had never obtained sufficient food and its death was probably the result of starvation or disease. How it had died was of no interest to the eagle; it represented an easy meal and she was an opportunist quite capable of taking waterfowl, large mammals or carrion, though 90 percent of her diet was rabbits.

She banked easily from her 1,200-foot altitude and headed for the sheep, circling above the carcass before landing. After several minutes of observation, she hopped onto the dead animal and began to "subdue" it with powerful talons. She alternately flexed and extended her talons in an awesome display of strength, repeatedly grabbing the carcass and crushing its lifeless form. Her golden hackles were raised as she finished "killing" her prey.

This process, which would have taken the life of a rabbit in seconds, is always repeated, even when the prey has been dead for many hours. As a young eagle she learned the hard way that prey could break loose and escape, even when severely wounded, and that it was important to make certain the prey was dead.

Since even this small sheep was more than she could carry, she ate from the carcass on the ground. After filling her crop, she took off, much like a heavy-laden bomber, and flew to the nearest telephone pole where she preened and then began digesting her meal. While perching atop the pole, she saw a small truck crest the hill on which the half-eaten sheep lay. At almost the same instant that the rancher noticed his dead sheep on the ground, he saw the eagle rise to the sky.

This golden eagle's broken wing, which failed to heal for two years, has been surgically mended with a bone graft, though she never may be able to return to the wild.

Because golden eagles do occasionally kill domestic sheep, the rancher mistakenly blamed her for the death of his. As the eagle climbed in ever-expanding circles to escape, the rancher took aim, and several shots cracked out in the West Texas sky. The eagle's left wing was hit and she plummeted earthward in an uncontrolled dive, crashing into a brushy area near the highway.

For several days she stayed in the brush, but her hunger finally forced her to try to reach a road-killed jackrabbit that lay on the other side of the highway. She safely crossed two lanes and was about to leave the median for the other side when a large truck streaked by. Terrified, she panicked and attempted to fly, but instead of lifting skyward, she fell feebly to the ground.

Her repeated escape attempts attracted the attention of an oncoming motorist who stopped, removed a blanket from the trunk of his car, quickly grabbed her feet and wrapped her in the blanket. In her weakened condition, she was no match for him. Her rescuer then took the wounded bird to a small zoo where she was placed in a cage with fresh meat to eat. Hunger soon overcame fear and she greedily gulped down the meat.

Unable to escape, she settled down to the quiet zoo life. The rifle bullet had fractured both of the bones in her forewing and, without the support of these bones, her wing muscles contracted until they folded the outer third of her wing back on top of the rest of the wing. Despite massive calcium deposits at the fracture site, the wing never mended. Since the wing was so unwieldy, she often struck it on the side of her cage causing continual bleeding and preventing healing.

In seeking help for the injured eagle, the zookeeper contacted the Raptor Preservation Fund, a nonprofit, tax-exempt foundation dedicated to the conservation of birds of prey. Raptor is a general term that applies to any predatory bird including eagles, hawks, owls, falcons, kites and even vultures.

As director of the organization, I suggested we take the injured bird and try to repair its wing. However, since the wing had been fractured for at least a year, chances of a successful operation were slim.

Dr. Bill Riddle of Austin donates his services in the treatment of injured raptors, and his X-rays of the bird revealed that extensive orthopedic surgery was the only hope for the eagle's wing.

Several months earlier Riddle had performed a bone transplant on a red-tailed hawk's wing that had been fractured by a gunshot wound. The transplanted bone was wired into place over the fracture site, thus making the fracture stable and promoting proper alignment for healing. This operation was successful, so we decided to try it on the eagle's wing.

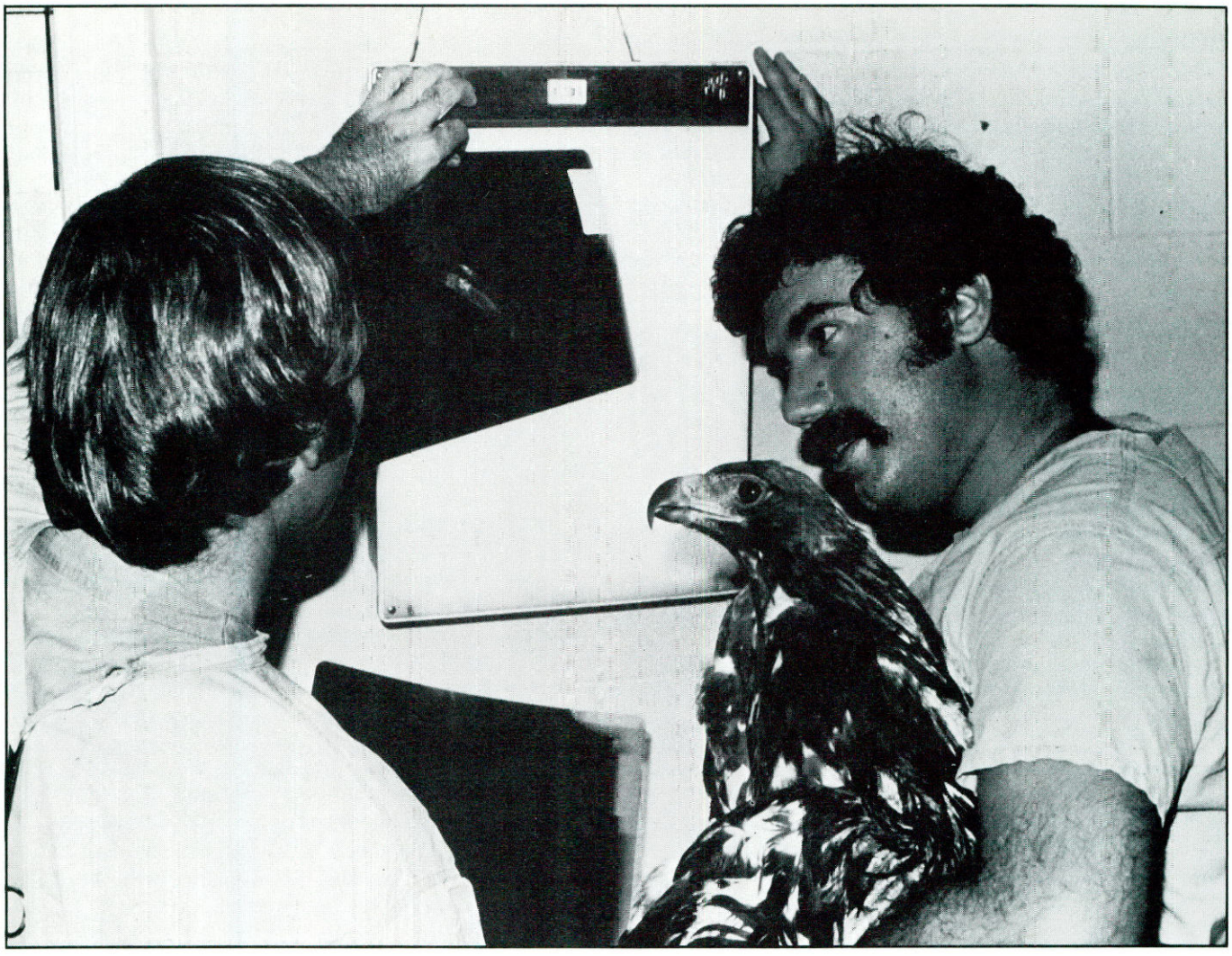
In the bone-grafting procedure on the red-tailed hawk, we had used bone from a red-tailed hawk that had been killed by a car. Finding an eagle bone was more difficult, but finally the United States Fish and Wildlife Service in New Mexico sent us two eagle wings packed in dry ice. These wings had come from two eagles that had been found dead in that state and had been frozen shortly afterwards.

Riddle, demonstrating his surgical skill during the five-hour operation, performed the bone graft. Several days later the eagle ripped open the incision, necessitating another operation.

The eagle's wing was straightened by the operation, and she is beginning to use it. Since she had extensive muscle damage, it will take time for her to fully recover, if ever. Even if she cannot be released to the wild, her life in a zoo will be much better since the surgery.

Golden eagles are not the only

J. Randall Green



Months after the initial injury, the eagle's wing was X-rayed (left), and the decision made to try a bone transplant. During the five-hour operation (above), a wing bone from a dead eagle was wired over the broken bones. The straightened wing began to heal, and the bird is now learning to use it again.

birds of prey that are being shot. Red-tailed hawks are also targets. This large conspicuous hawk, incorrectly referred to as the "chicken hawk," is commonly seen throughout Texas perching on dead trees and telephone poles. Its primary diet, made up of small mammals such as mice, rats and rabbits, makes it beneficial to the farmer and rancher alike. It is also an effective snake hunter and occasionally takes insects and birds — but few chickens.

Other hawks are shot for a variety of reasons. The small sparrow hawk is sometimes mistaken for a dove, or is shot because it is thought to prey on dove. Although it infrequently chases them, it rarely captures any, preying mainly on mice and insects.

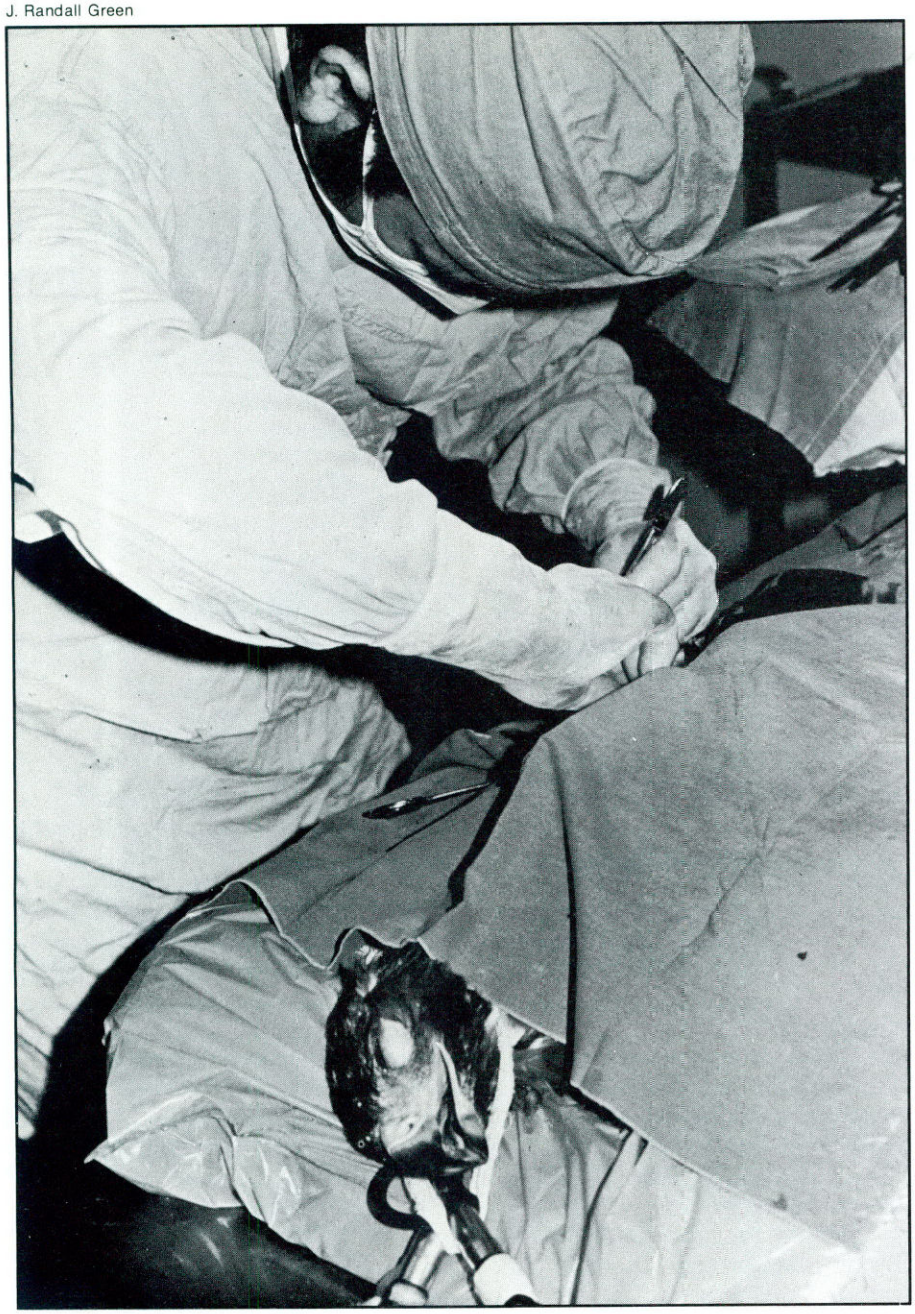
More than 90 percent of the hawks, eagles and falcons we have treated have been brought in as a result of gunshot wounds. All raptors (except the golden eagle which is protected by federal but not state laws) are protected by both state and federal laws. It is against the law to shoot or trap these birds, and it is also unlawful to have these birds in your possession, unless you have state and federal permits. This law also applies to dead birds of prey.

Another group of raptors victimized by man is the owls. We have treated more owls than all of the rest of the raptors combined. Since most owls are active only at night and seek shelter during the daylight hours, their inactivity during the day spares them from much of the shooting pressure. However, their habit of hunting along the grassy roadsides at night brings them into contact with automobiles, and they often are hit. This is the most frequent owl injury we have treated.

The other most significant problem with owls is that people take them from the wild, usually when they are still nestlings. Owls do not build their own nests, but nest in cavities, on ledges and in the old abandoned nests of other birds. Adult owls fear man and usually leave the nest site when approached. They are secretive and can slip away undetected by the human intruders. The young owl is then "found" on a ledge or a tree branch and is assumed to have been abandoned, which is not the case at all.

Young owls, covered with soft

J. Randall Green



downy feathers, are very cute at this stage, and the thought of an owl for a pet is too tempting for some to resist. This is illegal, and raptors make very unsatisfactory pets as most young ones die in captivity. Their dietary demands are great and it is essential that they be fed whole animals such as mice or rats to prevent rickets. So unless you have a permit to collect a raptor and know how to properly care for one, leave the bird in the wild where it belongs.

The Raptor Preservation Fund is trying to organize rehabilitation centers for injured raptors throughout the state. When possible, personnel from the organization also trap and relocate raptors that are depredating livestock. The Texas Parks and Wildlife Department is providing help by issuing permits to qualified individuals and by referring injured birds to the proper people. They are also helping by providing transportation for injured birds whenever possible.

Not only is this department interested in the care and treatment of injured birds, but it is also engaged in field studies of several raptorial species to monitor their populations. It is hoped that these studies will provide valuable information in the conservation of these species.

Currently there are four individuals permitted by the Texas Parks and Wildlife Department to rehabilitate injured birds of prey. They are as follows:

Roy C. Fanguy, Ph.D.
Texas A&M University
College of Agriculture
Department of Poultry Science
College Station, Texas 77843

Mr. Peter C. Cragg
116 Poplar
College Station, Texas 77840
Phone: 713/846-1660

Mrs. Dennis Bartz
Director of Interpretation
Fort Worth Museum of Science
and History
1501 Montgomery
Fort Worth, Texas 76107
Phone 817/732-1631

J. Shawn Ogburn, Director
Raptor Preservation Fund
2100 Walsh Road
Round Rock, Texas 78664
Phone: 512/255-4749

The Raptor Preservation Fund will be opening two new raptor rehabilitation centers this spring in Houston and El Paso. Individuals to contact in these areas are as follows:

Mr. Rick Pratt, Director
Armand Bayou Nature Center
Seabrook, Texas 77586
Phone: 713/488-7811

Mr. David Steinbach
1033 Lufkin Way
El Paso, Texas 79924

Mrs. April Yellot
3115 Ojemann
Houston, Texas 77080

One of the most pathetic sights I have ever seen is a magnificent golden eagle permanently grounded by a thoughtless rifle shot. To see a winged predator with a damaged wing hanging useless at its side, looking longingly upward, is an unbelievably tragic sight. It is my hope that these majestic birds will always fly our skies and that someday in the future there will be less need for the rehabilitation of injured raptors. **

Handwork Adds to Quality and Cost of FISHING LURES

Article by Guillermo Garcia, Photographs by Frank Aguilar

Ever wonder why that little plastic fishing lure costs as much as it does? If you had the opportunity to watch lures being made and saw how much handwork is involved in the process, you'd never wonder again. You might even consider the making of lures as another art form.

Most lures begin as two pieces of clear plastic molded into a variety of shapes and sizes determined by what they represent and the way they are to be used. Weights, metal reflectors, rattles or combinations of these items are inserted before the two parts of the lure are put together to produce action, flash or noise. The inside air pocket gives the lure flotation while the inserted weight tends to pull it down. These different forces working together create a built-in wiggling, zig-zag motion that simulates baitfish movement and entices a fish into striking.

Once the lure parts are joined together and the joints buffed smooth, the painting process begins. Each different color or design represents another step in the handling process, and some detailed lures require as many as 13 separate steps to paint.

Some people have certain favorite color combinations, but the most successful anglers know to experiment with a variety of colors and let the fish choose their preference. After all, the test of a lure is not whether it is attractive to the fishermen, but whether or not it catches fish. Also, it has been determined that the fickle nature of game fish, particularly black bass, often means that a lure of a certain design and color which catches fish on one day may be totally ineffective on another day in the same location, even with identical weather, water conditions and time of day.

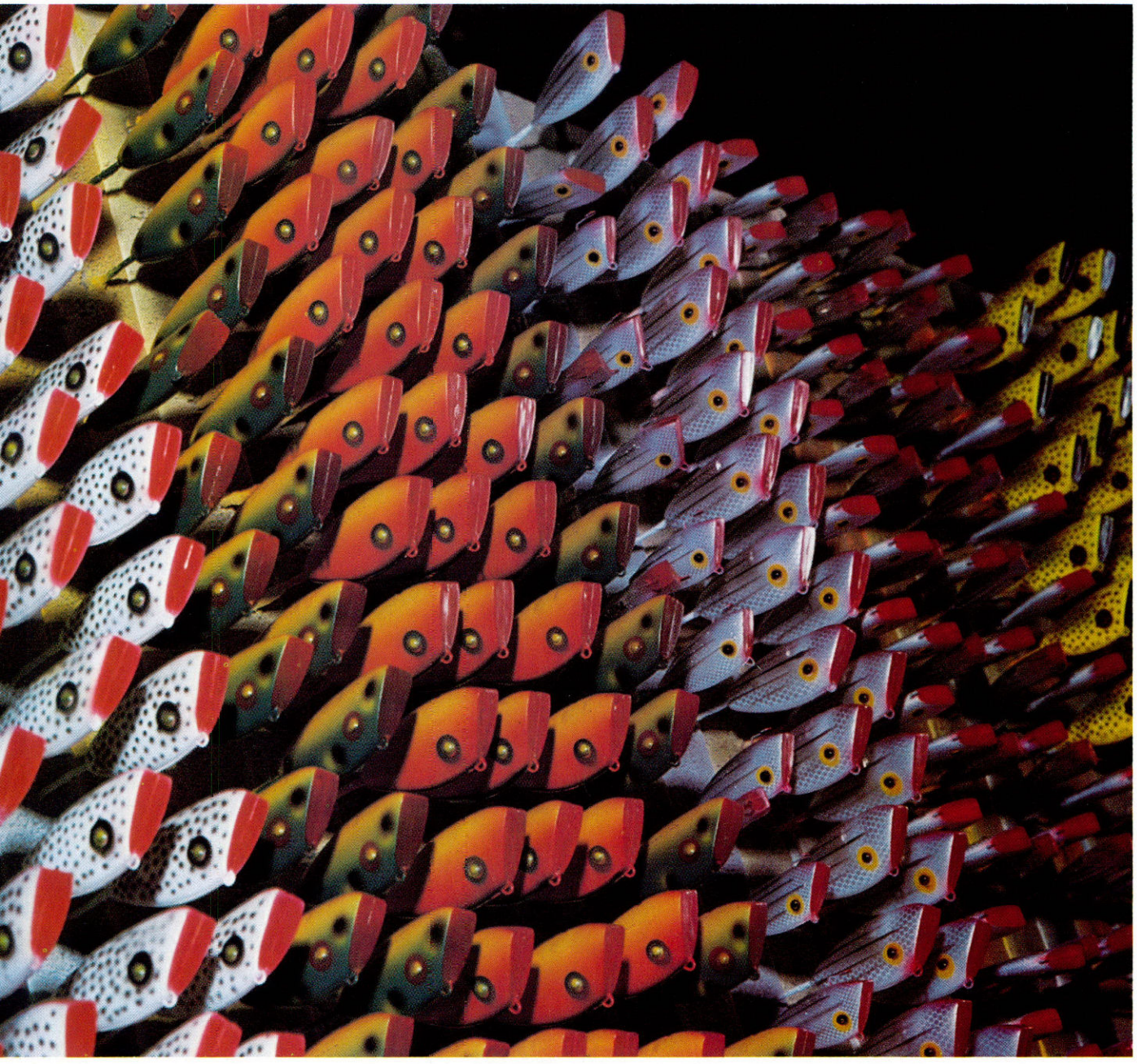
Some lure colorings come about by accident. One Texas manufacturer came out with a "Halloween special" topwater lure that was painted a fluorescent orange and black. It was presented as a novelty item during the Halloween season but, to everyone's delight, including the manufacturer's, it proved to be a fish-catching color combination. Needless to say, it is now a part of the manufacturer's regular line of lures and is offered in two popular sizes.

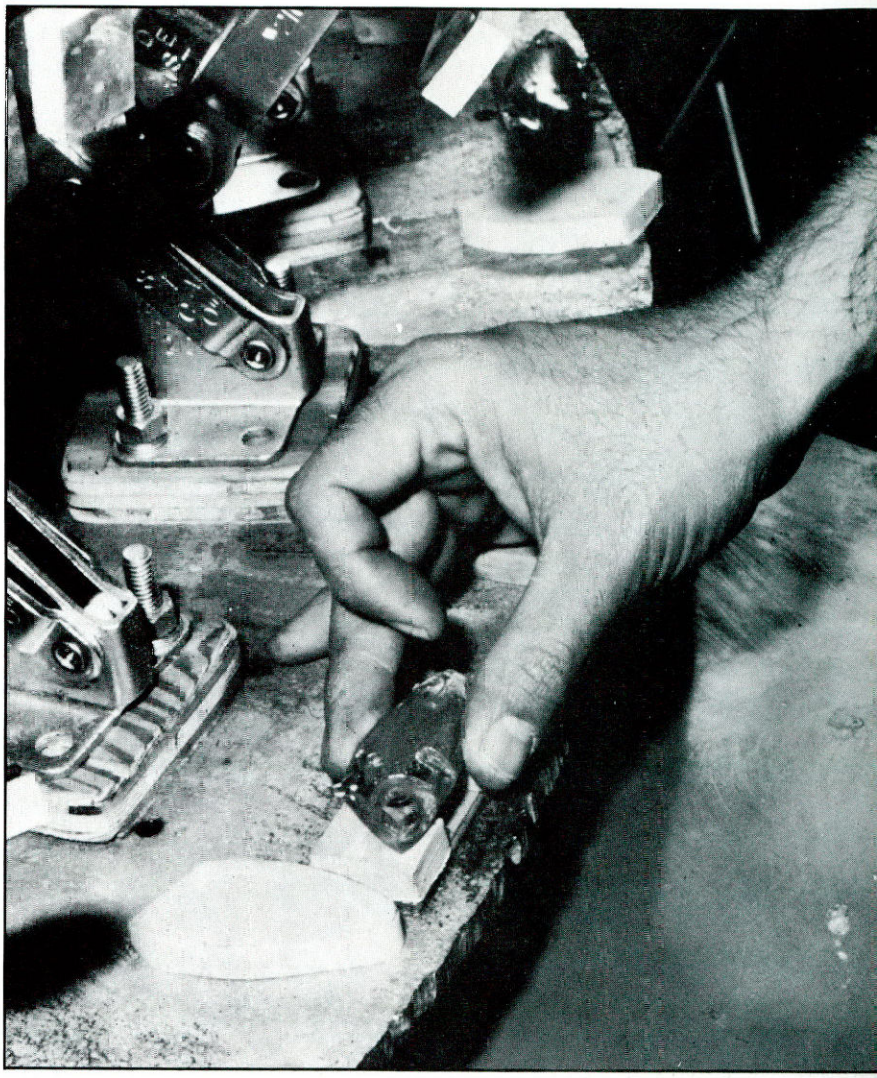
When the painting process is finished, the lures are dipped in a clear acrylic lacquer and allowed to dry. Those not immediately needed to fill orders are stored in this hookless condition. The rest move on to the next stage of production.

Screw eyes and sharp treble hooks are attached. Accessories such as propellers or deep-running lips are also added at this point. Completed lures are then packaged and boxed for distribution.

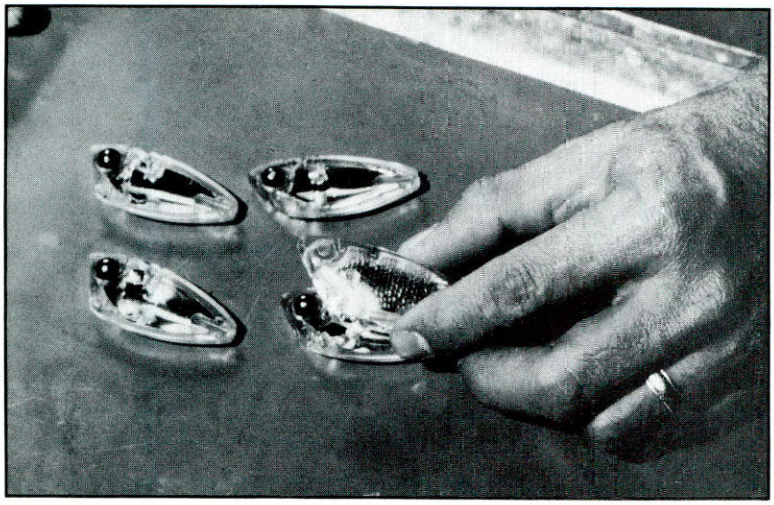
Another interesting phase of lure manufacturing involves the bucktail lures. Their popularity has increased steadily over the past several years for one simple reason — they catch fish.

To keep pace with this demand, lure manufacturers have had to increase production while maintaining a source of supply for the major ingredient — deer tails. Veteran anglers may recall that polar bear hair was once used on lures, but this source of supply is now illegal.





Rattles, metal reflectors, lead weights, or combinations of these items are inserted before the two lure parts are glued together. They produce action, flash or noise, and are steps that involve handwork. Without such handwork, lures would be less effective.



Manufacturers have found the fine texture, length and resistance to limpness after repeated, prolonged periods in the water make the hair of the white-tailed deer's tail ideal for lure use. The white flag hair also can be dyed one of the many popular colors, be it bright yellow, pale green or deep purple.

Flytiers may use the belly hair of the deer for their delicate flies, but this half-inch hair is too short for use on jigs and bucktail spinners. Northern species of whitetails tend to have longer tails (12 to 14 inches) with correspondingly longer hair that is best for the larger saltwater

Sometimes detailed lures require as many as 13 separate painting steps and wear exotic tresses of feathers or deer hair. If the fish catchers seem costly, remember the handwork and time required to make them.

lures. However, freshwater lure manufacturers have found the southern whitetail's seven- to eight-inch tail more suitable. Its hair length is just about right and eliminates waste.

Each year during the hunting season the call goes out for white-tailed deer flags. One Texas lure manufacturer estimates that it takes 100,000 tails to supply his needs from one hunting season to the next. To obtain them he may barter with "Joe Blow" for the 50 to 100 "ripe" tails Joe has collected over a period of time from hunters at the local deer storage plant. Or he may bargain with a hide processor for as many as 2,000 less-odorous tails. The condition of the tails, of course, determines the price he has to pay.

The bucktail lure is really simplicity itself. Whether the bucktail is destined for a spinner or jig, the lure is made by tying strands of the hair so they cover the hook. However, if you've tried to do this yourself, you know that it takes a certain amount of skill to accomplish the task. Watching a professional bucktail tier work can be quite an experience, especially for those of us whose coordination leaves a bit to be desired.

Skirts of feathers or plastic, nylon or rubber strands are often substituted for deer hair, but many anglers prefer the natural bucktail.

Next time you visit your local sporting goods store and look over the selection of fish getters, remember the time and effort that went into the making of these first-class lures. **

OUTDOOR BOOKS

PLANT A TREE: A WORKING GUIDE TO REGREENING AMERICA by Michael A. Weiner; Macmillan Publishing Co., Inc., 866 Third Avenue, New York, N.Y. 10022, 1975; $15.95, 276 pages.

Whether you feel a personal commitment to regreen America or just want to plant a tree or two in your yard, this comprehensive guide is a good handbook for accomplishing the task.

The author provides "tree profiles" of more than 160 varieties which include: common and scientific name, brief physical description, type of shade and foliage it provides, areas where the tree grows, growth rate and life expectancy, favorable soil condition and propagation, plus miscellaneous, helpful facts.

Presented in a different format is a regional breakdown of trees rated by the International Shade Tree Conference as either 100 percent or 80 percent safe to plant based on adaptability, degree of required maintenance and longevity. Lists obtained from a state forestry department, a state cooperative extension service or perhaps a particular city are provided as further guidelines for tree selection.

After choosing the tree you want, use the remainder of this book's information for selecting the site, preparing the soil and planting and caring for the tree. Perhaps the most valuable chapter for the plant parent is "Maintaining Trees." Do's and don'ts of watering and fertilizing as well as control of parasites are described, including a list of "soft" but effective pesticides with directions for their preparation and application. A section on pruning and preparing dressings for wounds offers further help for the novice.

A six-page section is devoted to the diagnosis of principal causes of tree injuries. The agents of destruction, such as sap feeding insects, mites, etc., are listed together with symptoms of their infestation. Remedies or treatments are presented for each of the 39 symptoms and range in severity from pruning or applying fertilizer to cutting out and burning diseased parts.

If your concern for the protection and promotion of trees goes beyond your own yard, the suggestions for urban tree planting projects may give you some planning ideas. Everything from initiating a letter to your treeless neighbors to presenting tree-planting applications to the responsible city agency is discussed. The urging of civic leaders to consider such approaches as donating live trees to the city Parks and Recreation Department for planting is within the realm of any citizen's concern. One California judge offers minor offenders the choice of paying a fine or planting a tree.

The important contribution made by this book is to show individuals how to regreen America through practical work methods for planting and maintaining trees in both private yards and urban communities. — *Elaine Byrne*

INSECTS by Ross E. Hutchins; Prentice-Hall, Inc., Englewood Cliffs, N.Y. 07632, 1972; 324 pages, $3.50 paperback.

To survey the whole field of entomology is quite an undertaking, but Hutchins has produced an intriguing saga. The author obviously enjoys this subject and passes along his enthusiasm to the reader through fast-moving prose and interesting sidelights of various insect species.

One of the many fascinating chapters deals with insect instinct, intelligence and behavior. A noteworthy example of insect instinct vs. intelligence is the honeybee's ritual Schwanzeltanze, meaning dance for gathering nectar. It is generally known that scout honeybees leave their hives in search of good nectar sources and that when they return a so-called "honey dance" is performed. But it was not until Austrian researcher Karl von Frisch conducted his glass hive observations that the full importance of these dances was known. By observing distances of travel, location of nectar sources and time of day, Dr. von Frisch determined that an information pattern based on gravity and sun angle was formed which communicated the location of the nectar to the other bees.

The "dance" consists of variations on a figure eight pattern or may be represented by a "waggle dance." The direction of the flowers in relation to the sun is indicated by the upward or downward wagging movement, while a side-to-side movement indicates angles. The speed with which these waggle runs are made across the waist of the figure eight indicates distance. Twenty runs a minute indicate that the nectar is half a mile away while only 12 runs mean it is two miles away. When the bees leave the hive their delicate sense of gravity enables interpretation of this data in relation to the sun. Thus the honeybees have all the information necessary in order to find their source of food.

Another chapter deals with insect migration. It is interesting to note the extremely long distances flown by such insects as the monarch butterfly. In 1956 and 1957 monarchs were tagged in Ontario, Canada, and later recovered in such distant locations as Galveston, Brownwood and Seguin, as well as points in Mississippi and Arkansas. In some locations, such as Pacific Grove, California, the monarchs arrive in winter clusters, and have been regular visitors for at least a hundred years. Because Pacific Grove is a regular wintering ground for butterflies, it has become known as Butterfly Town, U.S.A.

Other chapters on insect sizes, color, songs and more are filled with intriguing facts and hypotheses. This is a recommended publication for any age individual from sixth grade up. — *Elaine Byrne*

THE GOOD THINGS AROUND US (AND HOW TO ENJOY THEM) by Walter E. Klippert; Exposition Press, Inc., 900 South Oyster Bay Road, Hicksville, N.Y. 11801, 1975; 103 pages, $6.00.

If you have yearned to try the old-fashioned way of doing things but don't want to spend ALL your time as grandma and grandpa did, you might enjoy sampling the "good life" as presented in *The Good Things Around Us.*

Beginning with maple sugaring techniques, the author progresses to other topics of more direct interest to this area of the country, such as how to collect and prepare sassafras for the making of tea, jelly and syrup. Then Klippert moves on rapidly to requirements for readying a home garden (including analyzing soil content), building a family-size smokehouse (with plenty of recipes for curing and smoking common foods), making wine and even building your own fishpond. The conclusion offers more recipes for the curious, from brandied peaches to vinegar pie. — *Elaine Byrne*

PHOTO AND ART CREDITS

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Back Cover — Aguilar; Nikon F2, 35mm Nikkor; Kodachrome 25.

LONG SHOTS SHORT CASTS

compiled by Neal Cook

That Extra Effort: Whether hiker, fisherman, camper or hunter, anyone who enjoys the outdoors should exert a little extra effort to pick up some of the trash dumped along trails, waterways, camps or hunting grounds. If everyone picks up just a sack or two of litter, in addition to his own, our state recreation areas will be more beautiful.

Lest We Forget: In the 1912 Annual Report of the Texas Game, Fish and Oyster Commission, W. G. Sterett made a plea to the Governor and Legislature for more stringent laws and additional funds for the protection of Texas' wildlife and fish. He stated in part "It's scarcely a child's life since our coastal and interior waters produced as much fish life as any like waters in all the world, and yet today a man with a hook and line, or even a net, may work for days without securing a catch worth a tenth of his labors. Not one thing, but many things have contributed to the destruction of our fish and game supply." Today, some 64 years later, through added powers and laws to regulate the harvest of wildlife and fish and restock depleted resources, this department has aided our resources in returning to bountiful conditions. But it is up to the individual to continue supporting our efforts at maintaining the quality of our state.

Fish Identification: Every freshwater fisherman should have a copy of "Freshwater Fishes of Texas," Bulletin 5-A which features, in color, 35 species of fish. These fish paintings by Nancy McGowan first appeared in *Texas Parks & Wildlife* magazine, before being compiled into this 40-page publication. The bulletin costs 63 cents and can be ordered from the Parks and Wildlife Department, John H. Reagan Building, Austin 78701. Be sure to send the correct amount of money and specify that you want Bulletin 5-A.

Help the Survey: Beginning in March and continuing through July, the U.S. Fish and Wildlife Service is mailing 1,000 Texans a survey questionnaire to gather information about the activities of hunters and/or fishermen. If you should receive one of these questionnaires, please cooperate by filling it out and returning it to the organization conducting the survey.

Small-craft Warnings: These are posted to save your life and should not be ignored. A red pennant flying on a flagpole along coastal and inland waters during the day, or a red light at night, warns that bad weather conditions exist for boaters. Radio and television stations also announce small-craft warnings.

Nonleaded Gas: Maybe it's good for keeping down lead emissions into the air, but nonleaded gasoline is apparently not so good for camp stoves, lanterns or catalytic heaters. Additives in the gasoline clog the generators on stoves and lanterns, and while nonleaded gas can be used in emergencies, extended use will probably damage your camping appliance.

West Texas Rarity

by Terry C. Maxwell, Texas A&M University

Pat O'Brien

Sometimes called fool's quail because it refuses to fly until almost stepped on, the Montezuma quail, Cyrtonyx montezumae, is one of our more strikingly beautiful residents. Texas' 200 to 300 birds are limited to the Davis Mountains and threatened because they probably have less tolerance to man's encroachment than any other upland species.

If, while camped in the Davis Mountains State Park near Fort Davis, you are awakened by a peculiar whinnying sound, take time to search out its origin. You'll be rewarded by the sight of Texas' most singularly beautiful quail with the most uncharacteristic call.

The Montezuma quail, *Cyrtonyx montezumae,* has been called by more names than probably any other quail in North America. Mearn's quail, Harlequin quail, Messena quail or partridge, black-bellied quail, black partridge and fool's quail are among the many names recorded for this species.

However, by any name, it is the most brightly marked of any North American quail. The male possesses a buffy crest and a bold, black-and-white, clownlike pattern on its face. Its back and wings are protectively mottled with brown, cinnamon and black. Its breast is deep chestnut grading into black on the belly and under the short tail. The sides of its breast and flanks are spotted with white on a black background. The female is a buffy, less boldly marked version of the male. In size, the species is similar to the bobwhite.

Famed southwestern ornithologist, Elliot Coues, first found the Montezuma in the United States near Ft. Whipple, Arizona, in 1864. Distribution of the species at that time included the highlands of Mexico from Oaxaca north to the United States border. Within the United States, it was found from Central Arizona east to about San Antonio.

This rather extensive distribution, however, did not accurately describe its true restricted range. Mostly, this quail was confined to the pine-oak wood-

land of the higher elevations. In the Edwards Plateau it was known to occur from the highest elevations down to well below 1,000 feet.

As late as 1900, its distribution in Texas included all of the West Texas mountain ranges and the Edwards Plateau, north to the Callahan Divide in Nolan County, east to Bexar County and sparingly south to Maverick County. Wherever hills and rough breaks were found with pine or juniper and oaks with a healthy stand of grass, the Montezuma quail was resident.

No one seemed concerned about the abundance of these quail in Texas in the last century. Shortly after 1900, however, the picture began to change. Howard Lacy, writing from Kerr County in 1914, observed: "A bird that seems to have left us is Mearn's quail; it never was very common and kept to the rough country . . . Comparatively few quail are shot here, and it is rather hard to see why they should decrease in number . . ."

Likewise, in West-Central Texas, William Lloyd reported them in 1887 along the Middle Concho River in Tom Green, Irion, Reagan and, possibly, Upton Counties. Biological survey men investigating this area around 1900 failed to find the Montezuma quail, and the birds have not been seen there since Lloyd's day.

By 1940, on the Edwards Plateau, these quail could be found only in Edwards and Uvalde Counties. The Uvalde County population soon disappeared but the Edwards County population continues to cling to a precarious existence in a very restricted area.

A decline in Montezuma quail in West Texas was noted early in the 20th century. By 1950, they were restricted to the Davis, Glass and Del Norte Mountains with possible small populations in the Sierra Vieja and Guadalupe Mountains. They had disappeared from the Chisos Mountains in the Big Bend National Park with but two unconfirmed reports after 1950.

Two Christmas bird counts in the Del Norte Mountains in 1966 and 1967 failed to list the Montezuma quail, although its secretive nature makes its detection difficult. Rare reports point to its survival in the Glass Mountains. The Davis Mountains, in Jeff Davis County, remained the last assured stronghold in Texas by 1970. Even there the situation seems desperate with an estimated current population of only 200 to 300 birds. Davis Mountains State Park remains the only parcel of readily accessible, publicly-owned land where the birds occasionally may be observed.

A landmark event occurred for this species in Texas when on January 11, 1973, the National Park Service released 26 birds in Pine Canyon in the Chisos Mountains of Big Bend National Park. Four of the Arizona transplants were heard singing in 1974, but no one will feel at ease about the attempted reestablishment until reproduction is confirmed.

Why has the Montezuma quail declined in Texas? There are no sure answers, but the habits and habitat of the bird give us some possible clues.

Unlike the bobwhite and scaled quail, the Montezuma travels in small flocks of only about eight birds. Throughout most of their range they migrate short distances, a mile or two, from higher elevations down to lower grassy flats and stream beds in the spring. After nesting, often late in the summer, they lead their broods back to the high woodlands.

They are noted for holding their ground longer than other quail when approached. This habit of crouching until the last minute earned them the name "fool's quail." Captain Carpenter, a military officer in 19th century Central Texas, wrote of this habit, "I once stopped my horse, when about to step on one, and watched it for some time without creating alarm . . . I dismounted, and almost caught it with my hat, from under which it fluttered away."

This habit undoubtedly benefited those birds living in the tall grass of pristine habitat since the best escape from predators in tall grass would be to remain still and camouflaged. However, when the grass is gone, the habit of remaining motionless when approached is obviously less of an advantage.

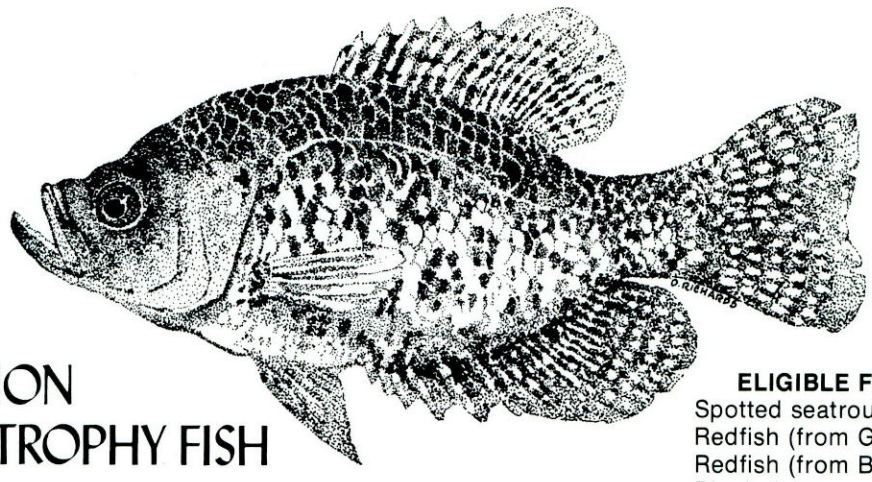
Like other quail, the Montezuma feeds primarily on vegetation in the winter and supplements its diet with insects and other animal foods in the summer. Important winter foods are fruits of madrone, juniper, pine, sumac, and mountain laurel, and the bulbs or tubers of buttercups, sorrel and "nut grasses" or sedges.

The peculiar bulb-eating habit of this quail has been a curiosity that has puzzled field biologists for a long time. Captain Thorne encountered Montezuma quail while stationed at Ft. McKavett in the 1880s, and wrote: "All the stomachs I have examined (fall birds) contained little else than large quantities of white, shiny, bulbous roots, rounded at both ends, and about the size of French pease (sic)." Those bulbs are now known to be primarily from flat-sedges of the family Cyperaceae, for which the Montezuma quail spends much of its time prodigiously digging.

The decline of Montezuma quail in Texas is most likely caused by loss of habitat, which consists of pine-oak or juniper-oak with good grass for cover and plenty of bulb-producing plants for food. A 1945 bulletin of the Texas Game, Fish and Oyster Commission stated the situation simply but all too correctly: "The Mearn's quail is probably the most intolerant of civilization of all upland species."

Studies in Mexico, Arizona and New Mexico indicate that intensive overgrazing by livestock can push the Montezuma quail over the brink. The species is managed successfully today in Arizona, where heavy hunting pressure has not adversely affected it. With good range management in Texas, the Montezuma quail should benefit. This beautiful quail is far from being in healthy numbers in the Edwards Plateau, but the Chisos experiment provides us with a gleam of hope. **

Editor's Note: The subspecies of Montezuma quail found in Texas is currently being considered for federal classification as "threatened." Should this classification be finalized, the bird will then be afforded protection by more stringent laws (both federal and state) than presently exist.



RECOGNITION FOR YOUR TROPHY FISH

Are you eligible for a Certificate of Fishing Merit? If you have caught a trophy-sized fish lately, you may qualify for this special fishing award.

True record-breakers may be few and far between, but there are still a lot of big ones out there. Since our fisheries biologists need to know about these big fish and where they are caught in order to better manage our state's fish resources, they have designed this awards program as a means of obtaining this information.

You will receive a Certificate of Fishing Merit if you catch a trophy specimen that meets the minimum poundage requirement in any of the 14 eligible freshwater and saltwater fish categories, if you meet the rule requirements for the program and if you file an application with this department.

AWARD RULES

1. All fish entered must have been taken by hook and line in Texas waters after January 1, 1974.
2. Entrant must have hooked, fought and landed the fish.
3. All fish entered must be measured for total length and weighed on an inspected scale (certified for trade by Texas Department of Agriculture) with a statement of weight signed by a witness.

ELIGIBLE FISH CATEGORIES

Spotted seatrout	7 lbs.
Redfish (from Gulf)	25 lbs.
Redfish (from Bay)	14 lbs.
Black drum	35 lbs.
Southern flounder	6 lbs.
Largemouth bass	8 lbs.
Crappie	3 lbs. 8 oz.
White bass	4 lbs.
Channel cat	15 lbs.
Blue cat	40 lbs.
Flathead cat	60 lbs.
Walleye	12 lbs.
Striped bass	20 lbs.
Rainbow trout	2 lbs.

When completed, mail the form below to:
Fish Award Program
Parks and Wildlife Department
John H. Reagan Building
Austin, Texas 78701

APPLICATION FORM
(Please print all information)

Species: _____ Weight: _____ Length: _____

Waters in which caught: _____ County: _____

Type tackle: _____ Date of Catch: _____

Name of angler: _____

Address: _____ City _____ State _____ Zip _____

Certification

Location of Scales: _____

Type of Scale: _____ Capacity: _____

Texas Department of Agriculture Certification No. _____

Witness to weighing

Name: _____

Address: _____ City _____ State _____ Zip _____

Affidavit of Angler

I, the undersigned, certify that the fish described in this form was hooked, fought, and landed by me personally without assistance and that all other information contained herein is true and correct.

Signature of angler _____

Amusing Antics Distinguish the Avocet as the

Clown of the Shorebirds

Article by Joan Pearsall, Photographs by Larry R. Ditto

Probably the showiest of American shorebirds is the avocet, *Recurvirostra americana*. Its size and striking coloration in addition to its long, comically upturned bill, are enough to make it conspicuous even at a great distance. Its amusing antics also fit the showman image.

Avocets put in a widespread appearance on beaches, shallow lakes, lagoons and prairie ponds throughout the state when migrating, from March to May and from July to October. They breed locally in the Panhandle, West Texas and along the lower coast, and also winter on the Texas coast as well as in Mexico and Guatemala.

These birds are perfectly equipped for their watery habitat. The dense, thick down of their underparts is a complete insulation from the chill of cold water. They are smooth divers, can swim like ducks, wade like herons and flush from the water almost like rockets.

Measurement from the point of the bill to the end of the tail is 16 to 18 inches and the full wingspread is 20 inches. Their long, sticklike legs and partially webbed feet contribute to the birds' ease in wading and swimming.

Bold coloration makes the bird unmistakable. Its body is white, and the back and wings are distinctively striped with black. Head and neck in breeding season are rusty, replaced by gray after molting. Its pale blue feet and legs have earned it the colloquial name "blue shanks."

Obviously, these birds were an easy target for gunners, who in the past eliminated them from much of their range. Since they now are protected by the Federal Migratory Bird Treaty Act, the only present-day threat to them is the destruction of their breeding and wintering grounds.

The avocet's food, which it finds on or about the water, consists of insects, worms, crustaceans, brine shrimp or other small aquatic life. Their feeding movements, involving their peculiarly curved bill, often are amusing.

According to one observer, the bird wades, sometimes running, until water is up to its body with its wings partially raised. If the water

Conspicuous even at a distance, the avocet, or "blue shanks," with its distinctive coloration and long, upward-curving bill is one of the showiest of all North American shorebirds.

gets too deep, the bird swims until the next shallow area is reached.

Avocets feed silently but apart, crisscrossing each others' paths, but not showing enmity, except to other species to whom they give instant chase. They also frequently feed in a company of a dozen or more, walking slowly, shoulder to shoulder as in a drill formation, thrusting their heads under water and sweeping their tipped-up bills along the bottom like scythes with each forward step.

In feeding, they depend upon the sense of touch, since much of the time the head is immersed. Anything that touches the bill is gathered, so the birds often are scavengers, eating living or recently dead prey.

Flight maneuvers can be arrestingly beautiful. A typical pattern consists of a compact company of about 50 avocets flying a short distance, turning, returning almost to the starting point, diving, rising again about 50 yards, then swinging around and repeating the whole sequence.

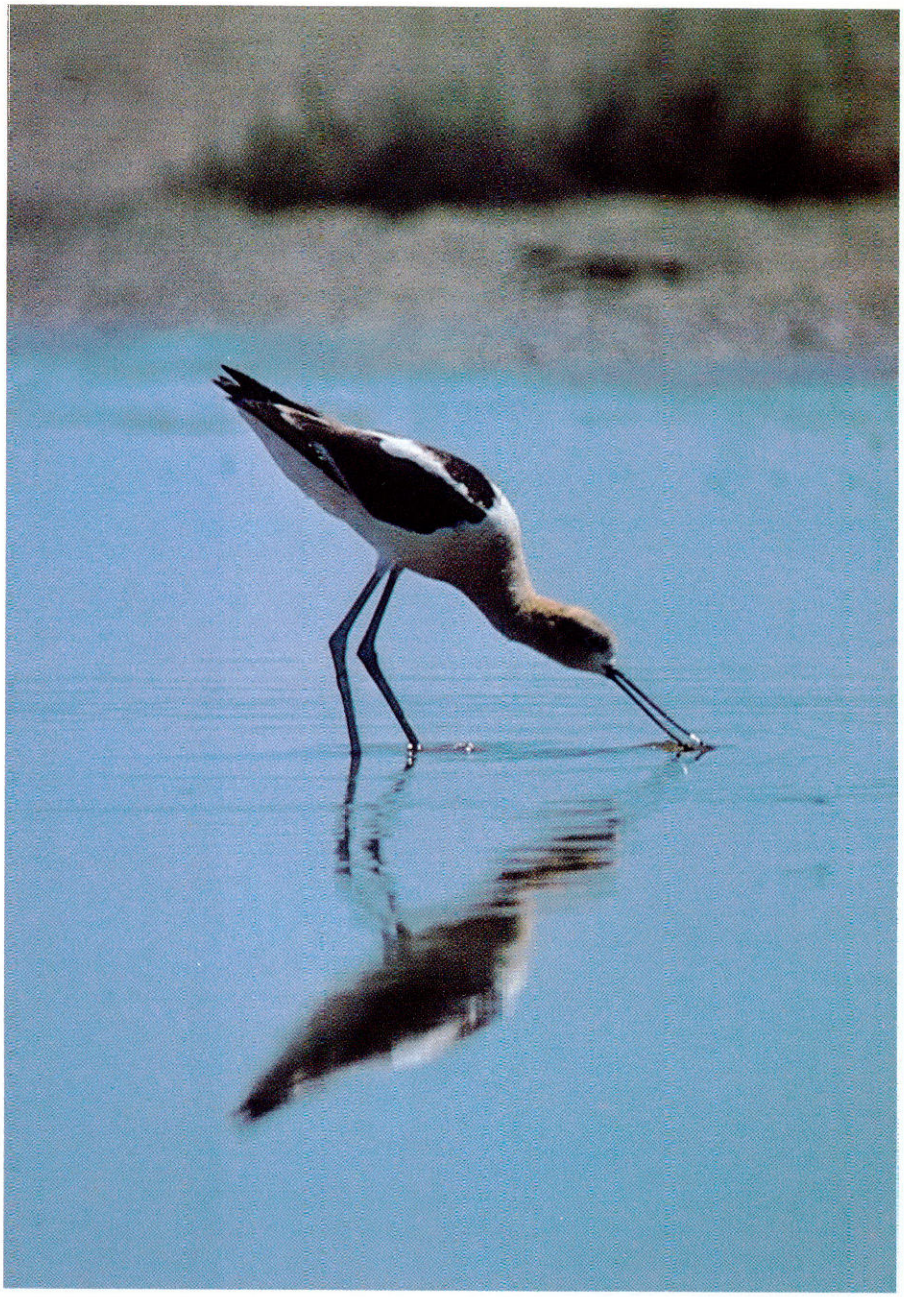
A witness of another choreographed performance described a mass of birds which seemed fascinated by a particular small, round mud island. They packed themselves on it to the water's edge, the whole crowd revolving from left to right with slow, short steps, giving the impression of marching at half step. Whenever any birds flew from the milling throng, others nearby would fly to take their places in the dance. Seemingly, the purpose of all this activity was simply for entertainment.

Avocets are endowed with a very keen sense of hearing. A soft whistle causes an instant reaction of alertness from them. However, if the whistler makes no noticeable movement, the birds will not become flustered.

Although their vocabulary is not elaborate, these birds make themselves heard, especially on the breeding grounds. Then their voice is described as a loud, shrill whistle or yelping scream, sounding like a repeated *wheep, wheat, plee-eek* or *click,* always strident and angry. A softer, conversational tone has been noted at other times and, once when a bird was pretending to be wounded, a low, suffering *oo-oo,* as though in great pain was heard.

Avocets usually are very tame, unsuspicious creatures, with only mild curiosity. However, in courtship and when breeding there are marked personality changes.

The European species does not seem to have a courtship period; however, the American avocet indulges in various actions and posturings. These include wading about gracefully in shallow water, frequently bowing or crouching down close to the water and sometimes dancing with widespread wings tipping from side to side as though in a balancing act. Some-



To feed, the avocet thrusts its head or bill into the water and sweeps the tipped-up bill along the bottom like a scythe. Its food consists of insects, worms, crustaceans and other small aquatic life.

times one will lie prostrate on the ground or water with head, neck and wings extended.

When nesting, the birds are aggressive to intruders or comic in their anxiety. Regardless of their safety, they will confront the interloper and hound him until he is out of the critical area. Their loud cries of displeasure often cause their companions to join in the counterattack. Several of them may stage a moaning, crippled act and, if this does not work, they go into frenzied convulsions. Another ploy is to beg for pity, the birds stand with wings upraised, moaning and quivering in supplication.

Avocets make their nests in colonies of 10 or 12, usually on the ground near water. Sometimes the nest is a mere, grass-lined depression in a marsh, or it may be loosely made of grasses, weed stems, straw and small sticks with, occasionally, a few feathers. No attempt is made at concealment, as the color of the eggs make them inconspicuous. When rising water is a threat, the birds, in what seems like confusion, scurry to raise the level of the eggs by the addition of any building material handy. Nests have been raised 12 to 15 inches in this manner.

Four is the usual number of eggs per clutch. They are a dark greenish or brownish buff color, boldly marked with brown and black. Usually they are elongated, with a smooth, but not glossy, shell. The incubation period varies from 22 to 29 days, with an average of 24 days.

After hatching, the young are self-sufficient and soon leave the nest, running about and picking up their own food. On water they are able to swim and dive like young ducks. They are experts at hiding, even in the open, since the coloring of their downy covering is good camouflage on beaches or alkaline flats.

Upperparts are cinnamon or grayish buff, darkest on the rump, with brownish black stripes. There are varying dusky spots on crown, wings, back, rump and thighs. Underparts are buffy white, with nearly pure white on throat and belly. This coloring modifies through the juvenal stage, and a late-winter body molt produces a first nuptial plumage much like the adult. The first postnuptial molt the following summer produces the complete adult winter plumage.

Adults have a complete postnuptial molt beginning in August and a partial prenuptial one beginning in January, involving plumage of the body and some of the scapulars and wing coverts. Nuptial plumage is characterized by the cinnamon or pinkish color of head and neck. It is at this time that the birds are at their most flamboyant.

There are many locations where they can be found in Texas and it's worth going off the beaten track to find them and enjoy their beauty and antics. **

Fish Stocked in 1975

by Ilo Hiller

Jim Whitcomb

Rainbow trout (left) have been stocked in Texas waters on a put-grow-and-take basis for the past 10 years. This particular stocking occurred below Canyon Dam. Since December 1975, fisheries biologists have stocked more than 100,000 catchable-size rainbows in the Guadalupe River immediately below Canyon Dam and extending about 14 miles down river.

Fish culture has gone through a lot of changes since the early attempts by the Chinese in rice paddies many centuries ago. Efforts in this country were first aimed at massive stocking programs which were thought to be the cure for all the ills of poor angling. When they didn't solve the problems, opinion swung the other way and the public advocated plowing up hatchery lands and planting crops since hatchery efforts were obviously useless.

It is hoped that modern-day thinking has finally placed fish culture in its proper perspective as a tool to aid biologists in the management of our vast fisheries resources. Fish culture serves as a method for introducing proper species in newly impounded waters, as an assistance in providing a good predator and prey balance and as a way to experiment with species not native to our waters to find those that will provide sport fishing while filling an important ecological niche in our deep-water reservoirs. Experiments are also conducted to develop hybrids that combine the best genetic qualities of two species.

Most of our state-operated fish culture stations, or hatcheries, were constructed when techniques for rearing fish were what we now view as archaic. The hatcheries are small, with an average of only 35 acres of production water each. Most facilities are old and not adequately designed to produce the species and numbers of fish necessary to support a modern fisheries management program.

Available hatchery pond acreage must be used not only to hold hatched fish, but also to hold brood fish and to produce the food to feed

these fish. Many ponds are devoted exclusively to the rearing of forage species, which reduces the amount of pond acreage actually available for producing desired crops of different species.

More than one crop of fish is raised in each pond, but each successive crop becomes more difficult to achieve when a pond is placed back into production immediately after harvesting the last crop. Natural fertility and available natural food are reduced to such an extent that the number of fish in the succeeding crop may be greatly reduced. In order for the natural fertility to be reestablished, the pond must be drained and allowed to dry so the series of chemical transformations of the waste products remaining in the pond bottom can take place.

Utilizing these limited fish culture facilities presently available, our fisheries division produces and experiments with native, hybrid, imported and marine species to provide fish to improve sport fishing throughout the state. At the present time, each acre of existing hatchery pond area must produce enough fish to support sport fishing recreation programs for more than 6,000 acres of water.

Last year's stocking programs involved 20 different kinds of fish, 18 of which were cultured entirely or partially in our state-operated facilities. Species stocked in public waters of the state were: redear sunfish; green-redear hybrid; flathead, blue and channel catfish; smallmouth, largemouth, Florida and striped bass; white-striped hybrid; northern pike; northern pike-chain pickerel hybrid; chain pickerel; muskie; rainbow and brown trout; walleye; red drum; southern flounder; and spotted seatrout.

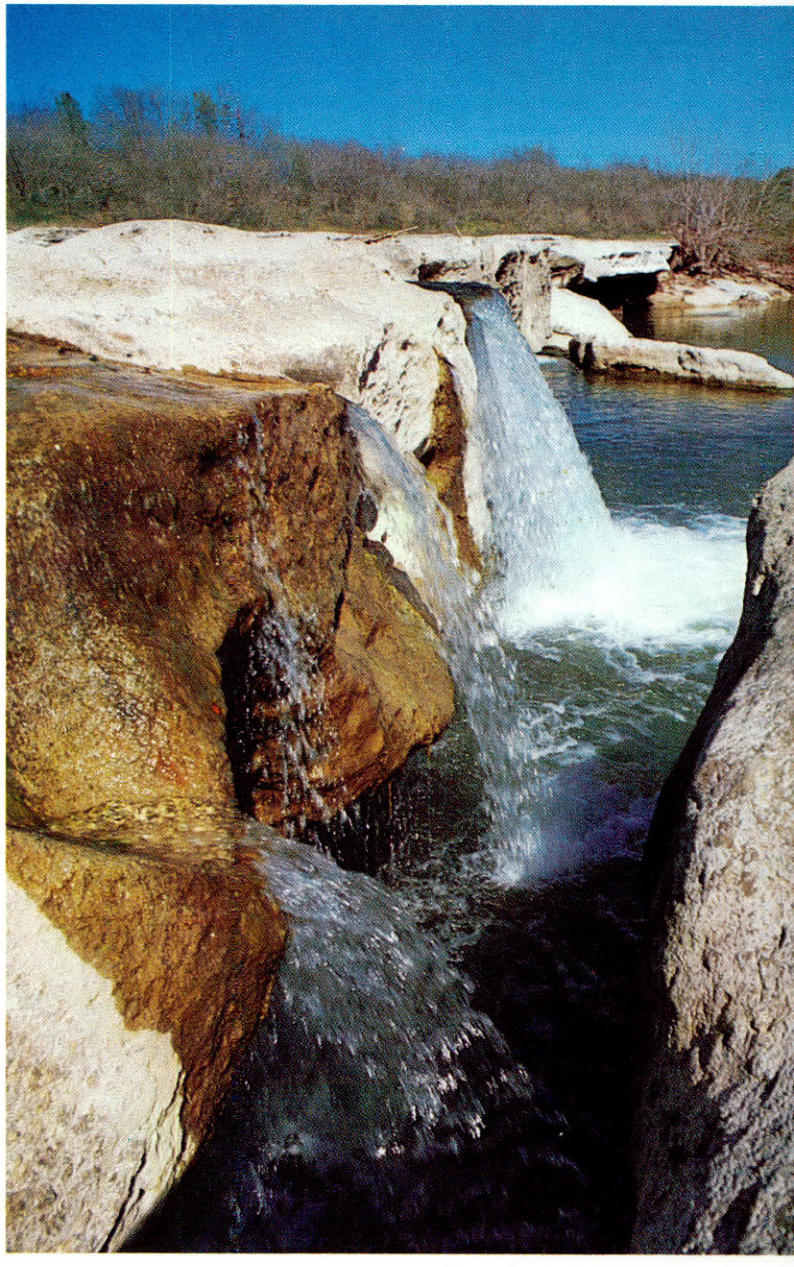
If our hatcheries are to continue to produce fish for future needs and conduct necessary experimentation, existing facilities must be expanded and brought up-to-date. Plans for such expansion are being studied and we can only hope that this important fisheries program will not fall behind the demands placed upon it due to lack of support or available funds. **

WATER BODIES STOCKED IN 1975

Amarillo Martin Road
Amistad
Arlington
Ascarate
Austin
Balmorhea
Bardwell
Barton Springs
Bastrop
Bastrop State Park
Baylor
Bellwood
Blue
Bon Wier
Bonham State Park
Bounton
Boykin Lake
Boykin Springs
Bridgeport
Bronte City
Brownwood
Buchanan
Buescher State Park
Buffalo Springs
Calaveras
Canyon
Canyon Tail Race
Cedar Creek
Cleburne State Park
Copper Breaks State Park
Daingerfield State Park
Double
Eagle Mountain
Edgewood
Elm Creek
Fairfield
Falcon
Farmers Branch City Lakes
Fort Parker State Park
Ft. Phantom Hill
Galveston
Gladewater
Granbury
Grand Saline
Grapevine
Guadalupe River
Halbert
Hawkins
Herman Park
Jacksonville
Kemp
Kidd Springs Park
Lady Bird Park
Lake Creek
Leon
Lewisville (Garza-Little Elm)
Livingston
Long (Decker)
Lubbock City
Macho
MacKenzie
Martin
Marvin
Mayse
Medina
Meredith
Meridian State Park
Mexia
Mill Creek Lake
Moss Creek Lake
Nasworthy
Navarro Mills
Novice City
Oak Creek
Old Anson
Overton
Palestine
Palo Pinto
Patman (Texarkana)
Pickens
Possum Kingdom
Possum Kingdom Tail Race
Rayburn
Red Bluff
Rhine
Rita Blanca
Rochester Park
Royce City
Runnels City
Samuel Park East
San Antonio Bay
Skyline Park (Dallas)
Somerville
Spence
Stillhouse Hollow
Striker
Tawakoni
Texoma
Town (Austin)
Tradinghouse
Trinidad
Twin Buttes
Tyler
Tyler East
Tyler State Park
Van City
Waco
Water Works
Welch
White River
White Rock
Whitney
Wolf Creek
Worth

FISH SPECIES	WATER BODIES STOCKED	CULTURED IN TEXAS	PROCURED OUT OF STATE	TOTAL AVAILABLE
Redear Sunfish	1	27,000	0	27,000
Green-Redear Hybrid	12	39,510	0	39,510
Flathead Catfish	4	9,961	0	9,961
Blue Catfish	6	94,300	0	94,300
Channel Catfish	45	206,483	0	206,483
Smallmouth Bass	6	48,000	265,000	313,000
Largemouth Bass	8	68,582	0	68,582
Florida Bass	17	1,377,318	0	1,377,318
Striped Bass	5	166,809	0	166,809
White-Striped Hybrid	17	725,106	0	725,106
Northern Pike	2	6,306	0	6,306
Northern Pike-Chain Pickerel Hybrid	1	1,200	0	1,200
Chain Pickerel	1	1,700	0	1,700
Muskie	1	0	1,400	1,400
Rainbow Trout	8	25,800	127,556	153,356
Brown Trout	1	0	5,000	5,000
Walleye	21	13,586,100	9,400,000	22,986,100*
Red Drum	6	132,820	0	132,820
Southern Flounder	2	1,819	0	1,819
Spotted Seatrout	1	6,087	0	6,087
*20,550,000 of these were fry				

Jim Whitcomb



McKinney Falls: Your Newest State Park

by Guillermo Garcia

Near the western perimeter of the central portion of the park, Onion Creek cascades over limestone formations, forming the lower and upper falls (above and far right).

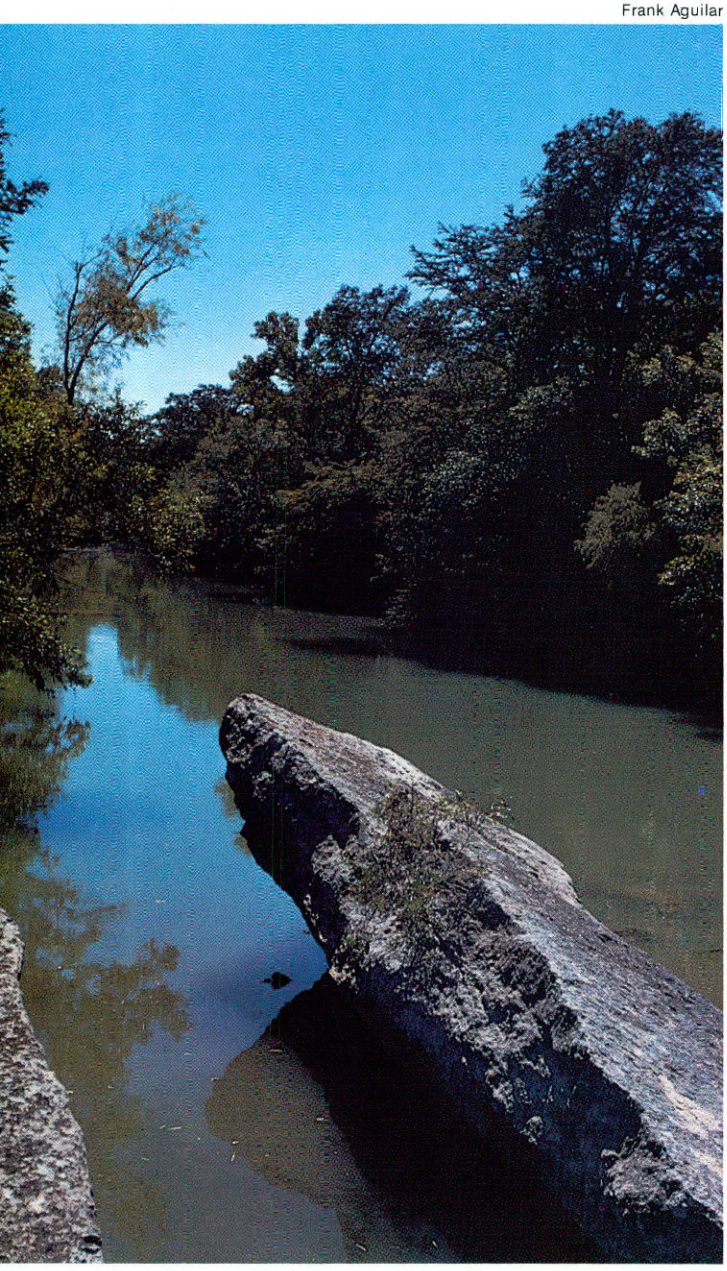
Seven miles from the State Capitol at the confluence of Onion and Williamson Creeks lies historically rich McKinney Falls State Park.

Volcanic action millions of years ago contributed to its geological formation; prehistoric man found shelter there and left his remains; and, during early-Texas history, it became the homestead of Thomas F. McKinney, one of Stephen F. Austin's 300 original colonists.

Scenic upper and lower waterfalls, which are among the outstanding features of the more than 700-acre park, partially owe their existence to the long-extinct Pilot Knob Volcano, located on private property about a mile from the park site. The beautiful cascading falls, which give the park its name, flow over limestone that at some point in the past was calcareous sand lining the outer edge of the volcanic island.

The area was under water approximately 80 million years ago when the Pilot Knob Volcano erupted; molten material spewed out, and formed an island as it broke the ocean's surface. After volcanic activity ceased, erosion reduced the island to sea level, and the original crater, one and a half miles in diameter, was covered with water. This effectively buried the slopes commonly associated with volcanoes. The beach sand surrounding the island was composed of fragments of shells of marine animals that in time solidified to form limestone deposits. An episode of uplift roughly 25 million years ago brought the region above sea level and allowed erosion to produce the landscape we now see.

Frank Aguilar



Jutting out of Onion Creek, these rocks (left) can be found near one of the seven picnic areas in the park. Rare Texas peach bushes, growing around the camping and picnic areas, comprise the second largest colony of the tiny fruit found in Central Texas.

Bill Reaves

On the east side of Onion Creek, almost at the geographic center of the park, is one of the best local chronologies of the prehistoric character of Central Texas — Smith Rock Shelter, named for J. E. Smith, whose family had owned the land for 75 years.

The rock layer that forms the shelter's roof was brought about indirectly by the Pilot Knob Volcano. Time and running water wore away the material below the rock, undercutting it and eventually forming the nearly 150-foot-long, 15-foot-deep shelter area.

Earliest known habitation of the shelter by humans is dated to about 1500 B.C. Archaeologists describe the shelter as a multicomponent site, meaning several distinct layers of cultural remains have been discovered. It is theorized that as one group flourished, then was driven out by periodic rises in the creek, other groups would reoccupy the site. In that manner, precise stratified layers of different cultures were preserved. Studies indicate these inhabitants were nomadic, and may have occupied the site only on a seasonal basis, with the shelter probably representing only a portion of the habitat area covered by these wandering nomads. There are other smaller shelters on the park site, but they were probably too moist to be suitable habitation.

From an archaeological excavation done by Dr. Dee Ann Story, of the University of Texas, it has been determined that the residents' diet consisted of fish, turtle, birds, deer (the primary meat source), bison, skunk, raccoon, opossum, beaver, antelope and members of the dog family.

Although pronghorn antelope are now confined to the Trans-Pecos and Permian Basin areas of far West Texas, bones found at the site indicate that at one time pronghorns were present in this area of the state.

The more recent history of the area was created, for the most part, by Thomas McKinney, a merchant trader from Missouri. McKinney had lived in Nacogdoches where he married his first wife. Later, he moved to Galveston where he married his second wife, Anna Gibbs, and where he also was a business partner of Samuel Williams.

The Williams-McKinney firm became the principal financial backer for the Texas army and a major underwriter of army campaigns against Mexico. Some of the firm's ships were also used by the Texas navy in the fight for independence. Later, the partners financed the operations of the newly born republic. Records indicate that many of the loans McKinney and Williams made to the republic were never repaid.

McKinney's two-story home (below), across Onion Creek from the park facilities, was built by slaves in the 1850s. A fire in the 1940s destroyed all but the stone walls, and some of these have since collapsed. This visitor (right) is following one of the nature trails through the park's scenic areas. Slide shows and other exhibits will be housed in the interpretative center (lower right) located near the lower falls.

Frank Aguilar

Bill Reaves

Frank Aguilar

After the war, in the early 1850s, McKinney moved to his 2,500-acre tract of land outside Austin. On this property, near Onion Creek, his slaves built a two-story stone structure to serve as his home. Slave labor also built stone fences that still stand in some areas of the park.

Constructed near the lower falls was a water-powered gristmill. An engineering marvel, the mill turbine was operated by water diverted from the creek. A log dam forced water into the turbine that was used to turn the large, horizontal drive wheel. The water then flowed down a tunnel and back into the creek about 40 yards from its diversion point. This ingenious device was one of the first gristmills in Central Texas and, prior to its construction, all flour was imported to that area of the state.

Despite the elaborate nature of the mill, it was operational less than 20 years. A flood in 1869 wiped it out and, due in part to McKinney's increasing financial difficulties, no effort was ever made to rebuild it. Only foundations remain of the building, but still evident are metal rods stuck in the ground to hold in place the diversion logs.

In addition to the mill, McKinney was prominent in Central Texas horse racing circles. He bred and raced his own stable of horses and there is evidence that he constructed a race track. Actual location of the track has not been clearly established.

McKinney also raised hogs and was an innovator in raising sheep. In fact, he is thought to be one of the first to import sheep in an attempt to improve native breeds.

A limekiln was also located near the creek, leading to speculation that local limestone was used for mortar in constructing the buildings.

The McKinney house remained intact for nearly 100 years, when a fire in the 1940s all but leveled it. Only preserved ruins remain. A structure, believed to be a horse trainer's cabin, stands almost intact.

McKinney attained stature as a public servant as Galveston's senator in 1846, and representative in 1849, and as the Travis County representative in 1857. He was also a Travis County Commissioner.

As the turbulance of the Civil War approached, McKinney's unionist feelings became vocal. He did not want the Union to split, primarily, it is assumed, so his Eastern trading connections would not be disrupted.

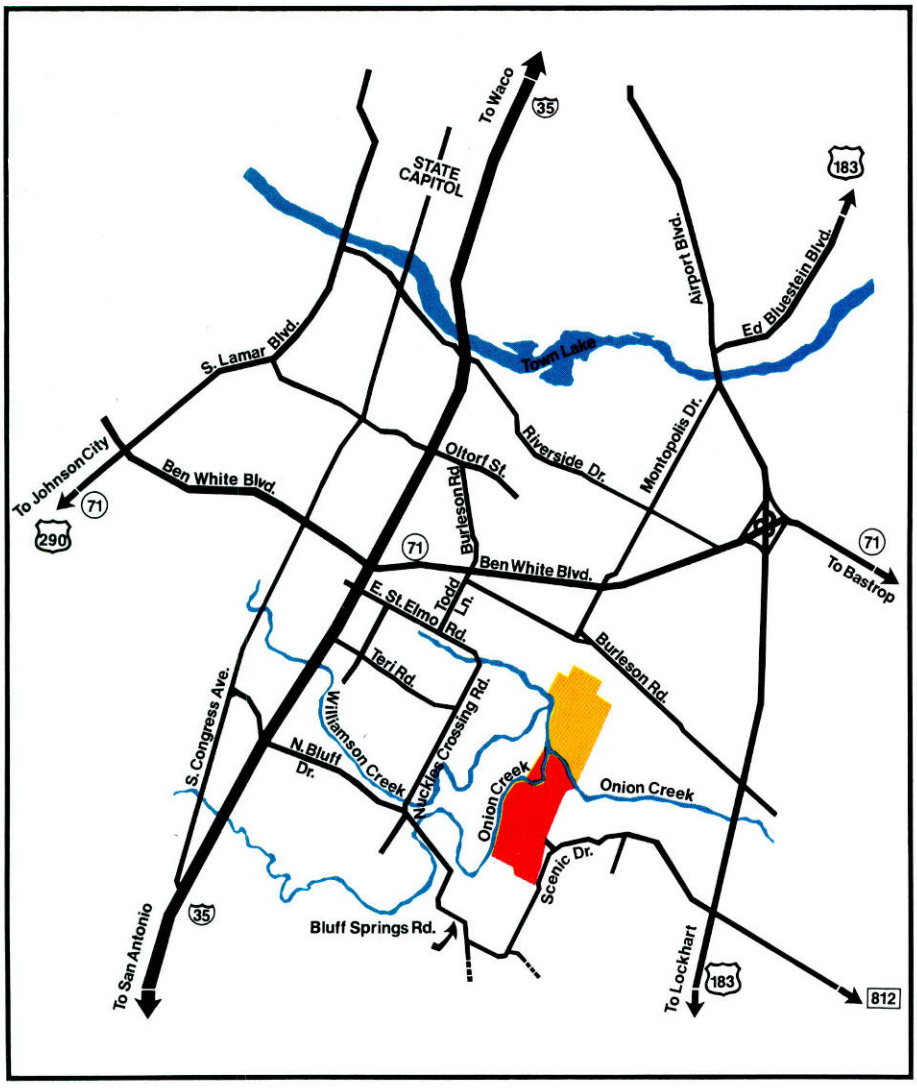
In time, as Texas sentiments were drawn to the Confederacy, McKinney went along with public opinion in favor of secession. Too old to serve in the front lines, McKinney was confined to the role of a supply agent.

He also went heavily into cotton speculation at this time, which proved to be his undoing. Considerably overextended at the end of the war, he was forced to sell off large sections of land to meet rapidly mounting debts. By 1870 a civil suit was lodged against him for collection of debts, and more property sales followed until he died in 1873 at the age of 72 of a kidney ailment. After his burial in Austin, his wife Anna continued selling parcels of land to pay off his debts. She eventually retained some 400 acres, now largely included within the park property.

By 1891 most of that land had been sold to the grandfather of J.E. and Miss Annie Smith, and the Smith family retained possession of the land for more than 75 years. In 1970 the 632 acres which comprise the heart of the park were donated to the state by J.E. "Pete" Smith and his sister, Miss Annie Smith.

This beautiful parkland contains pecan, Texas persimmon and deciduous yaupon. The rolling terrain adjoining Onion Creek is heavily wooded with live oak, cedar elm and red cedar. Rare Texas peach bushes, located around the camping and picnic areas, comprise the second largest colony of the tiny fruit found in Central Texas.

Pay a visit to McKinney Falls State Park and see for yourself its natural beauty. You'll enjoy this new Central Texas park. **



Using the map at the left, visitors should have no difficulty locating McKinney Falls State Park. Those entering Austin on Interstate 35 from either the north (Waco) or south (San Antonio) should find the Ben White Boulevard exit (Texas Hwy. 71) the easiest route to U.S. Hwy 183. A highway sign on U.S. 183 will then direct the way to the park via Scenic Drive. The only public access to the park is by the entrance on Scenic Drive, regardless of the route used to reach this point. At the present time there is no vehicular access to the park area designated in yellow.

Photographs by J. A. Germany

Spaghetti Plant

The dodder (left), is one of the few wholly parasitic plants found in the United States. After germinating in the ground, the seeds send up tendrils that first entwine the host, then attach themselves to it with suckers. The tendrils (above) sometimes become so massive that they completely cover the host plant and eventually kill it.

by Lucy Germany

People notice it, examine it and comment on it, but not many of them know what it is.

It looks like orange, yellow or greenish-yellow spaghetti, or a wild tangle of fishing line disarrayed by a bad cast, and it grows prolifically along Texas roadsides in late spring and early summer. This plant, called dodder, is not only bizarre in appearance, but also of some concern to farmers because it attacks crops such as clover, flax, alfalfa, lespedeza and other legumes. Some species are also parasitic on woody hosts such as walnut, oak, elm, sumac, grape and persimmon.

Dodder is one of the few wholly parasitic plants found in the United States. Although some species show some evidence of being able to produce chlorophyll, the twining herb gets all of its nourishment from the host plant. As soon as its seeds germinate and the stems entwine and entangle themselves to the host plant, the dodder seedlings lose contact with the earth and set their suckers (technically called haustoria) into the stems of the host plant. From this point on it curls and winds in the most intricate way imaginable, often completely covering the host plant with yellow or

Bruce Snyder

Dodder blooms all summer and into fall, with its white, four- or five-petaled flowers attached to the stem in clusters. Look closely and you will see blooms, unopened buds and seed pods. Although it is not green and has no leaves, dodder is a plant and a member of the morning glory family.

orange masses of stems and clusters of small, white, inconspicuous flowers.

Not a particularly pretty sight, dodder is an interesting phenomenon of the plant world. Though it is not green and has no leaves, it is still a plant. It is a member of the morning glory family, but there is little obvious resemblance. Its white, four- or five-petaled blooms are attached closely to the stem in tight clusters. Small scales help the dodder attach itself to the host plant. The stems come in yellow, pale orange and an almost-brown, deep burnt orange. They sometimes become so massive that they completely cover the host and kill it.

Dodder blooms throughout the hot summer and into the fall, shedding its seeds, usually four from each flower, to the ground to start the whole annual cycle again.

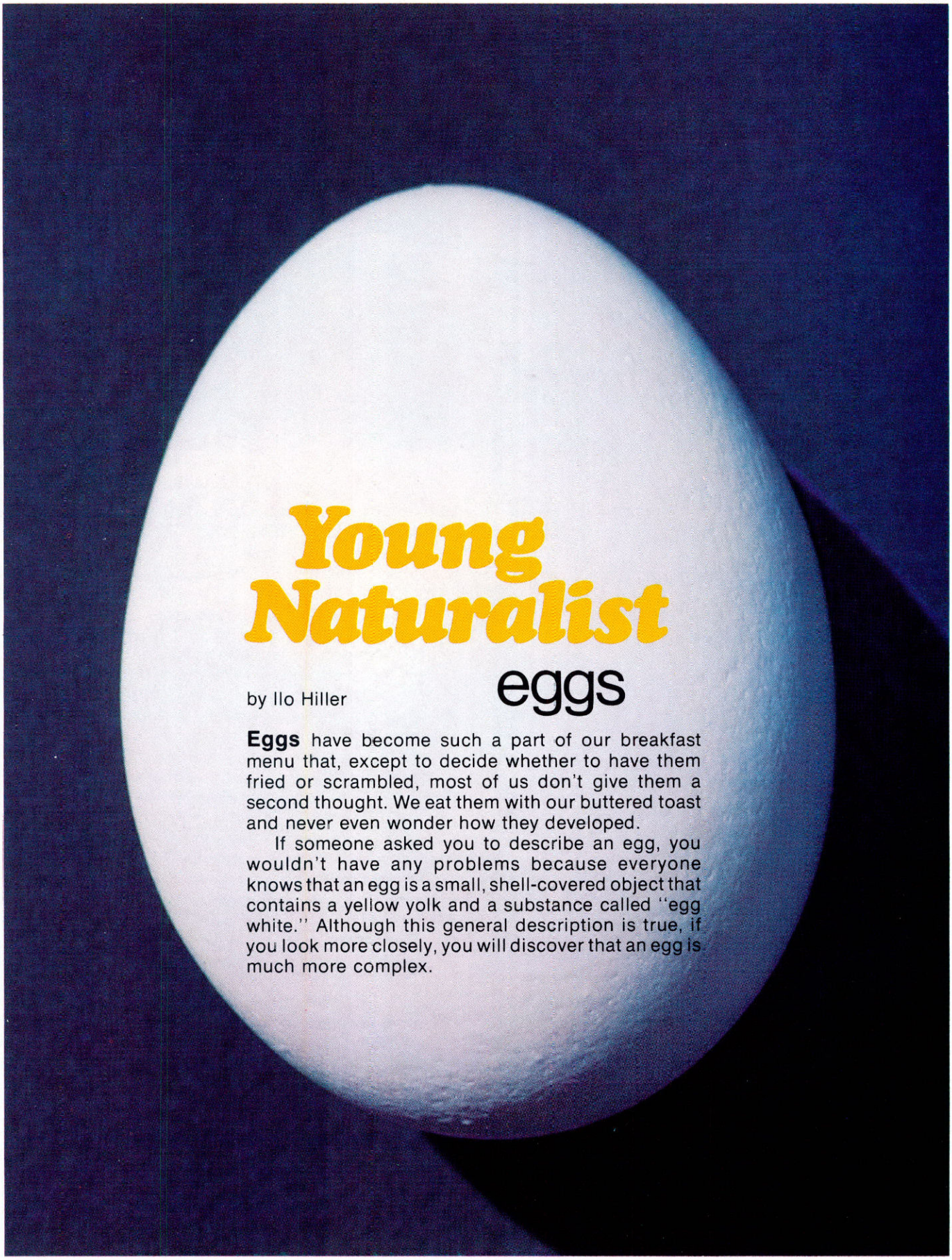
There are 24 species and varieties of dodder in Texas alone, some 170 of them exist throughout the world, mostly in the Americas. In some areas dodder is called love vine because of its caressing nature. Other common names include angel's hair, tangle gut, witches shoelaces, devil's gut and strangle vine.

No state of the United States is free of it with the possible exception of Maine and its near neighbors and a small area around the Great Lakes.

The plant bears the genus name *Cuscuta* (Arabic derivation meaning clinging plant). Several common species in Texas are *indecora* (not in good taste, not conforming); *cephalanti* (derived from the Greek word for head); and *gronovii* (named for Ivan Gronovius, a Dutch botanist famed as the teacher of Linnaeus, the Swedish naturalist who established the modern method for naming plants and animals).

Next time you see a patch of tangled yellow or orange spaghetti along the road, stop and make the acquaintance of this unusual plant curiosity. For a baffling game, try to untangle a length of it. You'll have to agree that dodder is one of the true wonders of nature. **

Neal Cook



Young Naturalist

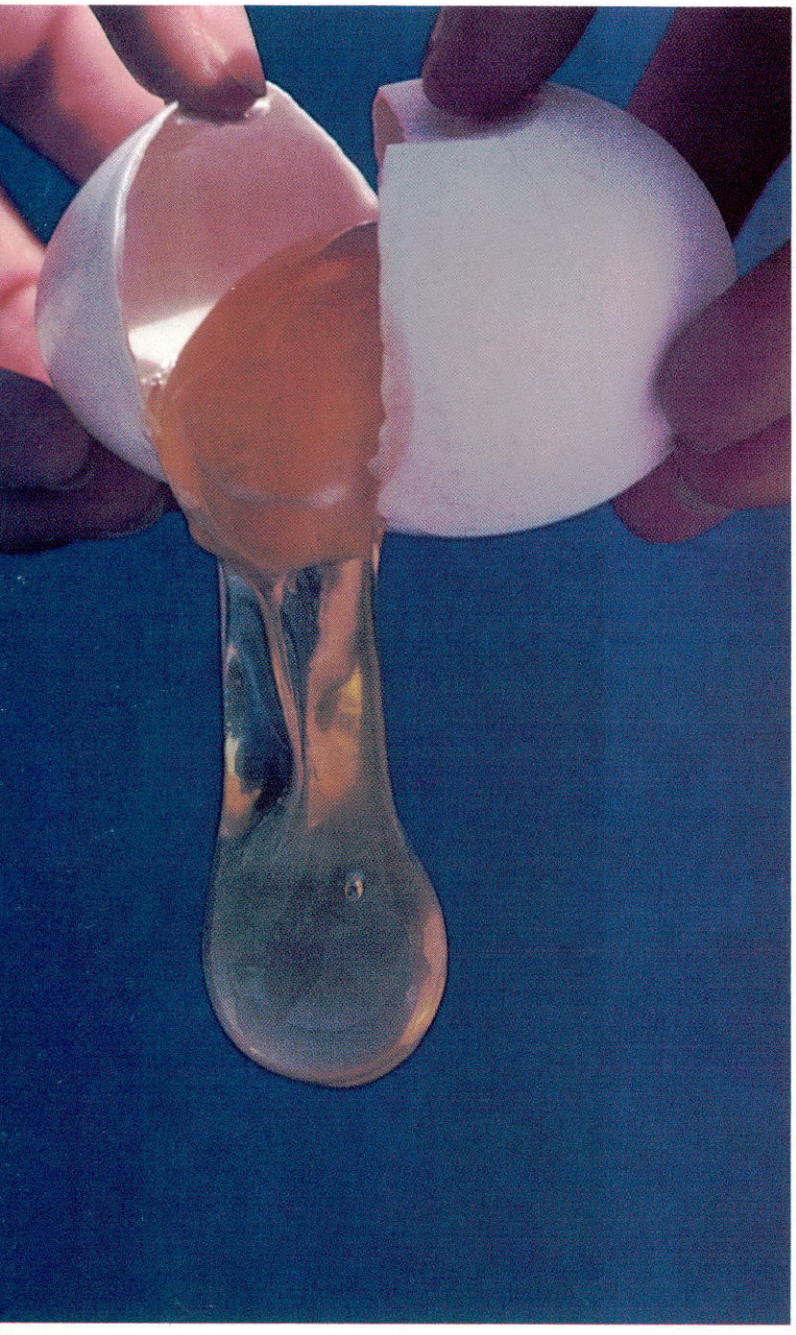
eggs

by Ilo Hiller

Eggs have become such a part of our breakfast menu that, except to decide whether to have them fried or scrambled, most of us don't give them a second thought. We eat them with our buttered toast and never even wonder how they developed.

If someone asked you to describe an egg, you wouldn't have any problems because everyone knows that an egg is a small, shell-covered object that contains a yellow yolk and a substance called "egg white." Although this general description is true, if you look more closely, you will discover that an egg is much more complex.

Located in almost the exact center of the unfertilized egg yolk on the right is the white germ cell area called the blastodisc. In a fertilized egg, this area is known as the blastoderm and is the point at which the young chick begins to develop. If you break an egg and do not see this spot, turn the yolk over to expose it. (The two brighter spots on the yolk are reflections of the lights used to photograph the egg.) The milky, ropelike substance at the top right edge of this yolk is a portion of the albumen, or egg white. Look at the edge of the shell being opened below and you will see part of the protective membranes added before the shell forms.



Neal Cook

Bill Reaves

Perhaps the easiest way to study an egg is to go back to the beginning when it is just a cell inside the female bird and follow along on its step-by-step development.

When a female bird is hatched, she already has inside her body the germ cells of more eggs than she will probably lay in her entire lifetime. At the age of three months, the young bird forms the first coating of yolk around one of these cells. As this yolk begins to develop, another cell receives its first coating. This action, repeated assembly-line fashion, insures that there will be several yolks in various stages of development inside the female bird at all times.

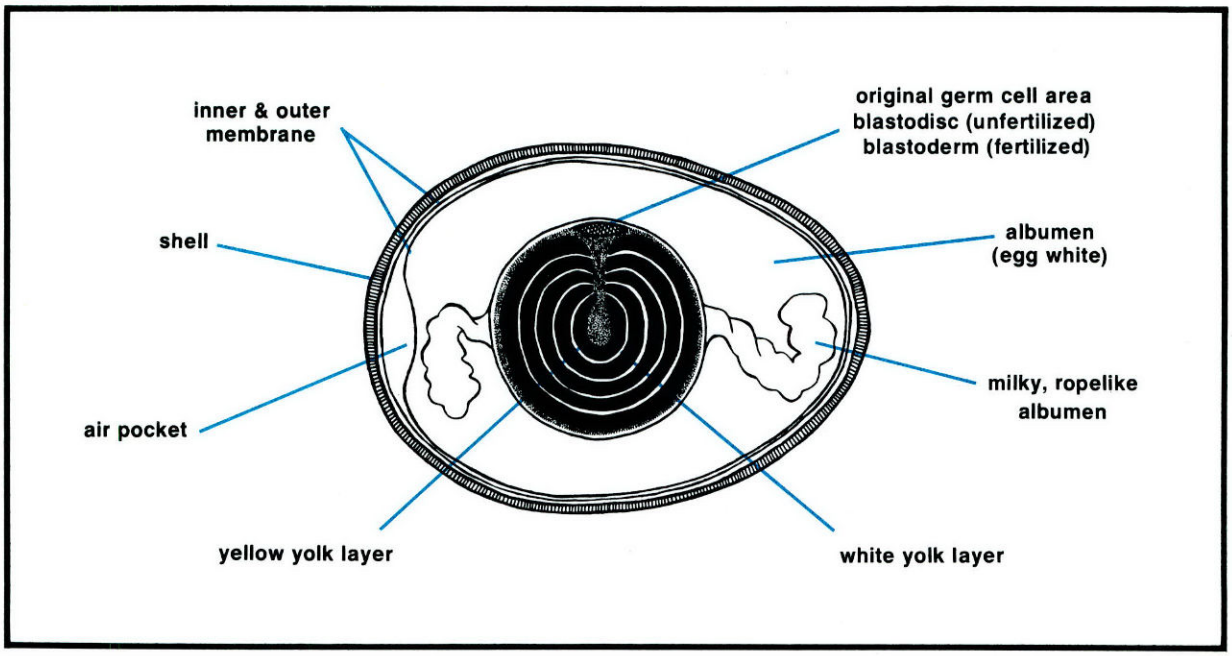
Microscopic studies have shown that an egg yolk is made up of six rings, each with a white and yellow layer. These layers are added to the cell in a strict rhythm determined by the position of the sun — the yellow layer during the day and up until midnight, and the white layer between midnight and sunup.

The springtime presence of a male bird causes a hormone change in the mature female which creates the final yolk layer. His courtship then triggers the finished yolk to break loose and fall into the oviduct, a tube which serves as a passageway for the egg as it moves through the next stages of development.

Most wild birds cannot lay eggs if there is no mate, but this is not true of domestic chickens, ducks and pigeons. Records show that one leghorn hen laid 1,515 eggs over an eight-year period and never saw a rooster.

If successful mating takes place, the egg is fertilized as it travels down the funnel-like oviduct. Unsuccessful mating, or the absence of a male as in the chicken's case, produces an infertile egg which will not develop into a young bird.

It takes about 20 minutes for the yolk to travel down to that part of the oviduct where the albumen, or egg white is produced. This albumen, like the yolk,



is made up of several layers and is gathered by the yolk over a three-hour period. The first layer is but a thin covering; however, the second is dense and tough. It serves as a shock absorber to protect the cell during the egg's drop to the nest and during the shifting and turning of the eggs by the female throughout incubation.

As the egg spirals down through the oviduct, a light, watery third layer of albumen is forced through the denser second layer and up against the yolk. The yolk now floats in this watery fluid and the tiny cell comes to the yolk's surface.

If you have ever looked closely at an egg before it has been cooked, you may have seen the original germ cell. It looks like a small white speck on the yolk. You may also have noticed the milky, ropelike matter attached to the yolk ends. These "ropes" are formed as the spiraling motion of the egg twists the albumen at either end of the yolk, and they keep the yolk anchored in the center of the egg. During incubation these ropes break and the female bird must turn the eggs occasionally to keep the yolks centered.

When the egg has received its albumen layers, it moves on to be wrapped in two white sheets of tough membrane. Formation of these membranes takes about an hour and 10 minutes. Then the egg drops into the shell-producing area of the oviduct. Here it stays for about 19 hours while the shell is added in four porous layers.

During the last of these hours, the shell receives its coloration. Although one-fourth of all bird species lay white eggs, the rest are colored in some manner. They may be spotted, blotched or marbled with various colors or they may be a solid color such as olive green or sky blue. The last eggs laid in the nest are often paler or have fewer spots than the first ones. Coloration can also vary from one bird to another within the same species. Since color pigments are obtained from the food eaten by the female, a difference in diet may be the reason for these shell color changes.

Yolk color also depends upon the food eaten by the female. You may have noticed that your breakfast eggs sometimes vary from a pale yellow to a dark orangish-yellow. Wild bird egg yolks vary from very pale yellow to a dark red that is almost a maroon.

Once the egg is laid, air enters through the pores in the shell and an air pocket is formed at the blunt end of the egg between the two membranes. This air cell provides oxygen for the developing bird during incubation.

Occasionally an abnormal egg is produced when something goes wrong with this natural assembly line. Double- or triple-yolked eggs occur when two or three yolks enter the oviduct at the same time and all are surrounded by the albumen, membranes and shell of a single egg. Such eggs are considered rare. Records show that only one out of every 500,000 chicken eggs has two yolks and one out of every 25,000,000 has three yolks.

Yolkless eggs may also occur if something prevents the yolk from entering the oviduct. In this rare case only the white gets enclosed in the shell and the egg is usually smaller. In the case of a chicken, the egg will be about pigeon-sized.

If something goes wrong with the shell-secreting area or if the bird's diet has an extreme lack of calcium, a "soft-shelled" egg may be laid. This egg will be surrounded only by the two membranes.

These abnormalities, although described for the domestic chicken, also occur among the eggs of other birds. However, considering the number of eggs produced, the errors are quite small.

Tomorrow morning as you eat your breakfast, stop and think about that egg on your plate and the miraculous assembly line from which it came. **

LETTERS TO THE EDITOR

Saltwater Collecting

I really enjoyed your articles on saltwater fish and aquaria in the February issue. However, I believe the article "How To: Set Up a Saltwater Aquarium," though good overall, needs some comments.

To begin with, the opening line, "Maintaining a marine aquarium is no more difficult than keeping a freshwater one . . ." just simply isn't true. However, to those of us who have been bitten by the saltwater aquarium bug, the extra work, study, disappointments and heartbreaks are more than compensated by the excitement, pleasure and satisfaction that comes from a well-established saltwater tank.

The article you carried seemed to be written basically for people who live inland, I believe. For those of us who live on the coast, an aquarium filled with salt water from the Gulf and stocked with native fish we have collected ourselves can be a most absorbing hobby. Water from the Gulf *can* be used if you have a good motorized outside back filter in addition to the undergravel filter.

This type of aquarium is so much more exciting than store-bought fish in artificial sea water. And you don't have to be a young, athletic skin diver to collect your own fish specimens. I, myself, am a little old lady in tennis shoes, and I do quite well with a dip net and seine.

We are many. Next time you're at the beach, look for us. You'll see us collecting on the jetties or dipping up and combing through sargassum weed or seining the grassy bays. You'll recognize us by our assortment of dip nets, plastic buckets and air pumps.

Mrs. S. E. Kelly, Jr.
Corpus Christi

Flopped Photo

Your January 1976 issue's caption for the inside front photo states "Sophisticated photographic equipment is not necessarily a requirement for a good photograph . . ." This was admirably borne out by your positioning of the inside front photo — backwards. Man doesn't need the air of science to err.

Thanks from a camera bug for the corresponding article and photos on nature photography.

James W. Martin Jr.
Metairie, Louisiana

■ Your letter was not the only one we received concerning the inside front cover photograph. We ran the picture reversed for layout purposes not realizing it would cause some of our readers to believe that left-handed Nikons were now on the market. We'll try to be more careful in the future.

Food Coloring Questioned

Banning further use of Red Dye #2 in foods, drugs and cosmetics because of the latest Food and Drug Administration studies might also raise the question of the safety factor in using red food coloring in the hummingbird feeders as was suggested in the hummingbird article "Sparkling Acrobats" in the April 1976 issue.

Perhaps the use of natural red colorings such as beet or berry juices would be more advisable, providing a close check for earlier spoilage were made. If you do not want to try these natural colorings, use the clear mixture and rely on the red coloring of the feeder itself to attract the birds.

Midge Randolph
Fort Worth Audubon Society

■ Our hummingbird article was already in print by the time the ban on Red Dye #2 was made, and we appreciate your bringing this item to our readers' attention.

BACK COVER

Visitors to the newly opened McKinney Falls State Park can enjoy the scenic qualities of historic Onion Creek as it flows through the park. Long before the days of the automobile and highway, travelers going from Austin to the coastal settlements around Port Lavaca followed a winding wagon trail that forded Onion Creek at its only natural crossing point for miles around, located about 200 feet upstream from the limestone ledge stepdown that became known as McKinney Falls. Photo by Frank Aguilar.