

TEXAS

PARKS & WILDLIFE

LIBRARY
ABILENE CHRISTIAN COLLEGE
ABILENE, TEXAS



LIBRARY
MAY 26 1975
PAN AMERICAN UNIVERSITY
EDINBURG, TEXAS

April 1972 • 50¢



PRESTON SMITH
Governor of Texas

**PARKS AND WILDLIFE
COMMISSION**

JACK R. STONE, Chairman Wells
PEARCE JOHNSON Austin
HARRY JERSIG San Antonio
MAX L. THOMAS Dallas
JOE K. FULTON Lubbock
BOB BURLESON Temple

**PARKS AND WILDLIFE
DEPARTMENT**

JAMES U. CROSS Executive Director

ASSISTANTS

GEORGE H. COOK Legislative Affairs
GEORGE C. ADAMS Land Acquisition

DIRECTORS

RON D. JONES Planning
ROY T. HUFFMAN Current Operations
JOHN D. MACKLIN, JR. Personnel and
Administration
RICHARD A. MCCUNE Information and
Education
SAMUEL W. KENDRICK, JR. Support Services
CLAYTON T. GARRISON Finance and
Data Processing

REGIONAL DIRECTORS

Region I. HENRY BURKETT, San Angelo
Region II. A. W. LEWIS, Waco
Region III. JOHN M. CARLISLE, Tyler
Region IV. ERNEST MARSH, JR., La Porte
Region V. TOM D. MOORE, Rockport

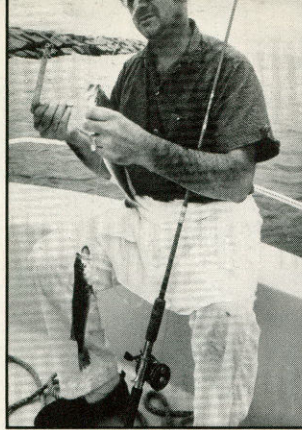
**TEXAS PARKS & WILDLIFE
magazine**

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

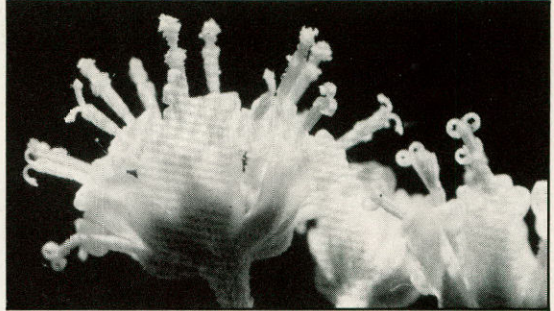
NEAL COOK Editor
DAVID BAXTER Associate Editor
ILO HILLER Assistant Editor
ANNETTE MORRIS NEEL Art Editor
JIM WHITCOMB Photo Editor
ETHEL SPECK Advertising-Circulation

Published monthly by the Texas Parks and Wildlife Department, John H. Reagan Bldg., Austin, Texas 78701. Republication of material is not permitted except by special written permission. The inclusion of advertising is considered a service to subscribers and is not endorsement of products nor concurrence with advertising claims. Rate schedule available upon request. Subscription rates: \$3.15 for one year and \$5.25 for two years. Single copies and all back issues, 53¢. Prices include 5 percent sales tax for Texas residents. Foreign subscription rates: \$4.00 for one year, \$7.00 for two years.

Postmaster: If undeliverable, please send notices by form 3579 to Reagan Building, Austin, Texas 78701. Second class postage paid at Austin, Texas, with additional entry at Oklahoma City, Oklahoma.



April 1972; Vol. XXX, No. 4



12

2



**TEXAS
PARKS & WILDLIFE**

- Flowers** by David Baxter 2
April is the start of the most beautiful season for the state's 5,000 species of wildflowers.
- Toward Better Fishing** by David Pritchard 12
Department biologists are working to streamline Texas' freshwater management techniques.
- Saltwater Favorite** by L. D. Nuckles 16
The mainstay of Texas coastal sport fishing is a tasty fish which bites on almost any lure.
- Fiddleback** by Dr. Kenneth W. Stewart 20
If having the black widow in Texas wasn't bad enough, a poisonous little brown spider has now moved into the state.
- Turkey Talk** by Elroy L. Young 24
Tune up your turkey call and get ready for another spring gobbler hunting season.
- Skink** by Joan Pearsall 26
These shy reptiles are unfamiliar to most outdoorsmen despite the fact that there are nine or 10 species in Texas.
- Beaks and Bills** by Ilo Hiller 30
Birds have developed beaks to fit every item on the menu—seeds, insects or fish.

Outdoor Books 10 Long Shots, Short Casts. 11
Photo and Art Credits 11 Letters to the Editor 32

Outside Front: A crab spider, *Misumena* sp., blends with its background and lies in wait of prey. Photo by Jim Whitcomb.
Inside Front: Our national emblem is an impressive bird victimized by pesticides and habitat loss. Photo by Tim Fulfer.





the earth becomes covered with flowers

by David Baxter

Flowers are color, and they reflect the seasons of the year in the hues of their petals.

The flowers of spring are vibrant and full of renewed life. Their life is startling in contrast to the seeming death of winter. The poppies at my grandfather's always amazed me; one day they would be shrouded from the chill of early spring in coarse green palls, the next day they would throw off their covers and spill crimson over the black soil.

Summer colors are reflections of the sun. The flowers have their colors baked on like the glazes of pottery fired in a kiln. And, like earthenware, they are brittle and ready to chip if mishandled. Those flowers which cannot compete with the sun retreat to the shade and luxuriate while the hardy bask themselves.

Heat persists during the Texas autumn but the color of summer grows tired and hazy. The new strength of spring and summer settles down to more sensible tones. Mature colors of fall know the end is nearer than in the first flush of April exuberance.

Dead my fine hopes
And dry my dreaming
But still . . .
Iris, blue each spring.

Shushiki

Their life is startling



Green Thread, *Theleesperma filifolium*



Verbena, *Verbena* sp.



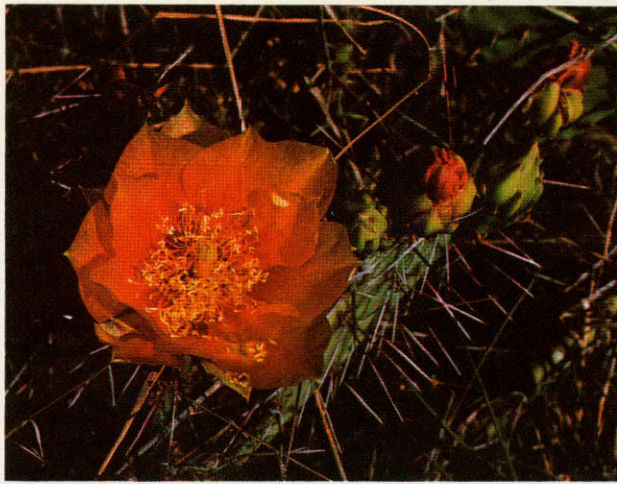
Lily, *Nemastylis* sp.



Texas Paintbrush, *Castilleja indivisa*

Hymenopappus artemisiaefolius

Opuntia lindheimeri



Passion Flower, *Passiflora incarnata*



Colors baked on like glazes

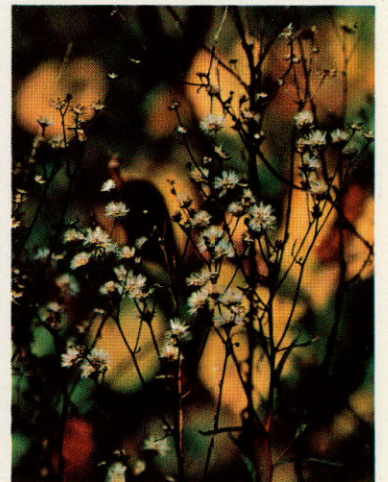




Mature colors of fall



Buttercup, *Ranunculus* sp.



Aster, *Aster* sp.

OUTDOOR BOOKS

REPTILES AND AMPHIBIANS OF NORTH AMERICA by Alan Leviton; Doubleday & Co., Garden City, N.Y.; 250 pages, \$9.95.

Another excellent book in Doubleday's North American wildlife series has been released; and like the volumes *Birds*, *Insects* and *Mammals* (reviewed January 1972 *Texas Parks & Wildlife*), *Reptiles and Amphibians* contains beautiful color photographs which alone make the volume worth having. Everything from pale pink salamanders and egg-laying toads to multicolored snakes and loglike alligators fill the 250-page book.

If you have wondered whether the horned lizard really squirts blood from its eye, rest assured that it does. Photographic proof appears on page 118 and the text explains that "the blood comes from a sinus at the base of the nictitating membrane, the third or inner eyelid."

If your interests go beyond pretty pictures, you will not be disappointed with Alan Leviton's *Reptiles and Amphibians*. Of course, you cannot expect a complete natural history for approximately 2,700 species of amphibians or 6,000 species of reptiles, but the general information is presented well.

Leviton prefaces his book with the fact that reptiles and amphibians date back more than 300 million years and have been able to adapt, so far, to earth's changing environment. However, man has so speeded up the changing process that none of our flora and fauna is safe, not even the reptiles and amphibians. Chemical, thermal and radioactive pollution are drastically changing earth's watery world. The author bemoans that "Because of the bleakness of our future it becomes awesomely uncomfortable to think that this volume, as well as the others that appear in this series, may stand as an ultimate requiem for the fauna of North America."

Leviton then goes on to introduce the different orders of amphibians and reptiles with specific information on many species. He ends the book with a short chapter on how to keep reptiles

and amphibians as pets in case the book has stirred your interest as an amateur herpetologist.

So, if you are interested in salamanders, frogs, toads, lizards, snakes, turtles, alligators or crocodiles, Leviton's book is the one for you.—Ilo Hiller

THE WORLD OF THE BOTTLE-NOSED DOLPHIN by David K. Caldwell and Melba C. Caldwell; J. B. Lippincott Company, New York, N.Y., 1972; 157 pages, \$5.95.

Anyone familiar with the Living World series published by the J. B. Lippincott Company will be pleased with *The World of the Bottlenosed Dolphin*. However, readers may find some of their pet theories about dolphins exploded by the experiences and observations made by the authors.

I thought dolphins ranked pretty high on the intelligence scale and would probably rank even higher when humans developed a common language in which to communicate with them. The Caldwells, however, class them as "...exceptionally amiable mammals with an intelligence now considered by most workers, on a subjective basis, to be comparable to that of a better-than-average dog."

Also, contrary to the popular belief that dolphins can "talk," the Caldwells claim that, while dolphins communicate with each other and humans in many ways, they do not actually talk to humans.

Controversies resulting from such separate viewpoints among scientists have resulted in extensive studies of dolphins. Much of this research is being conducted in such places as Marineland of Florida where the Caldwells study and observe dolphins.

As in the studying of any animal, long-term, detailed observations of all ages and sexes must be made to determine what is considered "normal behavior" for dolphins. Studies are presently being conducted on hearing, sound production, sound location, vision, touch, smell, taste and communication. Brief information on these

studies is presented by the Caldwells. Regardless of your personal viewpoints on dolphin intelligence and potential, you will find most fascinating this presentation of dolphins as they play, fight, breed and raise their young.—Ilo Hiller

SEA SHELLS OF THE TEXAS COAST by Jean Andrews, photographs by Jean Bowers Gates; University of Texas Press, Austin and London, 1971; 298 pages, \$17.50.

Most visitors to the Texas beaches have paused to pick up and examine a few sea shells and delight at the variety to be found. In attempting to identify his find, the collector had to use books and field guides which include descriptions of specimens from both coasts of North America, from Florida and the Caribbean.

Few books with scholarly descriptions accurate enough to separate similar species are suitable for use by the layman. Still fewer, if any, books tell the collector how to go about his hobby, where to go and how to get there. Jean Williams has managed to put all this information together in her *Sea Shells of the Texas Coast*.

No field guide, this, but a substantial, well-illustrated volume with 369 superb mollusk photographs and 65 line drawings. The author opens with a historical and physical description of the Texas coast to familiarize the reader and pique his interest to follow the footsteps of early Spanish explorers down the still-remote beaches of Padre Island.

A description of the general features of the mollusk follows. It is here that the author deftly introduces the layman to terminology necessary to define differences in species which may look the same to the unschooled eye.

This easy to read section leads the reader to the meat of the subject: the systematic descriptions. Included here is a photograph and text on each shell which includes name and description of size, color, shape, habitat and range.

Included with each description are the author's remarks with nuggets of information and tips to the collector. For example, "This shell is said to be rare, but at times it can be picked up by bushfuls along the Mexican coast just south of the Rio Grande."

Although not trained primarily as a biologist, Andrews has done her field and homework well. She has compiled an excellent reference book for the amateur and professional alike.—Terrence R. Leary

LONG SHOTS SHORT CASTS

Front Cover—Jim Whitcomb; Nikon-F, Micro-Nikor w/bellows; Kodachrome II.

Inside Front—Tim Fuller; Nikon-F, Micro-Nikor; Kodachrome II.

Page 2—Whitcomb; Nikon-F, Micro-Nikor; Kodachrome II.

Page 3—Reagan Bradshaw; Nikon-F, Micro-Nikor; Kodachrome II.

Pages 4-5—Whitcomb; Nikon-F, Micro-Nikor w/bellows; Kodachrome II.

Page 5 (upper left)—John Suhrstedt; Hasselblad 500C, 80mm w/tubes; 2¼ Ektachrome. (upper)—Whitcomb; Nikon-F, Micro-Nikor; Kodachrome II. (middle)—Suhrstedt; Hasselblad 500C, 80mm; 2¼ Ektachrome. (lower)—Neal Cook; Nikon-F, Micro-Nikor; Kodachrome II.

Page 6 (upper left)—Paul Hope; Nikon-F, Micro-Nikor; Ektachrome X. (upper right)—technical information not available. (lower)—Cook; Nikon-F, Micro-Nikor; Kodachrome II.

Page 7—Whitcomb; Nikon-F, 300mm; Kodachrome II.

Page 8—Whitcomb; Nikon-F, Micro-Nikor; Kodachrome II.

Page 9 (upper and lower left)—Whitcomb; Nikon-F, Micro-Nikor; Kodachrome II. (lower middle)—Cook; Nikon-F, Micro-Nikor; Kodachrome II. (lower right)—Whitcomb; Nikon-F, 400mm; Kodachrome II.

Pages 12-13—David Pritchard; T.I.N.A.

Page 13 (lower left)—Pritchard; T.I.N.A. (lower right)—Bill Reaves; Nikon-F, 80-200mm, Kodachrome II.

Page 15 (upper and lower)—Reaves; Nikon-F, 55mm; Kodachrome II.

Page 16—Leroy Williamson; Hasselblad 500C, 80mm; 2¼ Ektachrome.

Pages 17, 18 and 19—Whitcomb; Nikon-F, 50mm; Kodachrome II.

Page 21—Dr. Kenneth Stewart; Practica FX2, w/portrait lenses; Kodachrome II.

Page 22—Suhrstedt; Hasselblad 500C, 80mm w/tubes; 2¼ Ektachrome.

Page 23 (left and right)—Stewart; Practica FX2, w/portrait lenses; Kodachrome II.

Page 24 (upper)—Williamson; Hasselblad 500C; 250mm; 2¼ Ektachrome. (lower)—Tate Pittman; Nikon-F, 50mm; Kodachrome II.

Page 25—E. L. Young; T.I.N.A.

Pages 26 and 27—John L. Tveten; Minolta SR-7, 55mm; Auto Rokkor w/Soliger 2x Extender; Ektachrome-X.

Pages 30-31—Margi Adey, pen and ink on illustration board.

Inside Back—Henry Compton; colored pencil and gouache.

Outside Back—Reaves; Nikon-F, 400mm; Kodachrome II.

compiled by Neal Cook

Exotic NoNo: For several years individuals and some government bodies have been praising the grass carp, also known as the white amur. The California Department of Fish and Game recently completed a study of the fish and decided that the fish should probably be listed as a prohibited species which cannot be introduced or possessed in that state. The grass carp is a native of China and Siberia which may reach 100 pounds, and has been considered for control of aquatic plants. But the fish may possibly reproduce and overpopulate the waters. Since it feeds at the bottom of the food chain it could completely change the environment into which it is introduced by direct and indirect competition with native species.

It's Your Land: In 1969 the Federal government began a program to raise the fees charged ranchers for grazing livestock on Federal lands to make these fees closer to those paid on private lands. This program was begun with promises of yearly increases for 10 years. In 1969 the fee was increased, in 1970 the government decided not to increase the fee, in 1971 the fee was increased, but now in 1972 the government decided that the fee should not be raised as much as was first proposed. At this rate it will take 20 years to bring the fees up to a more realistic charge and by then the fees will probably again be one half the charge on private property.

Words For '72: Whatever the cost of living is, it's worth it.

Indochina Environment: During the Indochina Conflict the United States has sprayed 100 million pounds of herbicides over prime forests in battlezones to destroy vegetation in an area the size of the State of Massachusetts (5½ million acres).

Natural Resistance: A meeting of three California Mosquito Abatement Districts has revealed that DDT and other insecticides are not controlling the mosquitos there anymore. The groups began using DDT in 1947 and reported that by 1949 the chemical was useless because of the insect's natural resistance. They changed to the use of toxaphene, but by 1951 this was ineffective. Methyl parathion was then tried. Mosquitos became resistant to it by 1962 and Baytex was used. The control experts now say that the mosquitos are resistant to all poisons applied.

TOWARD BETTER FISHING

Work at Heart of the Hills station
will benefit
every Texas freshwater fisherman.

By David Pritchard
Fisheries Biologist

Freshwater lake management in Texas is going to leap into the present.

While scientists have the technology to probe the moon and the ocean's floor, they have yet to develop the technology needed to revive a poor fishing lake.

Computers which analyze 100 years' computations in a split second are virtually unemployed when it comes to solving the problems of inland lakes.

But Texas Parks and Wildlife Department biologists hope they are nearing a renaissance. They envision the day when they can feed a lake's vital statistics into a computer and have within seconds a comprehensive program for the reservoir's revitalization.

In past decades the term "fish stocking" was magic. The theory was that a lake's fishing potential was directly related to the number of fingerling fish dumped into it. Unfortunately, in most cases the fingerlings proved to be nothing more than expensive food for the predator fish already in the lake.

Only in the case of a new lake—or one which has been drained or treated chemically to remove existing fish—is stocking of much value. A new lake stocked with game fish will usually experience a population boom and resultant good fishing.

But as a lake ages, its value as a sport fishing area usually fades. Biologists have no trouble analyzing the lake's problems. Some of these problems are siltation, pollution, noxious vegetation and expanding rough fish populations. But it is the lack of solutions which has kept lake management in the Dark Ages for so long.

Department biologists feel some of

the needed solutions are coming to the surface as a result of studies underway at the Heart of the Hills Fisheries Experimental Station near Kerrville. The station includes a series of controlled-environment lakes, and it has laboratories to handle a wide variety of fisheries experiments.

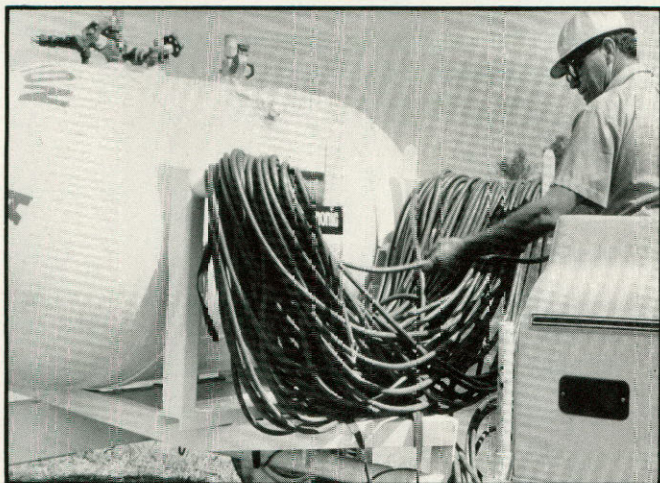
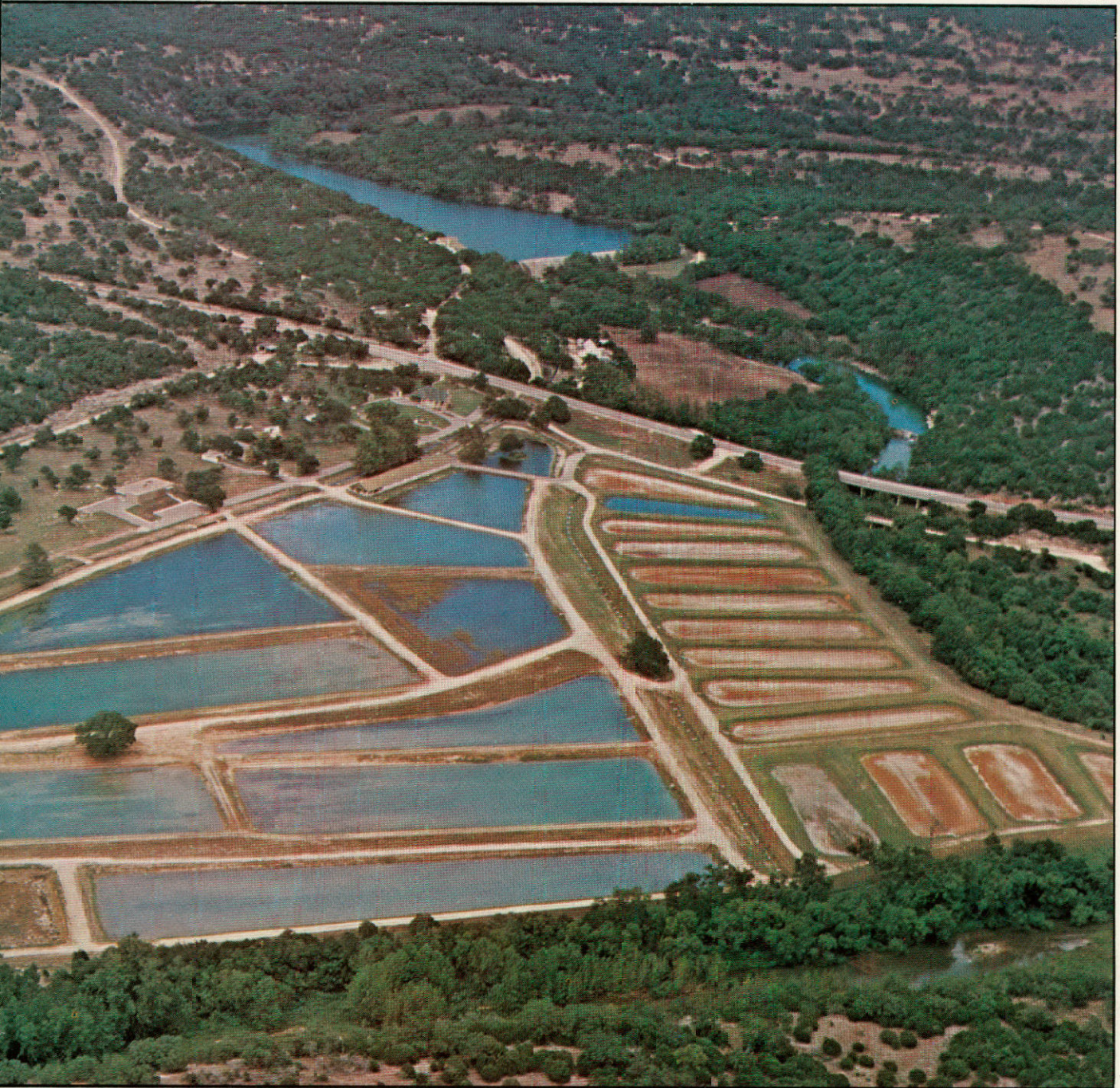
Do fisheries biologists already have methods to manage the state's gigantic artificial impoundments? Yes, but many of these techniques conflict with the primary purpose of a lake or they are expensive and must be applied without assurance that the improvement in fishing will be enough to justify the cost. Here are some of the management techniques being used to help provide the sportsman better fishing.

TRANSPLANTED SPECIES—The stocking of exotic species into Texas waters holds a great deal of promise, but this practice is in an experimental stage at present. Striped bass, walleye, northern pike and rainbow trout have been introduced into suitable Texas waters, but with varying degrees of success. Biologists always study the exotic fishes' habits to determine if they might harm native game fish populations before initiating a stocking program. The vast populations of carp—considered by most as an undesirable fish—serve as a reminder of what can happen when a species is stocked without regard to its long-range effects.

Many of the exotic species under consideration feed on rough or forage fishes and do not occupy the same portions of a lake used by native black bass, crappie and catfish. The striped bass, for example, can pursue open water forage fishes such as shad, par-



The experimental station is tucked away in the Hill Country near Kerrville. Most of the original ponds were renovated and laboratories, offices and a library were built. Equipped with the new facilities, the station is developing fish marking techniques, studying fish mortalities associated with hooking and studying the effects of ammonia on aquatic life. Ammonia occurs naturally and may be an effective check on undesirable aquatic plants and fish. Bottom samples are taken in the lower right photo to determine the chemical's effects on benthic organisms.



David Pritchard



Bill Reaves

ticularly larger shad which are largely ignored by native fish.

STOCKING NATIVE FISHES—Hatcheries throughout the state furnish large numbers of small bass and catfish for stocking new or renovated waters. The fish can give a boost to new lakes or to existing lakes which for one reason or another have insufficient numbers of game fish. Again, however, studies show that lakes with existing fish populations are usually not helped with the stocking of small game fish.

DEVELOPING HABITAT—Brush shelters, reefs, stream improvement structures, fertilization, vegetation control and lake level fluctuations help furnish more living space and food for aquatic animals. They also concentrate the sport fish so fishermen can more easily catch them. The basins of many man-made reservoirs are so carefully cleaned that little habitat remains for sport fish. These lakes may have good initial fishing, but the addition of habitat development programs would probably prolong fishing.

REHABILITATING IMPOUNDMENTS—As large impoundments grow old, rough fish far outnumber the game fish. Chemically removing the fish or completely draining the lake have been considered as the only practical methods of eliminating rough fish. The lakes that are chemically treated or drained are restocked with sport fishes, and good fishing is temporarily restored.

REGULATING SPECIES—Laws governing size and possession limits and methods for legally harvesting fish are helpful if correctly applied. These regulations are effective management tools only if they are based on the results of scientific observations which allow the catching of the highest number of fishes.

To understand why aquatic biologists do not have all the information and techniques they need to completely manage freshwater fisheries, we must consider the history of fishery management. Man's attempts to manage fish for recreation or food date back over 2,000 years. Fish management from that remote time to about 1900 A.D. was largely based on fish culture.

From 1900 to the 1930's the first attempts to understand and manipulate fish in natural and artificial lakes began. Only since the 1930's have modern management methods been emphasized. This has given modern fisheries workers only a little over 40 years to develop information and techniques to effectively manage a diverse and complex resource. Attempts to manage lakes and streams without a basic

knowledge of their ecology and the lack of facilities to conduct research have slowed the development of management techniques.

The experimental station was formerly the Ingram State Fish Hatchery. Thirty-one of the 46 original ponds were renovated in 1969 and 1970 to produce 11 large ponds ranging from 0.90 to 2.60 surface acres. The total number of ponds suitable for research was raised to 25. Most of the simulated pond and small lake research is being conducted in these ponds. All ponds are filled with clear spring water and are equipped with drains for evaluating the results of research programs and for recovering fish reared for studies.

The experimental station also has a new research building with offices, a library and two laboratories. One laboratory is being developed to hold and study fish and other aquatic organisms where environmental factors such as duration of daylight, water flow and temperature can be controlled. The second laboratory has been equipped with instruments capable of obtaining detailed analyses of biological, physical and chemical characteristics of lakes and streams.

Development of fish marking methods, the effects of ammonia on aquatic life and fish mortalities associated with various fishing methods are currently being studied at the station.

Any successful rancher has at his disposal several methods of marking farm animals for selective breeding, growth and reproductive observations. Fishery workers also need reliable tools to mark fish for research and culture studies. Many fish marking methods have been designed and tested within the past century, but most have not been acceptable because they were not retained by fish for more than a few weeks or because they killed large numbers of fish.

Two marking techniques are being tested on blue catfish and largemouth bass. Cold brands are applied with a branding iron cooled in a dry ice-acetone mixture. This freezes the skin and may leave a permanent mark. Anchor tags, applied with a special tagging gun, are inserted into the fish and a plastic "spaghetti" streamer containing information to identify the fish remains outside.

The fish are observed monthly to determine the retention of marks and the effects that marking has on growth, reproduction and survival. This information is compared with observations on unmarked fish in the same pond.

Rotenone has been the principal

chemical used to kill undesirable fishes for many years. Some fishes such as bullhead catfish, carp and gar are more resistant to the effects of this chemical than others and many may survive treatment. If a pond has extensive weed beds, rotenone may not penetrate far enough into them to control small stunted sunfish. When a pond is treated with rotenone, undesirable fishes sometime remain to immediately reproduce. When the pond is restocked with sport fishes, a large population of undesirable fish may be present to reduce the pond or lake's good sport fishing potential.

Ammonia is one naturally-occurring compound which may be more effective than rotenone for killing fish. The effects of ammonia concentrations on bottom-dwelling insects, water chemistry, plankton and fish and plant survival are being studied at the research station. Preliminary tests show that this chemical destroys both unwanted aquatic plants and fish. Ammonia is a fertilizer and stimulates the production of plankton which is important as food for young fish. Since ammonia is a natural compound, it degrades to nitrates and nitrites, thus furnishing the pond with additional fertility.

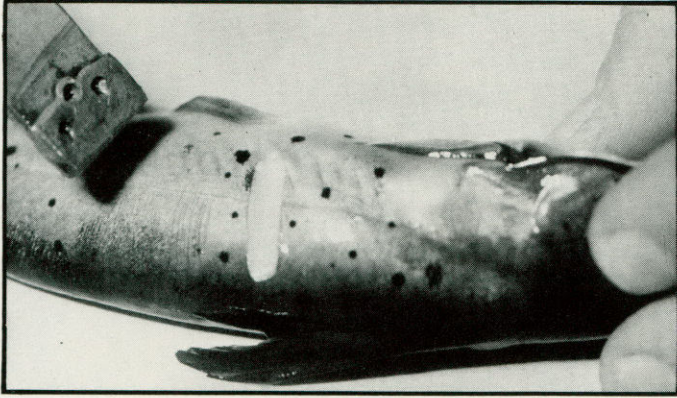
The study of the effects of hooking small channel catfish and largemouth bass has generated interest because public participation in this study will be necessary. This study will measure the mortality of fish resulting from the various methods fishermen use to catch, handle and release small catfish and bass. If most small fish survive the ordeal of being hooked and released, regulations might benefit fishing by requiring smaller fish to be returned to lakes to grow to a size large enough to furnish sport and food.

To study the effects of hooking, the station will be open to the public on Saturdays from 7:00 a.m. to 9:00 p.m. between April 1 and October 31. Six fishermen will be allowed to fish each tank. A maximum of 30 people per day will be allowed to fish the five tanks on a first come, first-served basis. The fisherman will be allowed to keep six bass or channel catfish over 12 inches.

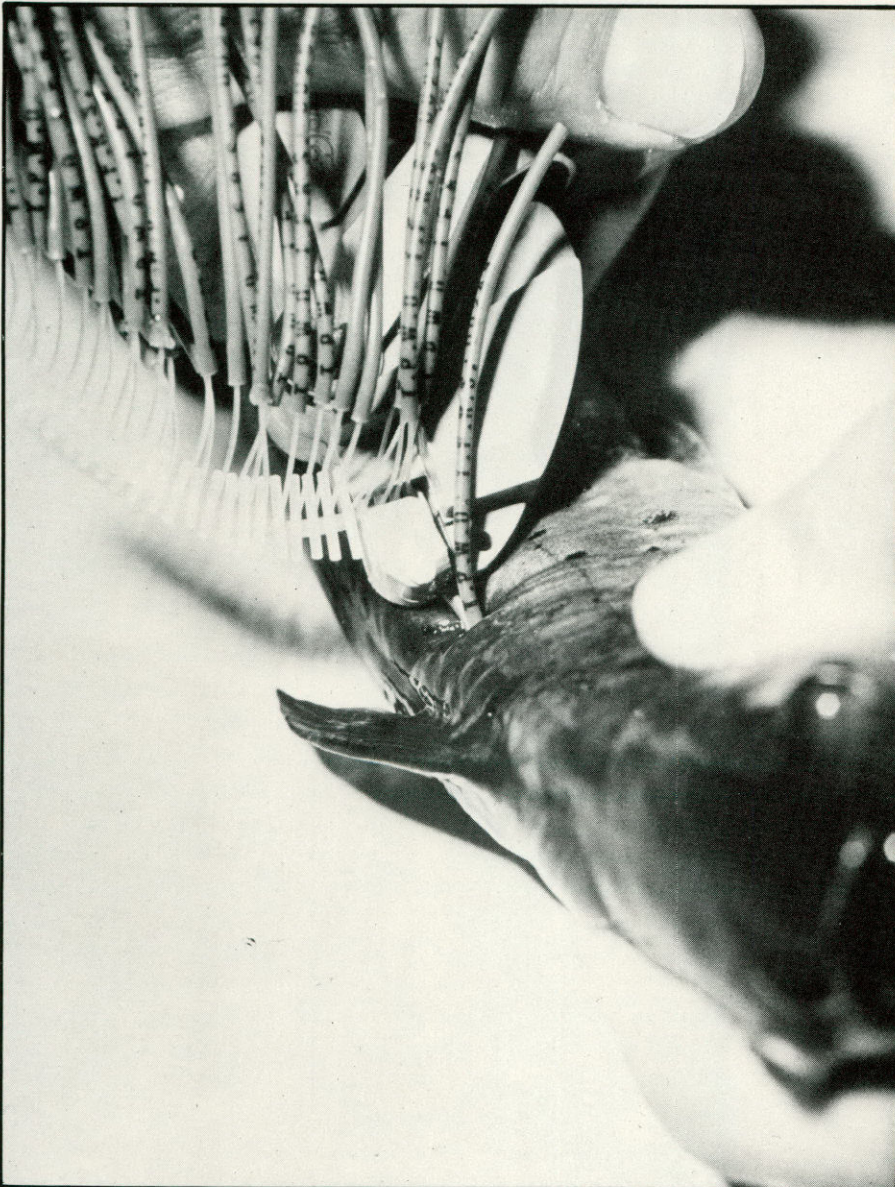
When new research and management tools are developed, further testing will be conducted at the research station by Parks and Wildlife Department biologists to determine their suitability for use in other state waters. As these new techniques are tested in actual situations, additional information will be gained as to their usefulness. Through the application of research and testing, biologists will be able to apply a man-

agement practice to every lake or stream problem.

Development of facilities such as the Heart of the Hills Fisheries Experimental Station will hasten the complete understanding of our lakes and streams. Benefactors of the work and research, as always, will continue to the sportsmen of Texas. **



Bill Reaves



Bill Reaves

One of the problems in fish management and research is identifying individual fish for study. Most marking techniques are unsatisfactory because they are not retained by the fish or because they kill the fish. Cold branding and marking with injected tags might prove to be useful. A branding iron chilled in a dry ice-acetone mixture freezes the skin and leaves an identifying mark. Tags are applied with a gun which inserts a small anchor into the fish and leaves a plastic streamer outside the body.

SALTWATER FAVORITE



Leroy William

Spotted weakfish, speckled trout, spotted trout, spotted sea trout, spotted squeteague, saltwater trout, speck, trout, yellowmouth trout, *Cynoscion nebulosus*—call him what you will, he is still the backbone of sport fishing on the Texas coast. Scientists and most record-keeping agencies prefer the name spotted weakfish, but most Texans call him speckled trout or just speck.

Children fish for trout off piers; so do adults. Summer tourists fish for trout with bass tackle, and winter visitors from the Midwest use tackle big enough to land a marlin. Some wade-fishermen use artificial lures such as spoons, plugs, jigs and plastic worms. Others use live or dead shrimp under a popping cork. Still others use nothing but live small fish such as piggy perch or pinfish. Some anglers fish in the daytime from a boat, and others fish from shore at night with powerful lights shining on the water. Commerical fishermen use trotlines and nets. The remarkable thing is that, sooner or later, they will all catch trout.

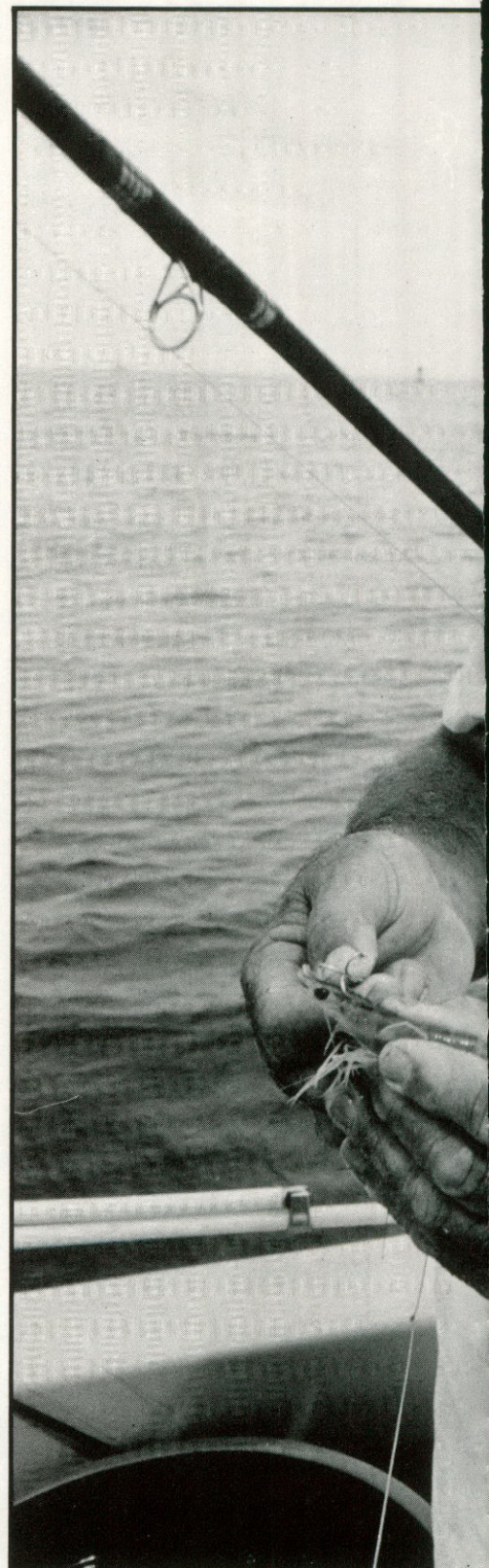
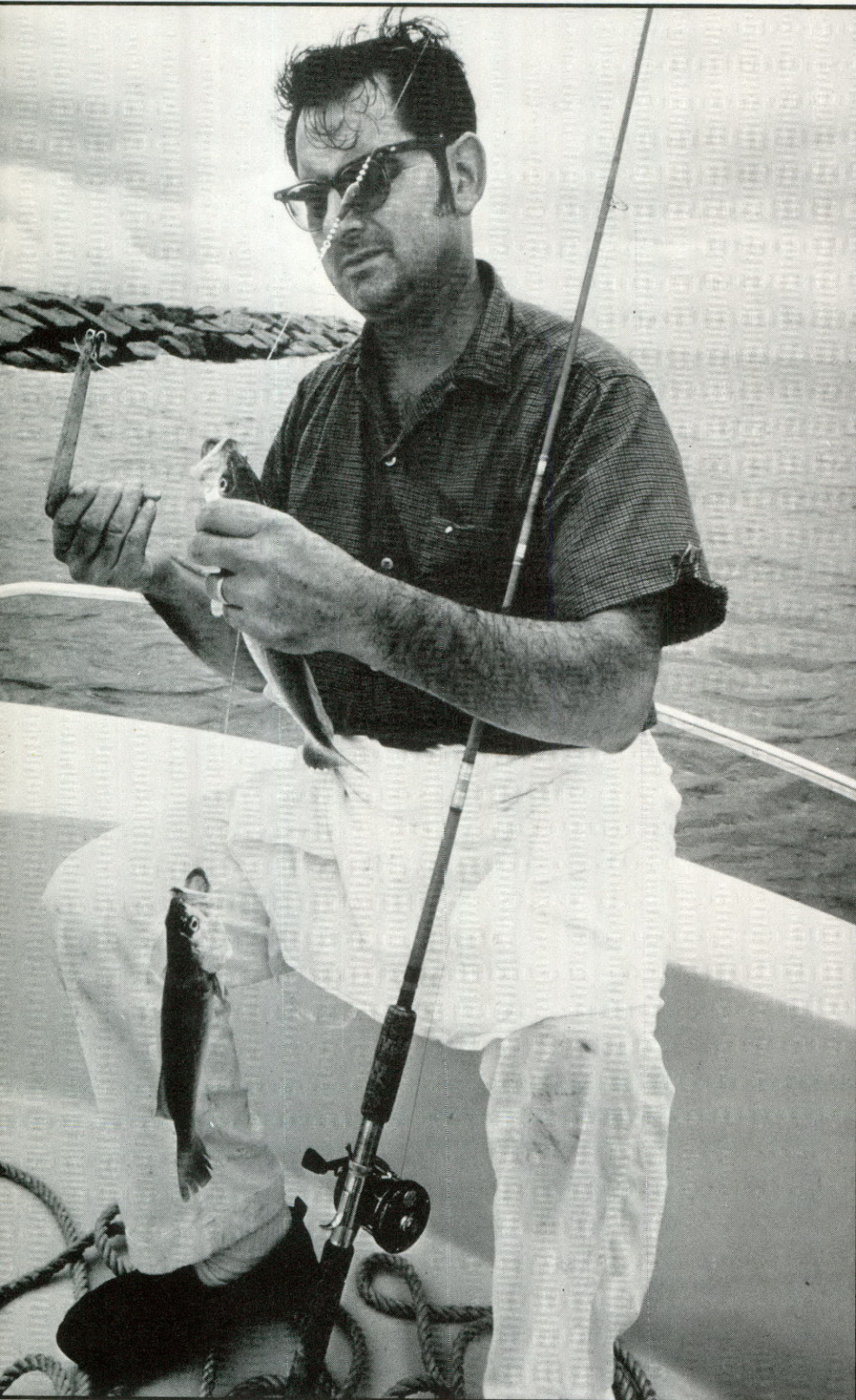
Trout are slow growers: a year after they are spawned in the bay they are only about seven inches long. All this time they will have been living in the shallow, grass-filled waters that biologists call "nursery grounds." At first they eat microscopic planktons which abound in these waters; then they graduate to tiny shrimp and fish. At this stage and until they are about 18 inches long, shrimp is the principal item on their diet. After more growth they prefer to eat fish and are not really particular about what kind. They will eat other trout as well as mullet, killifish or any of the species which are commonly thought of as forage fish.

During their second year of



Jim Whitcomb

SALTWATER FAVORITE



Photos by Jim Whitcomb



growth, the females start to outgrow the males. At the end of the second year a male will be 10 to 11 inches long, and a female may reach 12 or 13 inches. At about 24 inches the male will have reached his maximum size but the female will continue to grow until she is about 36 inches long. At this time she may weigh over 15 pounds. Thirteen pounds, two ounces is the officially recognized rod and reel record for Texas, but larger fish have been taken in nets. It is easy to see why all large trout are called "sow trout."

Although trout are known as bay fish, they do not necessarily stay in the bays. During the winter some large trout migrate into the Gulf and are caught by surf fishermen. Since the temperature of the Gulf waters remains at relatively constant levels and changes gradually, it is probably good for the trout to move. They are susceptible to cold, and if they stay in the bay, a sudden drop in air temperature combined with an outgoing tide and a strong north wind can kill thousands of them.

Stunned by the cold and swimming feebly near the surface, they are easy prey for fishermen with dip nets. However, many sink to the bottom and do not surface until too badly decomposed to be of any use. Of course, when one of these winter kills occurs, the larger trout die first and trout fishing is seriously affected for two or three years.

Trout are also very susceptible to pesticides, especially the persistent hydrocarbons like DDT. At one time Parks and Wildlife biologists came to the conclusion that trout in the lower Laguna Madre had accumulated so much DDT in their reproductive organs that they were sterile. Repeated sampling produced no juvenile trout in areas where once they had been plentiful. Now, however, three years after the use of DDT has been sharply curtailed by agricultural interests in the Rio Grande Valley, some juveniles are showing up in the samples.

Biologists tell us that, in spite of the tremendous fishing pressure sometimes placed on this species, we are still underfishing the potential harvest. **

Excellent catches of weakfish are made by rapidly working spoons, plugs or live bait just a few inches below the surface. Use a rod with lots of whip to cushion a sudden lunge from the fish. The only weak thing about the speck is its mouth and a hard strike will pull the hook from its tender jaw. Prime bait for specks is frisky live shrimp. Shrimp on a double rig of treble hooks will fill your stringer in a hurry. Use a dip net to land the trout.

FIDDLE

The brown recluse joins the black widow and adds to the worries of outdoorsmen.

by Dr. Kenneth W. Stewart
Biology Department
North Texas State University

Spiders are perhaps the most detested of creatures. Only snakes rival them in eliciting phobic reactions from mankind.

As if the spider's image wasn't bad enough, an intruder from the south is joining with the native black widow to form a poisonous twosome for Texas. The new spider is the brown recluse, *Loxosceles reclusa*.

A rather nondescript arachnid, the brown recluse nevertheless has a venomous bite which can deal misery to its victim. Its venom differs chemically from that of the black widow, but the bites of either can cause severe pain, illness and possibly death.

Almost all spiders are venomous, injecting poison into small insects and other prey to immobilize them. However, fangs of most species are too short or too fragile to penetrate human skin. The bites of other arachnids such as the common garden spider generally produce symptoms similar and comparable to bee or wasp stings. To persons who are hypersensitive to venoms, however, the bite of any spider may be potentially dangerous.

A Kansas physician made the first mention of the harmful effects of the brown recluse in 1929, but the spider was not considered dangerous until the publication of a series of reports and articles on bite effects in medical journals in the 1950's. Since that time, much

BACK



Dr. Kenneth Stewart

attention has been given by news media to the brown recluse. It has been given several common descriptive names, including "brown spider," "fiddleback," "brown recluse" and the erroneous "brown widow."

The brown recluse migrated from Central America and Mexico, and gradually spread across Texas, north to Illinois and Indiana and east to Georgia. There have also been reports of isolated specimens in California, probably from inadvertent transport by man.

The brown recluse is very common throughout Texas. It lives in both natural and man-made habitats. It is found outdoors under rocks and loose bark of dead trees, in stacks of wood or in decaying logs.

Specimens have been found indoors on the walls of barns, between undisturbed burlap feed sacks, between and under hay bales, in closets of dormitory rooms and homes, and in other concealed, relatively undisturbed areas in barns, sheds, garages and homes. The name "recluse" comes from the shy nature of the spider, and because it hides during the day. At night, the brown recluse is a hunter and wanders in search of its insect prey.

Adult brown recluse spiders are light brown or fawn with darker brown legs. A very distinctive violin-shaped dark brown figure is found on the carapace, just behind the eyes, with the "neck" portion of the violin figure projecting backwards.

The body is about one-third inch long, but including the long legs the spider gives the impression of being about the size of a quarter. The body is hairless and shiny, much like the black widow's.

Laboratory observations of spiders reared at North Texas State University indicate that adults live from two to

five years. Mating is unique and accomplished in a "head on" position of the sexes. The male weaves a special web and deposits sperm on it. He then collects the sperm with two modified anterior appendages. The male recluse crawls under a receptive female and transfers sperm by means of the two appendages to openings on the lower front portion of the female's abdomen.

Within two weeks of mating, females deposit 10 to 75 perfectly round, white eggs in a mound-shaped web called the egg sac. As many as three egg sacs may be deposited by a female each season from May to September. We have found that females may produce viable eggs for up to three years with only one mating. This phenomenon of delayed fertilization is common among arthropods, and one of the most striking examples is the queen honey bee, which mates only once and produces viable eggs for upwards of 12 years.

Incubation requires about 10 days and the young spiderlings mature the first year, after going through seven or eight size changes.

Both adults and spiderlings overwinter in a concealed special web called a "hibernaculum." During this time they are quiet and do not feed. In the fall, some individuals seek shelter from the cold in heated homes in which case they may remain active throughout the winter.

A major point to remember is that the brown recluse is a very nonaggressive spider. It must be cornered in very close quarters, with no choice of escape, before it will bite. Mice have been placed in small rearing chambers with brown spiders, where the mice barely had room to turn around, and the spiders clambered away. This was true even when females were guarding egg sacs.

Most brown recluse bites result from persons stepping on or rolling over or the night-hunting spiders, from direct contact with disturbed spiders around wood piles or hay, or from wearing gardening or other old clothes which have hung undisturbed for some time and contain concealed spiders.

Just how dangerous is the brown recluse? As in similar questions pertaining to other venomous animals, the answer is very complex because many variations and different circumstances exist with a particular bite.

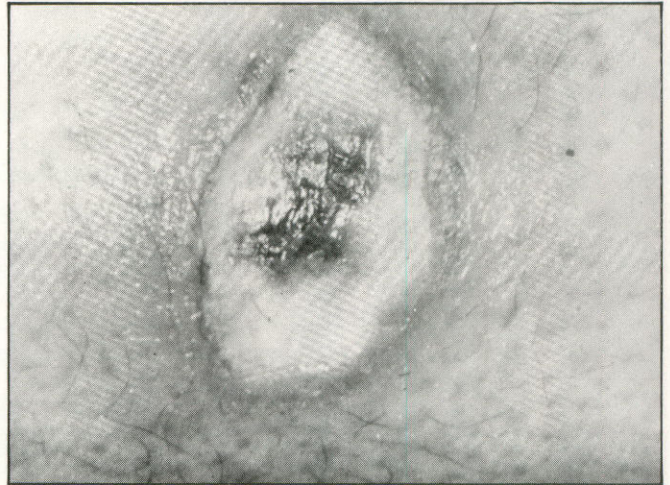
As in bee and wasp stings and snake bites, older or very young persons are more adversely affected. Bites on areas with less blood circulation are likely to produce less severe symptoms. A lower charge of venom due to recent feeding by the spider or reduced biting time would reduce both the tissue killing (necrotic) and blood destruction (hemolytic) effects. Some persons have less effective antibodies against specific venoms than do other individuals.

Unlike a scorpion or bee sting, the initial pain of a brown recluse bite is very little. Often, bite victims are unable to even pinpoint the exact time or circumstances of the bite. However, the pain usually becomes progressively more severe and may reach an agonizing state after four to eight hours.

The area adjacent to the bite may become reddened and form a small blister. Within 24 to 48 hours, the reddened area begins progressively to turn violet then black in color, with eventual development of a gangrenouslike area the size of a quarter or larger.

A systemic effect, consisting of throbbing muscular pains, nausea and possibly vomiting, may accompany the necrotic effects in some bite victims, but this usually subsides after a few hours.

Photos by Dr. Kenneth Stewart



BROWN RECLUSE

BLACK WIDOW

COLOR AND MARKINGS	Hairless, brown, with dark violin figure on back	Hairless, shiny black, with red hour-glass or other shaped figure on underside of abdomen (female)
HABITATS	Undisturbed crevices and cracks both indoors and outdoors	Mostly outdoors under rocks, in wood piles or associated with out buildings
SEX DIFFERENCES	Male slightly larger than female and similarly colored; male usually not killed by female after mating	Male much smaller, with brightly colored spots on abdomen; in contrast to folklore, male is usually not killed after mating
EGG SACS	Loose, dome-shaped sac attached to wood or rocks	Round, tightly woven, tough sac attached to web
FOOD CAPTURE	Night roaming hunters, away from the loose webs around their resting or hiding places	Web hunters; build vertical "tangled" webs near ground and wait for prey
BITING AGGRESSIVENESS	Very non-aggressive at all times	Generally shy, but more aggressive when guarding egg sacs
BITE EFFECTS	Necrotic (tissue killing) and hemolytic (blood destroying); mild to intense pain; fatality very rare	Neurotoxic, with severe agonizing pain, nausea, vomiting, dizziness, motor and speech paralysis and respiratory difficulty; fatality in about four percent of cases.

The blackened area around the bite forms a tough, black, deep scab by the end of the first week. It separates and falls out within two to five weeks and leaves an ulcerated depression with irregular walls and necrotic base. The area may be very slow to heal and a depressed scar about the size of the gangrenous area usually forms. This is the extent of the effects of brown spider bites in most persons.

In hypersensitive persons, more severe symptoms may develop, including a rash over the body, especially the abdominal region, vomiting, fever as high as 103 and 104 and black water fever from the destruction of blood cells. These symptoms may last from one to seven days. They can lead to organic damage, shock, and in very rare and severe cases, death.

Some success has been recorded by reducing symptoms with treatment with steroids and antiemetics. Surgical removal of necrotic tissue and skin grafts reduce the unsightly scar.

In 1963, Dr. Don W. Micks of the University of Texas at Galveston, reported at least 60 cases of brown recluse spider bites requiring medical attention from only 25 of Texas' counties between 1955 and 1960. His examination of Texas State Department of Health records indicated that at least four fatalities may have resulted from brown recluse bites in Texas between 1955 and 1960.

The accompanying table gives some basic comparisons between the brown recluse and black widow, and their bites. Only brief mention has been made of the black widow here, since volumes have been devoted to this spider in recent years.

In contrast to the tissue and blood destroying effects of brown recluse bites, the venom of the black widow primarily produces neurotoxic effects, including severe, throbbing bodily pain. The symptoms are primarily associated with effects on the nervous system. Comparison of black widow versus brown recluse venoms is basically the same as differences between the venoms of the coral snake (neurotoxic) and rattlesnakes (basically necrotic and hemolytic).

More detailed information on the life history of the brown recluse may be obtained from an article by Dr. Norman Horner and me in the December 1967 issue of the "Texas Journal of Science." Readers interested in spiders in general are referred to *American Spiders* by Dr. Willis J. Gertsch, D. Van Nostrand Company, Inc., 1949. **

The small recluse is drab compared to the striking black widow with its red hourglass, but don't underestimate the fiddleback. The bite of the brown recluse starts off as a mild stinging but the effects of the toxin are agonizing and may last for months. Photo on the left is of a victim's knee about a week after a recluse bite. The wound is similar to gangrene in that the necrotic lesion spreads to form an ulcer which may take months to heal. Right-hand photo was taken several weeks after contact with the spider. When the wound does heal, it leaves a nasty scooped-out scar that may require surgery to cover.



John Suhrstedt

Turkey Talk

by Elroy L. Young, Jr.
Wildlife Biologist

An experiment that started out in a single county now offers recreation to hundreds of Texans.



Leroy Williamson



Tate Pittman

Spring is the time to talk turkey in Texas.

But you need to speak the lingo.

So when hunters in 36 counties take advantage of this year's spring turkey gobbler season, the ones proficient in the art of turkey calling may have a marked advantage.

This year's season will begin the morning of April 22 and end the evening of April 30, with daily shooting hours from 30 minutes before sunrise to 30 minutes after sunset. The limit is one gobbler per hunter for the season.

Spring hunts and calling go hand in hand because early spring is the time of year gobblers respond to the coy yelps of hens. But as with other types of game calling, unskilled turkey calling is worse than none at all.

A call can add to hunting enjoyment whether a big gobbler is bagged or not. Although some hunters make their own calls, commercial ones are fine if used correctly.

Perhaps the most efficient of these store-bought calls is the hollow box with a handle hinged to one end. The call is made by sliding the handle across the thin rim of the box. These are the easiest to use because they are pretuned at the factory so strokes of the handle across the box produce consistently realistic yelps.

Boxes produce the greatest volume and have the greatest range. The biggest limitation of the box is its size and awkwardness.

Slate calls are usually half as big as boxes. These calls are made of a hollow sound box with a slate on one side. A peg is used to stroke the slate. It is a compact unit and can make a very quiet, soft call which is effective when the amorous tom is getting in close.

There are various other types of calls. Some work by suction or by blowing across a diaphragm.

If you aren't familiar with the noise made by the turkey hen, it might pay to visit a poultry farm to hear the real thing. Better still, persuade a veteran caller to give you a lesson or buy any of several commercial records of turkey calls.

For spring hunting, learn the love call of the hen. This can be made on any of the calls. It's a rapid series of loud calls to attract the gobbler's attention. When the bird approaches, the calls should be kept soft. The love call should always be made sparingly.

Texas started a limited experimental spring hunt in 1970, after similar hunts in other states demonstrated that such hunts can provide recreation and be consistent with good wildlife management. Wildlife specialists hope Texas hunters and landowners will become more aware of the spring season and take advantage of the bounteous resource.

Why hunt turkeys in the spring? Turkeys in Texas are underharvested and probably more birds die of natural causes each year than are killed by hunters. One turkey gobbler is capable of mating with many hens, so reproduction is not reduced by spring hunting.

From the hunter's viewpoint, hunting gobblers in the spring is logical. Gobblers respond readily to a skillful call in the spring, but will usually ignore a call in the winter. Hunters can concentrate on turkeys during the spring hunt, whereas in the winter they are concerned mainly with getting a buck. Some hunters never see the outdoors in the spring, the time of year when the woods are at their best.

Turkeys are usually concentrated in comparatively small areas in large flocks on their wintering grounds, but during the breeding season they break up into small groups or singles and the toms stake out territories. Turkeys will be found on more ranches and offer a better opportunity to the hunter.

Many of the chambers of commerce in counties with spring seasons will supply lists of landowners who lease land for hunting. Write them for a list, then contact the landowners. As the demand for spring gobbler hunting increases, the price for leases probably will increase proportionately, so an early inquiry may save money.

The equipment and clothing used on your deer hunt will probably be suitable for a spring turkey hunt. Your deer rifle can double as a turkey gun, although many seasoned turkey hunters recommend shooting the birds high in the back. This brings the bird down quickly but does not damage the good breast flesh. The .22 rimfire, while illegal for use on deer, is permitted for turkeys and is adequate in the hands of a marksman. Many hunters prefer a shotgun loaded with number six shot for a head-shot, but hit in the body, the birds can be surprisingly hard to bring down and buckshot might be more effective for long shots.

Be cautious when hunting turkey gobblers. Make sure that the turkey is a gobbler before you shoot, and avoid shooting at a bird standing in front of another, since a powerful bullet could kill both birds. Shotgunners must be careful not to shoot into a group of birds because the spreading shot pattern could kill more than one. Hunting too close to roosting sites can cause birds to abandon an area.

A turkey's eyesight is extremely keen, so concealment is necessary and body movement must be kept to a minimum. Blinds or camouflage clothing are essential to success. If neither is available, utilize natural cover as much as possible. It is a rare occurrence when a hunter can sneak up on a bird, so it is wise to hide and let the gobbler come to you.

Once a gobbler responds to your call by "gobbling" and heading your direction, use the call sparingly. Normally a gobbler will call at intervals as he approaches. He will be trying to locate the calling hen and will probably come within range without too much additional urging. Move as little as possible and take the first good shot—there may not be a second.

Many hunters would rather kill a gobbler than a deer. This can be attributed to the bird's wary behavior and excellence as table fare. To hunters, the satisfaction of outwitting nature's smartest game bird in its own environment can rival most other pleasures available in our fast-paced society. **

During the spring, turkey gobblers respond well to calls, but only proper use of a call will aid in hunting these smart birds. Learn to use the call by listening to records or by asking an experienced hunter to teach you.

The following counties are open for spring turkey hunting.

- | | |
|------------------|---------------------|
| Archer | Johnson |
| Bandera | Kerr |
| Baylor | McCulloch |
| Brown | Menard |
| Callahan | Mills |
| Clay | Montague |
| Coleman | Palo Pinto |
| Comanche | Parker |
| Cooke | Schleicher |
| Crockett | Shackelford |
| Dallas | Stephens |
| Denton | Tarrant |
| Eastland | Throckmorton |
| Ellis | Val Verde |
| Gillespie | Wichita |
| Hamilton | Wilbarger |
| Hill | Wise |
| Jack | Young |



Elroy Young

skink

by Joan Pearsall

The name has a misleadingly familiar sound. In trying to pin it on the right creature, many people would miss the mark. Yet the cosmopolitan skink dwells in each of the continents except Antarctica, and his family, Scincidae, is the most numerous among the lizards.

Of the more than 600 species of skinks, only 21 occur in the United States, yet they form one of the two most widespread groups of lizards here. Nine or 10 are found in Texas.

All but two of the American species belong to the genus *Eumeces*, the striped skinks with well-defined limbs. The exceptions are the brown-backed skink, *Lygosoma laterale*, also known as the ground lizard, and the wormlike sand skink, *Neoseps reynoldsi*. The former is four inches long, bronze colored with a yellow abdomen, and ranges from lower New Jersey to Florida, west to Central Texas and north into Illinois. This is the only American skink with a certain distinctive "window" in the lower eyelid. The rare sand skink is a burrower of central and southern Florida and was not discovered until 1910. Much like a salamander in looks, it is long and tiny with weak legs, yet if uncovered it can wriggle away swiftly. This skink "swims" through the sand by means of horizontal undulations.

The different striped species are widely located across the United States, but the five-lined skink, *Eumeces fasciatus*, has the greatest single distribution. It is most abundant and grows largest in the South, ranging west into Texas and north as far as Massachusetts.

The species—just plain "skink"—that has given the name to the whole family is a small lizard of the Sahara and Arabian deserts. Dried and powdered, it is considered an aphrodisiac and a cure for many ills. Primitive tribes still rate it highly as a food and a drug. The American five-lined skink has an opposite, but quite unmerited, folk reputation for being poisonous. The adult has various local names, including red-headed lizard and scorpion. He is not at all venomous, though he will bite viciously if cornered.

Although the family is large, it shows



much less variety of body form than do other lizard groups. In general, skinks have conical heads, cylindrical bodies and tapering tails. They are smooth and shiny and covered with overlapping scales.

A few species do vary somewhat, with heavy, blunt heads, slightly flattened bodies, and sometimes keeled scales, but those are the "odd cousins." There is a giant skink not found in Texas that reaches two feet in length, but the vast majority of them are less than a foot long, and most are less than eight inches.

Many skinks can climb trees, but most are ground dwellers and burrowers. The place to look for them is among leaf litter and decaying logs or under stones. Skinks obviously evolved toward specialization in burrowing. The great majority of them have deeply sunken eardrums, with small ear openings, if any, for protection against soil particles. The ones with fairly well developed legs have long, tapering tails. The more snakelike, limbless skinks have a thick, muscular tail to propel them. The conical head is a digging tool, and the scale pattern forms a protective sheath for the flexible skull.

Some have well-developed limbs with five digits. Just the opposite, some are blind burrowers without any external traces of limbs.

Other modifying stages can be seen in the fixed, transparent covering over the eyes. In some the lower eyelid is moveable and opaque and has a few enlarged, transparent scales in the center. Species which burrow a lot have lower lids which are less moveable. In some species the lower lid is more or less fused with the upper lid and is clear and scaleless to form a sort of window.

The largest skinks are vegetarians with blunt teeth, but most of them, including all the North American ones, feed primarily on small invertebrate animals such as insects. In this case, the teeth are much more sharp and pointed, for crushing the prey. The skink's thick, forked and sticky tongue easily traps ants and spiders.

Skinks are extremely shy, and this is their chief protection from enemies such as snakes. When they do venture out to forage or sun-bathe, they are extremely wary and run away from any intruders.

Predators quite often succeed only in getting a tail for their meal, for skinks, like most lizards, have a tail which snaps off when a predator grabs it. Many skinks play up that advantage by having a bright blue tail which draws the dangerous attention away from more vital parts of their anatomy. Some of them, including the five-lined skinks,



Photos by John L. Tvetan



Ground Skink

have this extra color protection only when the animals are young and face the greatest hazards.

The most common color pattern of skinks is a variety of stripes, but some species have spots, crossbars or an unmarked, uniform color. Somber tones generally predominate with the exception of the beautiful blue tail.

Skinks do not have the chameleonlike ability to change color rapidly with their surroundings, but many of them change with age or seasons. The Great Plains skink loses its light head markings on maturity. Some males develop reddish or orange hues. The male five-lined skink takes on quite a different look. His head becomes fiery red, and he loses the juvenile dark and light stripes. The female retains the striped pattern but in a duller hue.

The heads of male skinks often become more swollen and muscular as they mature, evidently the better for fighting. In breeding season the red heads are an incentive for males to rush at each other with open jaws, biting off skin and flesh with the intent of insuring that only the strongest will mate.

Skink species are evenly divided between egg-layers and those which bear live young. All the American species lay eggs. The five-lined skinks mate during May and about six weeks later the female deposits six to 18 eggs in a warm, moist place under a rotting log, fallen bark or rock or in a small hole she has dug. She then behaves unusually for a lizard by continuing to care for them. She does not "brood" in the correct sense, since it is not evident that the eggs are warmed, nor does she guard

them constantly. If there is danger to herself, she often scurries off. She also leaves at intervals to feed. But most of the time, the mother stays on duty, coils her body around the eggs or lies among them, and no doubt keeps away small egg-eating animals. She frequently turns the eggs, probably to prevent rotting from too much contact with the damp soil. As the embryos develop, the eggs grow slightly. The clutch hatches in six weeks, and the female leaves the one-inch youngsters to fend for themselves. The youthful five-lined skinks, with their bright sky blue tails, may have inspired a graphic addition to our language. They are not built for running, but in their eagerness to scamper out of sight, they have become a byword for high speed: "As fast as a blue streak." **

Year Round
"Guaranteed Trophy Hunting"
 Russian Boar—Javelina—Bobcats
 All exotic game
 Gun—Bow
Safariland Guide Service
 Junction Hwy., Box 1913 Kerrville, Texas 78028
 (512) 257-7567

VICKERS SNAKE REPELLENT
 4 POUND BAG TREATS 1400 SQ FEET
 \$4.95 POST PAID (NO C.O.D.'S)
 USE ON CAMPSITES, BLINDS
 UNDER MOBILE HOMES
 SATISFACTION GUARANTEED
VICKERS INDUSTRIES
 5607 RANSOM
 HOUSTON, TEXAS 77017

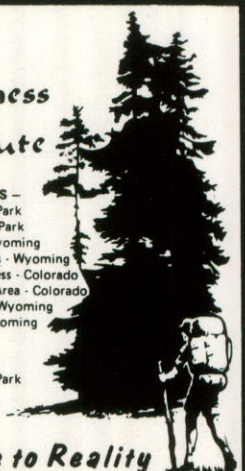
Bottle Collectors
 WHAT ARE YOUR BOTTLES WORTH? Identify and price over 2,500 new and old collectible bottles. Beams, Avons, Fruit Jars, Medicines, Inks, Snuffs, many others. "BOTTLE COLLECTOR'S HANDBOOK AND PRICING GUIDE", by Yount is the most complete bottle book you can buy. All 18 categories. Illustrated new edition! Plus, free bonus directory: "Where To Buy and Sell Bottles" \$3.95 Postpaid. Infobooks, Box 5001 San Angelo, 15 Texas 76901

ELECTRONIC GAME FEEDER
 Build your own game feeder with our pre-assembled electronic Motor/Control. Control operates once or twice a day with adjustable run time. Motor/Control and construction plans only—\$39.50 plus tax, post. Brochure available.
JACKSON MANUFACTURING
 P.O. Box 1216,
 LaPorte, Texas 77571

TEXAS BLUEBONNET SEEDS
 Pkg—35¢ ½ #—\$3.50
 ¼ #—\$1.50 1 #—\$6.00
 ¼ #—\$2.50 Post Paid
Capitol Garden and Patio Center
 401-03 W. 6th
 Austin, Texas 78701
 478-9565

NOW Set or Take up Trotline in 5 Minutes!
BOOKLET ON HOW TO CATCH 'EM 20 PAGES
"TROTLINE FISHING SECRETS"... written by experts.
 How, when, where to set trotline, illustrated. Baits laws, tackle. Send 25¢ for mailing cost.
LAWRENZ MFG. CO., DEPT. T, P.O. BOX 3837, DALLAS, TEX. 75208

The Wilderness Institute



BACKPACKING TRIPS —
 Yellowstone National Park
 Grand Teton National Park
 Bridger Wilderness - Wyoming
 Gros Ventre Wilderness - Wyoming
 Uncompahgre Wilderness - Colorado
 Rio Grande Primitive Area - Colorado
 Absaroka Wilderness - Wyoming
 Wind River Range - Wyoming
 and others

BICYCLE TOURS —
 Yellowstone National Park

An Escape to Reality

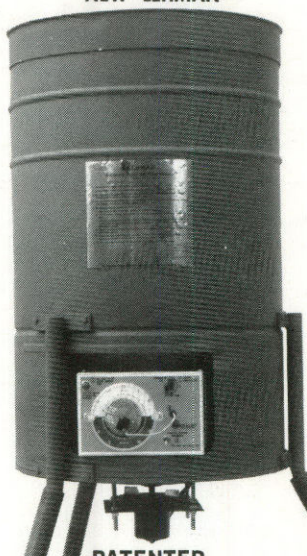
- One and two week summer vacation programs of wilderness living, study, and adventure.
- For individuals, families, and organized groups.
- Modern lightweight backpacking equipment and food furnished on all wilderness outings.
- Youth leadership development programs of backpacking, mountaineering, and bicycle touring.

Send for brochure and schedule of the 1972 Wilderness Program

The Wilderness Institute, Inc.
 P.O. Box UU
 Evergreen, Colorado 80439

Name: _____
 Address: _____
 City: _____ State: _____ Zip: _____

NEW LEHMAN



AUTOMATIC FEEDER
Fishermen • Hunters • Birdwatchers

1. New 24-hour 4-jewel movement.
2. Feed one or more times day or night any selected time regularly unattended.
3. Distributes feed 25 to 75 ft. — depending on installation height. Install suspended — or on pipe legs.
4. Operates on 6 volt dry cell — 2 to 6 mos.
5. Capacity 250 and 1,000 lb. sizes.

Write for Free Brochure
LEHMAN EQUIPMENT CO.
 Route 3, Box 53, Corpus Christi, Texas 78415

PATENTED

WILD TURKEYS
 Genuine Rio Grande Wild Turkeys. Orders will be processed in order of date received when accompanied by 25% deposit.

Fertile Eggs	\$6.00 per dozen
Day Old Poult	\$1.25 each
3 Weeks Old	\$2.10 each
6 Weeks Old	\$3.15 each
2 Months Old	\$3.50 each
3 Months Old	\$4.40 each
4 Months Old	\$5.25 each
1 Year Old	\$9.00 each (available now)

To place orders or for more information, write:
TEXAS WILD TURKEYS
 7915 Broadway
 San Antonio, Texas 78209



**"NO
GAME
NO
PAY"**

BLACK BUCK
ANTELOPE

SAFARI STYLE HUNTING

- OVER 125 SQUARE MILES
- GAME FROM FOUR CONTINENTS
- EXCELLENT MEALS, LODGING
- CUSTOMER ENTERTAINMENT PROGRAM

CALL OR WRITE TODAY



Y.O. RANCH

BOX 220, MOUNTAIN HOME, TEXAS 78058
Telephone (512) 654-2076

LLANO COUNTY LEASES

Excellent hunting available for season, week, or weekend. Individual pastures with cabins and/or campsites for each group. Deer, Turkey, Dove, Quail, Hogs. Reservations accepted now at reasonable prices.

BEN A. WALLIS & SON
LLANO, TEXAS 78643
(915) 247-5207

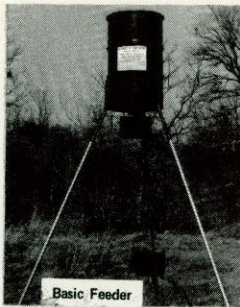
LIVE- CATCH TRAPS



Low as \$4.95

Write for
FREE CATALOG

Traps without injury squirrels, chipmunks, rabbits, mink, fox, raccoons, stray animals, pets, etc. Sizes for every need. Also traps for fish, sparrows, pigeons, turtles, quail, etc. Save on our low factory prices. Send no money. Write for free catalog and trapping secrets. MUSTANG MFG. CO., Dept. N 37 Box 10880, Houston, Tex. 77018



Basic Feeder



AUTOMATIC ELECTRIC FEEDERS for GAME • FISH • LIVESTOCK



Feeder Kit

Feeds daily anywhere at Dawn or Dusk or Both. Patented electronic timer, photocell operated, battery-powered. Feeds at optimum times regardless of the seasons for greatest effectiveness and feeding efficiency. Adjustable dispensing rate and time. 110 volt A-C powered models also available.

	Shipping Weight	Price
Basic Feeder — Model PTF (Includes battery)	85 lbs.	\$139.50
Feeder Kit — Model PTFK (includes battery, universal funnel for 5 gal. cans and larger, complete except for feed container)	20 lbs.	\$89.50
Pipe Leg Suspension — Model PLS (As shown)	38 lbs.	\$10.00
Tripod-Winch Suspension—Model TWS (Not shown)	140 lbs.	\$69.50

Send for free brochure of complete line.



SPENCO, Inc.

SPECIALTY PRODUCTS
AND ENGINEERING

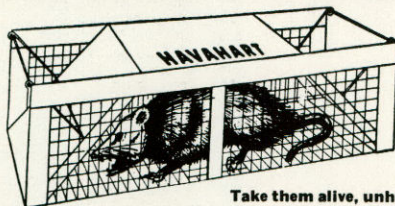
5911 Bullard Drive, Austin, Texas 78731 Phone 512/454-3355

WAGONYARD

Crockett, Texas—FM 229—2 mi west off Loop 304. Camp in beautiful East Texas. Trails for hikers, bikes and horses. Facilities for your horse.

Restrooms—Showers—Sanitary Dump

CATCH ANIMAL RAIDERS!



Take them alive, unhurt!

Simple, safe HAVAHART traps catch raiding rabbits, possums, coons, squirrels, pigeons, sparrows, etc., without injury. Straying pets, poultry released unharmed. No jaws or springs to break. Galvanized; many in use 20 years. Open ends give animal confidence. Sizes for all needs. Write for valuable illustrated guide and price list.

HAVAHART, 149 Water St., Ossining, N. Y. 10562

Please send new guide and price list.

Name _____ Zip _____
Address _____



CAMPING SHOULD BE TAKEN LIGHTLY

We specialize in lightweight camping equipment for the hiker, climber, canoeist, hunter, cyclist, and all outdoorsmen. For the discriminating enthusiast, we stock the finest in goose-down sleeping bags, light-weight tents, packs, frames, rucksacks, climbing gear, boots, kayaks, and a full line of mountain and trail products. Gerry, North Face, Camp Trails, Sierra Designs, Old-Town, Kelty, Eiger, Chouinard, Gerber, Vasque. We are Wilderness Equipment, Inc. and we do take camping lightly - seriously.

Wilderness Equipment Inc.

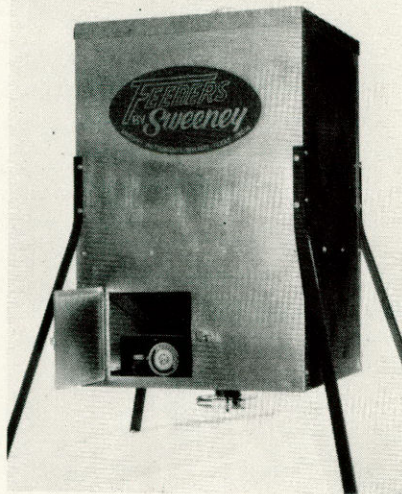
643 WESTBURY SQUARE / HOUSTON, TEX. 77035 / (713) 721-1530

AUTOMATIC FEEDERS MEET THE SQUARE

1. Admittedly, our feeder is different - it's "a square". But it gives better service for a longer time. Because it's especially designed for a special purpose.
2. "The Square" has another difference too — A clock Timer that works — in any weather. And, so simple a child can program it. Accurate - foolproof - dependable - guaranteed.
3. "The Square" uses only one battery. No photo cells or flashlight batteries. But 12 volts for maximum performance and longer life.
4. And, "The Square", has something else — A conservative price —
Only **\$149.50** (plus tax & freight)

Send for your free brochure on
"The Square".

SWEENEY CLOCK CO.
315 Brooklyn St. - (512) 223-8562
San Antonio, Texas 78215



BIRD DOGS

Chandler Kennels, one of the largest in the business offers to you for your selection over 100 top trained POINTERS, SETTERS & BRITTANIES. These dogs are all registered out of top blood lines. We guarantee all our dogs as advertised to suit you, the Hunter. Also puppies & started dogs.

Call, write, or come by:

CHANDLER KENNELS
P. O. Box 1011, La Porte, Tex.
Call: Area Code 713-GR 1-4023
Hollen Chandler - Owner

"RIO GRANDE" WILD TURKEYS

- *SELECT HATCHING EGGS—\$11.95 Dozen Feb. thru May—85% fertility guaranteed
- *DAY-OLD POULTS—100% LIVE DELIVERY \$2.50 each—Postpaid—Mar. to June
- *STARTED POULTS—3 wks—\$3.50, 8 wks—\$5.50 (Sold only with prior booking)
- *FREE INFORMATION ON REQUEST CONCERNING RE-STOCKING
- *WE'RE AS CLOSE AS YOUR TELEPHONE

TEXAS GAME BIRD RETREAT

Route 2, Fredericksburg, Texas
512-997-4585 or 257-7072

Young Naturalist

Beaks and Bills

by Ilo Hiller

Some human mouths are large and some are small, but basically they are all the same. However, when we think of birds and their mouths (beaks or bills), many different types come to mind. Did you ever wonder why they are all so different?

Unlike humans who have hands and tools to prepare their foods to fit their mouths, birds must have mouths adapted to fit their foods. Let's examine a few different types of birds, the shapes of their mouths and the types of food they eat.

If you have a backyard feeder, you are probably most familiar with the seed eaters. They have short, stout bills which are well suited for cracking hard seed coats to expose the tender kernels. The sharp tip of the beak is useful for capturing insects which are also part of their diet. Cardinals, grosbeaks, finches and sparrows are typical seed eaters.

Another seed eater with a unique bill is the crossbill. The tip of the upper bill curves downward to one side and the lower bill curves upward to the other side, crossing shortly before the tips. This enables the crossbill to pry off the scales on pine and spruce cones to reach the seeds at the base of the scales.

Insects play a large part in the diet of many birds. Warblers, chickadees, nuthatches and titmice are insect eaters. They have slender bills which enable them to remove insects and insect eggs from in and among bark crevices and leaves.

There are also flying insect eaters such as swallows, swifts and nighthawks. Although these birds have tiny, weak beaks, their mouths open wide like traps to scoop up insects in flight. Purple martins, members of the swallow family, are well known for their insect eating abilities and people often erect martin houses to attract them.

Woodpeckers have hard, chisel-like bills with which they hollow out their nests and bore for grubs in tree bark. Woodpeckers not only have well-adapted bills but also have the added advantage, along with hummingbirds, of being the only birds with tongues which can be extended beyond the tips of their bills to assist in food gathering. Once the hole has been bored and the insect is found, the woodpecker's barb-tipped tongue is inserted into the hole to extract the insect.

Since the hummingbird's food is the sweet nectar found deep within flower blossoms, nature has pro-



SEED-EATING



INSECT-EATING



PREYING

vided this bird with a long slender bill for probing deep into flowers. The long tubular tongue which can be extended beyond the tip of the bill can reach into the deepest blossom to suck the nectar. Tiny insects found inside the flowers are also eaten. Adaptations within the species have caused some hummingbirds to have either longer or shorter bills, or bills which are straight, curve up or curve down to fit more easily into specific flowers predominant in an area.

Birds of prey, such as eagles, owls, hawks and falcons are equipped with sharp-edged, hooked bills which are used to tear bite-sized pieces of flesh from the animals they capture and kill.

Although so far we have been discussing dry land birds, aquatic birds also have unique bills for food gathering.

Since many aquatic birds are fish eaters, their bills are adapted for catching and holding fish. The Pelican is a good example. It has a large skin pouch located on the underside of its lower bill. This pouch serves as a net for scooping up fish, water and all. After catching the fish, the pelican closes its bill, drains out the water and swallows the fish whole.

The skimmer, a relative of the gull, has a lower bill which is longer than its upper bill. When feeding, this bird flies over shallow water with its longer, lower bill skimming through the water scooping small surface-feeding fish and crustaceans into its mouth.

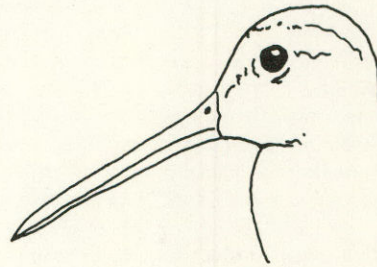
Some ducks are fish eaters and some sift their food from the ooze at the bottom of marshes and ponds. Their bills reflect their choice of food.

The merganser duck has a long, thin, tapering bill with serrated (sawlike) edges. The bill is well equipped to hold even the most slippery fish until the merganser can swallow it.

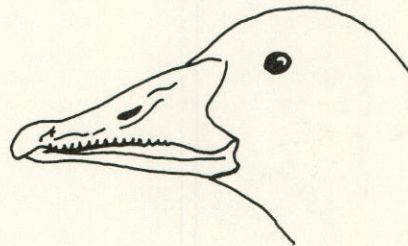
The shoveller duck, on the other hand, has a wide, flattened bill with comblike teeth along the edges. The water is strained through the teeth and the edible worms, aquatic insects and plants are trapped inside the bill to be eaten.

Some birds, such as the common snipe and woodcock, probe for their food. Nature has provided them with long, slender bills which can reach deep into the bogs and mud for worms. After a night of feeding, pencil-like holes show where these birds have been probing for their food.

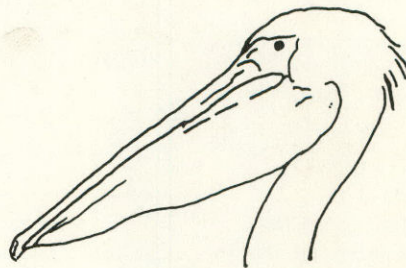
This by no means covers all of the different species of birds or types of bills. But perhaps you can see that physical adaptations are most important in helping birds live in specific surroundings and find and catch the available food in the area. **



PROBING



STRAINING



FISH-EATING

LETTERS TO THE EDITOR

Curlews

I would appreciate information on a species of bird called curlews. It is my understanding that these birds were once hunted as game and that at some point were reduced in number so as to endanger their existence.

H. C. Cazalas
Corpus Christi

Long-billed curlews are found all along the Texas coast and can be seen in the Panhandle every month except June. Whimbrels (Hudsonian curlews) pass through Texas on their migration and can be seen on the coast most often during the spring.

The eskimo curlew was found in Texas at one time, but today it is considered extinct or nearly so. These birds had as sad a fate as the much-publicized passenger pigeon. Eskimo curlews were once found in great numbers migrating through the Central United States, Canada and down to Argentina, but man hunted them to extinction.

As the birds gathered in great flocks on their migrations, hunters lined their routes and killed them in great

numbers. Arthur Cleveland Bent, in his "Life Histories of North American Birds," described some of the hunting and killing of these birds. "Hunters would drive out from Omaha and shoot the birds without mercy until they had literally slaughtered a wagonload of them, the wagons being actually filled, and often with the sideboards on at that . . . The compact flocks and tameness of the birds made this slaughter possible, and at each shot usually dozens of the birds would fall. In one specific instance a single shot from an old muzzle-loading shotgun into a flock of curlews as they veered by the hunter brought down 28 birds at once, while for the next half mile every now and then a fatally wounded bird would drop to the ground dead."

Most of the slaughter of these birds was in the years 1856 to 1875. From 1876 to 1890 small flocks were seen and shot, but by 1905 the birds were almost gone and very few sightings of individual birds were made. In Texas the birds were not seen from 1905 until two birds were seen in 1945. Another sighting was made in Texas in 1959 and single birds were seen off and on until 1968.

Cacti

Please send me any information you have about where we can obtain literature on Texas cacti. We have become real fans of these plants and would like to be able to recognize a species when we see it.

Jackie Pizzini
San Antonio

We suggest a book written by a fellow resident of San Antonio, Dr. Del Weniger, a noted expert on cacti. It is an extremely informative book with many color pictures and descriptions of various species. The name of the book is "Cacti of the Southwest," and it was published by the University of Texas Press. It is rather expensive, \$25, but an excellent addition to the library of anyone interested in cacti.

Another book is the "Pocket Encyclopedia of Cacti in Color" by Edgar and Brian Lamb. It is published by the Bradford Press and costs \$5.50. It is excellent for people interested in growing cacti as it has information on correct soil mixture, diseases, and even a chapter on growing cacti from seeds.

Your local bookstore should be able to order these books for you.

Cook Books

Several years ago, I purchased some Uncle Dudley Outdoor Recipe Books. I ended up giving these away and find myself without one. Could you please advise if this book is still published and, if so, how I may acquire one. As I recall, these were either from Fort Worth or Dallas.

James G. Newton
Springfield, Missouri

We are unable to locate any information on the Uncle Dudley Outdoor Recipe Book. Readers may send us any information that will be of help to Mr. Newton.

OUTSIDE BACK

The cardinal is one of the country's most popular song birds and the official bird of seven states. This female and her brightly colored mate are protected by both state and federal law. The species is found throughout most of Texas. Members of the family have a stout conical beak which is adapted to seed cracking, see page 30. Photo by Bill Reaves.

TEXAS PARKS & WILDLIFE

Send check or money order to:

TEXAS PARKS & WILDLIFE DEPT.

John H. Reagan Bldg., Austin, Texas 78701

Check one

RENEWAL

Paste your last magazine address label into space indicated and mail with payment.

CHANGE OF ADDRESS

Paste recent magazine label into space indicated, show change on form and mail.

NEW SUBSCRIPTION

Fill out form at right and mail with payment.

GIFT SUBSCRIPTION

Show recipient's name and address in form, indicate gift signature and mail with payment.

CHECK ONE

Out of U.S. (except APO and FPO)

1 yr. \$3.15 incl. tax 2 yrs. \$5.25 incl. tax

1 yr. \$4. 2 yrs. \$7.

Attach recent magazine address label here for renewal or change of address.

Name _____

Address _____

City _____

State _____

Zip Code _____

Sign Gift Card _____



TEXAS SALTWATER FISHES

The coastal fisherman is familiar with these two fishes. Both the pinfish and the pigfish are used as live and cut bait. They feed largely on small crustaceans and mollusks but will nibble on almost any kind of bait and both have earned the reputation of "bait-stealers."

The pinfish, or pin perch, shown at top is six to eight inches long. It frequents grassy bays in warm

weather but migrates to deeper water in the winter. The pigfish is tolerant to changes in its environment, which partially accounts for its great abundance.

The pigfish, lower, is also known to Texans as the piggy perch. It is also six to eight inches long and is found on sandy shoals and over grass or rocky bars.

Artwork by Henry Compton.

