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outdoors.

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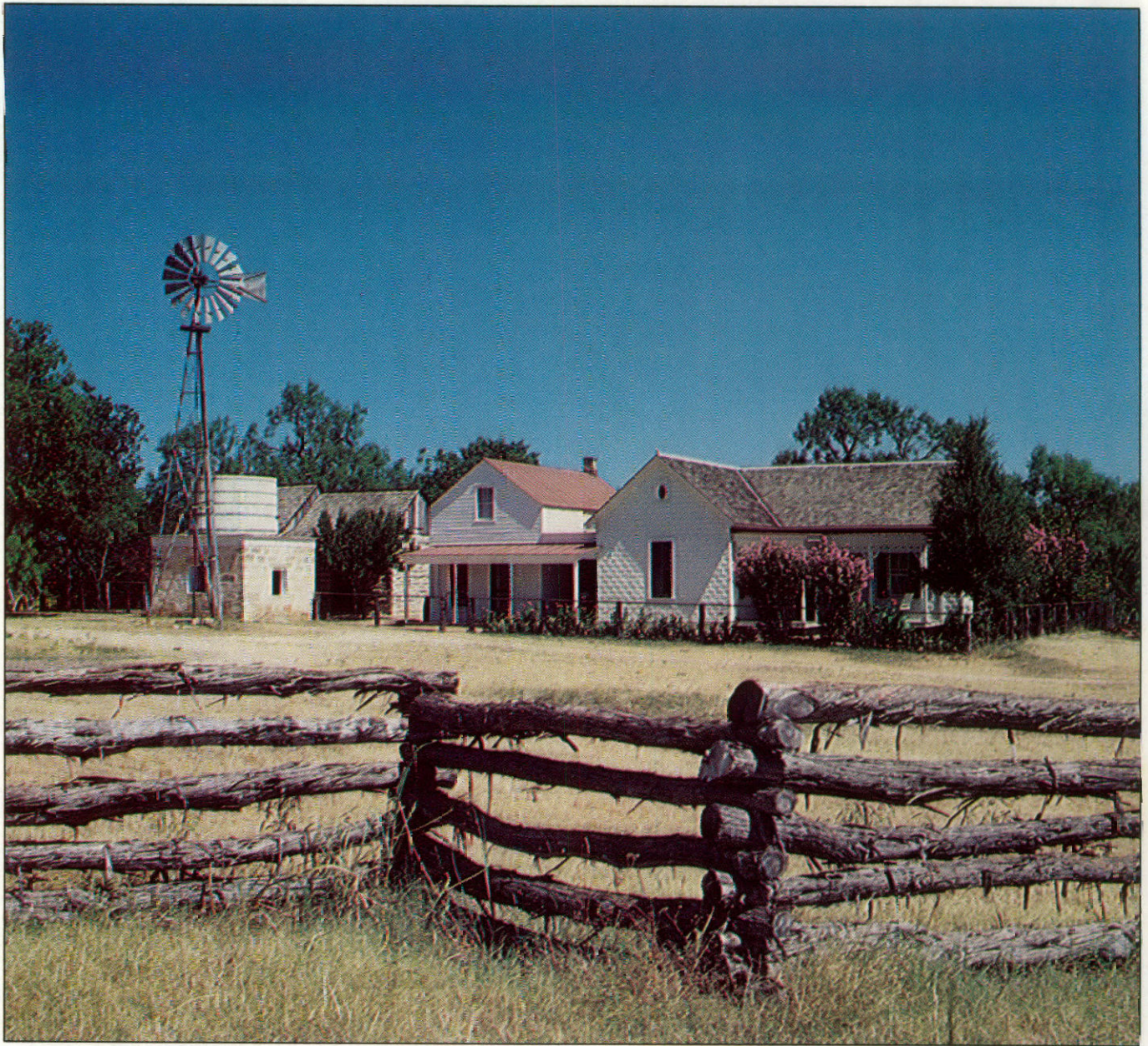


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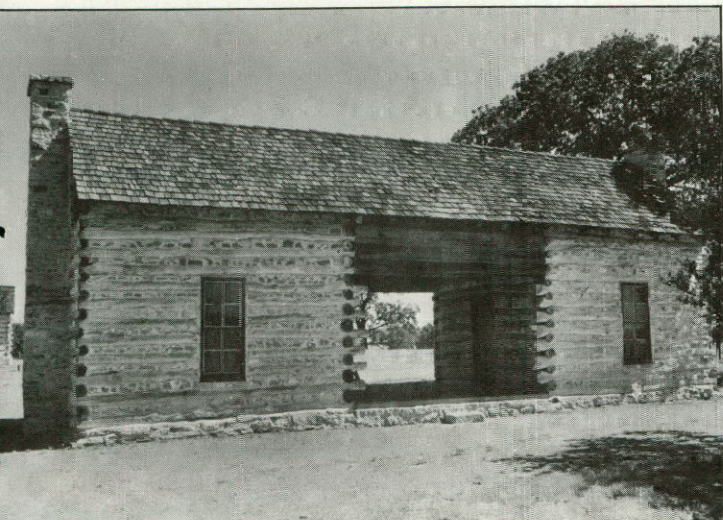
Hill Country Settlers 19th Century German Cabins Preserved at LBJ State Park

Article by Duncan G. Muckelroy, Park Interpreter, LBJ State Historical Park Photos by Glen Mills

Texas frontiersmen are some of America's most colorful and identifiable folk heroes. Promoted by the mass media as being worthy not only of acceptance and respect but also emulation, the pioneer Texan has become a stereotype whose true way of life often has been distorted and molded to fit modern imaginations.

However, the interpretation of three original log cabins at the Lyndon B. Johnson State Historical Park recreates the true picture of the life of early German settlers in the Texas Hill Country.

During the three-year period, 1844–1847, about 20,000 Germans emigrated to Texas. Virtually all of the



ones who settled in this part of Texas landed at the Gulf Coast town of Indianola. The town was a thriving community during the 19th century in what is now Calhoun County. A hurricane in 1886 destroyed Indianola and it was never rebuilt.

Before they traveled through the Coastal Plains and crossed the Balcones Escarpment, the Hill Country had been inhabited only sparsely and exclusively by roving bands of Indians. Anglos and Spaniards usually were the first to advance into the southwestern wilderness, but on this occasion the Germans assumed the role of the pioneer settlers.

One German immigrant who landed at Indianola in the winter of 1845 was a 27-year-old man named Casper Danz who had traveled to this country with his wife, Elizabeth, and infant son, Frederick. As was true for most of his fellow traveling companions, the journey had been long and disheartening.

Eager to establish his family in this land of opportunity, Danz was among the original settlers who founded the town of Fredericksburg in 1846. His wife and infant son died there that year, and soon thereafter he married a widow, Johannette Margarete. By 1852 they were living in the Grape Creek Community, a few miles southeast of Fredericksburg. After the death of his second wife in 1857, he married Johanne Dorothea. In 1860, he and his third wife purchased 700 acres of land immediately south of the Pedernales River, just east of the present-day Stonewall, and soon built a house on their homestead.

Danz chose to build a log cabin as their home. And to get the most floor space he built two one-room log structures, side by side, with an intervening breezeway or passageway, sometimes referred to as a possum trot or dog trot. Both cabins and breezeway were covered with one long, continuous roof. This was a common building form used for houses, barns and even storage or corn cribs.

With a broadaxe he notched, trimmed and fitted each post oak log precisely; no nails were used in the log construction. Native limestone rocks and red clay from a nearby field were used to chink between the logs, and the inside walls were plastered to a smooth surface with a mixture of mud and straw, and then whitewashed.

Symmetry was enhanced by the construction of a limestone fireplace and chimney at the far side of each room. A loft was built above each room, beneath the continuous roof. Two additional rooms of limestone

During restoration research on the Danz cabin (above), a trash-filled cellar was found nearby. Its original cabin had been torn down in 1946, but a similar cabin (left), acquired in a nearby community, was moved to the site and reconstructed over the cellar. Grounds of the restored Sauer-Beckmann Farmstead (extreme left) are defined by a cedar rail fence.

rock were built as lean-tos along the back. A covered porch with a flagstone floor ran along the entire front of this modest but sturdy home.

Descendants of Casper Danz lived in this house until it was acquired for the Texas Parks and Wildlife Department in 1966. However, at the time of acquisition the original double log cabin was completely hidden from sight by exterior and interior additions made during the approximately 100 years of continuous occupancy. Indeed, the historic log cabin was not discovered until inspection of the existing two-story Victorian house prior to demolition. When this valuable, historic log structure was discovered, only the more modern additions were removed, and care was taken not to damage the original fabric of the log portion. Because much of the original log cabin was intact when discovered, it was restored. The fireplaces, chimneys, shingled roof and loft entrances have been reconstructed. In conjunction with the interpretive program at the park, porches are to be built for the cabin as part of craft demonstrations which illustrate typical construction techniques used by Texas Hill Country pioneers.

During research for the restoration of the cabin, a trash-filled cellar was discovered approximately 100 feet north of the existing dog trot log cabin. These are the remains of another log dwelling on the site. A thorough archaeological investigation of the cellar revealed one of the most beautiful examples of early German masonry workmanship in the park. The cellar walls are almost two feet thick and made of uncut limestone slabs set in lime and sand mortar. Historical research has indicated that the northern double log cabin, which had been built above the cellar, was torn

down about 1946. In 1974, a double log corn crib, with a drive-through dog trot, was found in a nearby community. This structure was acquired, moved to the site and reconstructed as a storage building over the cellar for the interpretive program. This northern cabin does not have a loft and has only a dirt floor in the breezeway or dog trot section.

The Danz homestead also is complemented by several other features associated with the complex. An early hand-dug well is located between the two double log cabins. This well, which continues to furnish excellent water, is about 30 feet deep and hand-lined entirely with dry-laid limestone from the field. East of the cabins is a corral fashioned of cedar rails.

In 1869, Danz sold 188 acres of his land to another German immigrant named John Frederick Sauer. Sauer had emigrated to Texas at the age of 7. In the early 1860s he married Christine Strackbein, and by 1869 they had four children. The six-member Sauer family at one time lived in a one-room log cabin with a loft, to which they added a lean-to shed with a storage cellar. A limestone cottage adjoining the cabin came



next; then a second shed room with fireplace was built against the cottage, continuous with the first shed. Later, a separate limestone house with sleeping loft was built nearby to accommodate the growing family which had grown to 12 members by 1881. A wellhouse and a smokehouse of large limestone blocks also were built during Sauer's occupancy.

Sauer sold the place to Herman Beckmann in 1900. Herman's son, Emil, acquired the homestead from his father. Around 1915, the Beckmann family built a Victorian-style frame house with a breezeway connecting it to the limestone house. A large wooden-frame barn also was constructed. The grounds of the restored Sauer-Beckmann Farmstead are now picturesquely defined by a cedar rail fence. A daughter of the Beckmann family lived in the homestead until it was acquired for the Lyndon B. Johnson State Historical Park in 1966.

Just as the Danz double cabin was hidden when the site was acquired, a log cabin at the Sauer-Beckmann farm also was concealed when the homestead was obtained. Perhaps the discovery of the cabin at the Sauer Homestead was more of a surprise because it was found partially reconstructed inside the barn where it was being used as a corn crib.

Each post oak log had been numbered by Beckmann, who had dismantled and reassembled it for use as a corn crib. Thus, when the decision was made to reconstruct it on the foundation of the original cabin, the numbered logs had only to be reassembled in a manner similar to working a jigsaw puzzle. Native limestone rocks set in lime and sand mortar were used to chink between the logs. In addition, the lean-to shed over the storage cellar was reconstructed, and the cellar was reexcavated as part of the site restoration. The inside walls of the reerected cabin have been plastered flush with the logs, and whitewashed.

Visitors to the Sauer-Beckmann Farmstead are taken back to the daily way of life on a typical Texas Hill Country farm in 1918 (see *Texas Parks & Wildlife*, November 1976). Park employees dressed in period clothing tend daily and seasonal chores around the farm and guide the visitor through this fascinating living history farmstead. Some of the regular chores include tending livestock, milking the cow, separating milk, churning butter and cooking on a wood-burning stove. Seasonal activities include hog butchering and sausage making, gardening, canning vegetables and making lye soap.

In 1872, Danz sold a portion of his land to yet another German immigrant, named Henry Christian Behrens. This property is centrally located between the Sauer farm and the Danz place. Soon after purchasing

this homestead, Behrens built a one-room log cabin with a loft. This cabin of post oak logs was similar to the one-room log structure at the Sauer place. However, the addition of another separate one-room cabin with a loft soon transformed its appearance to that of the Danz double log cabin. Both cabins were connected by one long roof, creating a central breezeway or dog trot. Limestone rocks, bonded by a sand and lime mortar, were used to chink the gaps between the handhewn logs. Like the northern dog trot cabin on the Danz homestead, neither of the rooms in the double log cabin at the Behrens complex had a fireplace. Heat in the Behrens cabin was provided by wood-burning stoves.

Other components at the Behrens site include the stone foundation of a one-room structure immediately north of the double log cabin, and a limestone-lined cellar with a connecting retaining limestone wall built along a creek bed immediately south of the double log cabin. The well at this complex now is being pumped with a modern windmill.

Descendants of Behrens lived at the homestead until the property was sold to Earl W. Sweeney in 1960. The Sweeney family lived at the site until it was purchased for the Texas Parks and Wildlife Department in 1966.

Just as the Danz double log cabin had been completely engulfed by more modern Victorian additions, so it was with the double log cabin at the Behrens homestead. Again, when the historic log cabin was discovered during demolition of the more modern house, removal of the remaining additions was done with care. During this work it was learned that only the walls of the original dog trot cabin remained. Consequently, a new upper section and a surrounding porch were designed to incorporate the original walls of the log cabin into the new visitor center complex of the park. The two original log rooms now house a historical exhibit of early Texas furnishings typical of those which would have been used to furnish such a cabin.

The composite view afforded through the interpretation of the Danz, Sauer-Beckmann and Behrens cabins gives visitors the opportunity to identify with the everyday life of early Texas Hill Country settlers. These log structures are not shrines; on the contrary, they provide a candid, three-dimensional means of re-evaluating our pioneer heritage. One of the most valuable and enjoyable aspects of this vibrant, outdoor interpretive program is that the visitor is able to experience through the living history exhibits the characteristics of pioneer life which have shaped our present. **

As in the Danz cabin, walls of an original dog trot cabin were found during the demolition of the Behrens house. A new upper section and a surrounding porch were designed to incorporate these walls into the new visitor complex center at the park. The log rooms now house a historical exhibit of early Texas furnishings typical of those which would have been used in such a cabin. These log cabins are not shrines; they merely provide a three-dimensional view into the past to make us aware of our pioneer heritage.

around the state...

News of the Texas outdoors from the Parks & Wildlife Department's news service.

Spike Bucks Protected in Comal, Houston Counties

AUSTIN—The Texas Parks and Wildlife Commission has yielded to the wishes of the commissioners courts of Comal and Houston Counties to allow protection for spike bucks.

P&W commission members emphasized that they disagree with the reasoning behind the local counties' request, since department biological studies have indicated that spike bucks (bucks which have protruding antlers but no forked antler) are inferior animals with less growth potential than forked-antler bucks.

Delegations from the two counties told the commission that they felt protection of spikes was needed to provide a carry-over of bucks for breeding purposes and to give spikes time to grow into better quality (forked-antler) deer.

A statement to the commission by Charles Winkler, the department's big game program director, said "A high incidence of spike-antlered bucks in the population is a symptom of poor nutritional conditions. Protection of the spike segment of the population will not improve these conditions, which historically have been caused by man's manipulation of the habitat to

Remember Three Rules of Gun Safety

AUSTIN—The Hunter Safety Section of the Texas Parks and Wildlife Department asks hunters to remember the three primary rules of gun safety when they take to the field this year.

1. Treat every gun with the respect due a loaded gun.
2. Always point the muzzle in a safe direction.
3. Be sure of your target and beyond before you fire.

There also are some other safety tips to consider: Use the proper ammunition for your gun and be sure the weapon is in safe operating condition. Use good sportsmanship and self-control, respecting the rights of other hunters, hunting laws, wildlife and landowners.

Have a good and safe hunting season.



*HANDLE WITH CARE—
The TP&W Department
reminds hunters they have a
responsibility for gun safety
each time they go afield.*

increase the productivity of resources other than wildlife. Protection of spikes may, in fact, further aggravate the problem if another segment of the population is not removed to compensate for the forage consumed by the protected segment."

Spike bucks are not protected in regulatory counties except those counties in which the county commissioners courts have objected to removing the protection and in Medina County, where the department is experimenting with a bag limit that involves protecting spikes.

Swordfish Record Broken, Rebroken

AUSTIN—July was a good month for broadbilled swordfish.

Two new state records for the species were certified by the Texas Parks and Wildlife Department's Texas State Fish Records Committee, and it could have been three had the timing been a little different.

It all started on July 15 when Joe Johnson of McAllen caught a 158-pound broadbill off Port Isabel, displacing the record of 99 pounds set in July 1977 by Skip Martin of Cleveland. Johnson's new record fish was eight feet, 11 inches in length, with a girth of three feet, two inches.

Before Johnson's record was

even 24 hours old, Mrs. Joan Pulley of Seabrook reeled in a 176½-pound broadbill south-southeast of Galveston. The nine-foot, two-inch swordfish, 42½ inches in girth, became the official state record.

On July 29, Kirk Elliott of Galveston landed a 99½-pound broadbill at Freeport. It bested the 1977 record by half a pound, and would have stood as a record for a while if it had been caught before Johnson's and Mrs. Pulley's fish.

Dr. James E. Weaver, director of finfish for the department's coastal fisheries branch, credited the record catches in part to increased angler activity. "Perhaps there is a more

active interest in Texas now in fishing for swordfish," he said.

"The department appreciates reports of catches of record-sized fish because it helps us in our management programs," noted Weaver.

Department officials have received a report of a 286-pound broadbilled swordfish caught August 23 at Port Aransas. When the angler submits his application to the department it will go to the Fish Records Committee for consideration, and possibly will become yet another state record.

The broadbilled swordfish story may not be over yet.

Commission Adopts 1978-79 Migratory Bird Seasons

AUSTIN—The Texas Parks and Wildlife Commission has adopted the 1978-79 regulations for ducks, geese and other migratory waterfowl, with only minor changes from the previous season.

Working within federal guidelines, the commission increased the duck season from 55 to 60 days, removed the Mexican duck from the protected list and made some minor changes in the point system of bag limits.

The commission's primary decision among the options presented by the department staff was to choose the one which allows hunters in the eastern portion of the state to hunt during the week before Christmas rather than the week after Thanksgiving.

Dr. Harold Irby, coordinator for the department's migratory bird programs, said the comments from interested parties at the meeting indicated that they feel the Christmas week option offered more hunting opportunity.

In eastern Texas, the 60-day split duck season will be Nov. 4 through Nov. 26, and Dec. 16 through Jan. 21. Bag and possession limits are determined by the 100-point rating system.

The 72-day season for dark geese (Canada, white-fronted) in eastern Texas also will have a split, Nov. 4 through Dec. 8, 1978, and starting again (concurrent with the duck season) on Dec. 16 and running through Jan. 21, 1979.

For light geese (blue, snow) in eastern Texas, the 79-consecutive day season is Nov. 4-Jan. 21 (no split season).

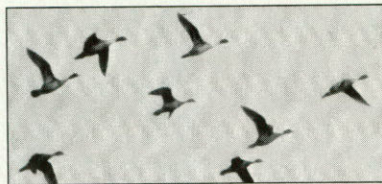
The goose bag limit for eastern Texas is five per day, five in possession. The daily bag limit may not include more than one Ross' goose and no more than either one Canada goose or one white-fronted goose. The possession limit may not include more than one Ross' goose and no more than two Canada geese or two white-fronted geese or one Canada goose and one white-fronted goose.

NOTE: For ducks, eastern Texas is considered to be east of a line formed by U.S. 277 from Del Rio to Abilene, U.S. 351 to Albany, U.S. 283 to Vernon and U.S. 183 to the Oklahoma-Texas line. For geese, eastern Texas is considered to be

east of a line formed by U.S. 81 from Mexico to Oklahoma.

In western Texas (High Plains Mallard Management Unit), there will be a combined 83-day duck and goose season beginning Oct. 31 and running through Jan. 21, 1979. Bag limit is five per day, five in possession. Goose daily bag limit may include no more than two dark geese and one Ross' goose. The possession limit may not include more than one Ross' goose and four dark geese.

The Mexican duck, which formerly was protected by federal statute, has been reclassified as a subspecies of the mallard. Recent studies have shown that most of the "Mexican" ducks in Texas actually are a hybrid between the Mexican duck and the mallard. True Mexican ducks are numerous in their native range in Central Mexico, Irby said.



The Mexican duck was placed in the 70-point category for this season, along with mallard hens, wood ducks, redheads and hooded mergansers.

The baldpate (widgeon) was lowered to 10 points throughout Texas, and the mallard drake and mottled duck were raised from 20 to 25 points in East Texas because of reported poor mallard production in Canada this year.

The duck point system is:

100-point ducks—Canvasback only except the season is closed to canvasback and redhead hunting in Brazoria, Chambers, Galveston, Harris, Jefferson and Orange Counties.

70-point ducks—Mallard hens, wood ducks, redheads, Mexicanlike ducks and hooded mergansers.

10-point ducks—Blue-winged teal, green-winged teal, cinnamon teal, pintail, gadwall, scaup, widgeon, shoveler and mergansers (except hooded).

25-point ducks—All other species and sexes. The season is closed on masked ducks and black-bellied and fulvous whistling (tree) ducks. Except: In the High Plains Mallard Management Unit, mallard drakes are 20 point ducks instead of 25.

Coots—Daily bag limit 15, possession 30.

The commission also set the season for lesser sandhill (little brown) crane (Zone B) at Dec. 5 through Jan. 31, 1979. Zone A (western-most area) is Oct. 31 through Jan. 31, 1979. Bag limit is three, possession six. A special permit, issued free of charge by the department, is required to hunt, shoot or kill lesser sandhill cranes in areas where a season is provided.

The woodcock season was set Nov. 18 through Jan. 21, 1979. Bag limit is five, possession 10.

Common or Wilson's snipe season will be Nov. 4 through Feb. 18. Bag limit is eight, possession 16.

Shooting hours for all species are one-half hour before sunrise to sunset.

Information on all migratory bird seasons and bag limits as well as other related information will be available in the department's 1978-79 Migratory Game Birds Hunting Regulations pamphlet which will be available at license outlets across the state before Oct. 1.

Growth Rate Promising for Smallmouth Bass

AUSTIN—A smallmouth bass recovered from the Blanco River recently may indicate a good growth rate for fish stocked under the Texas Parks and Wildlife Department's smallmouth bass program.

The four-ounce, eight-inch smallmouth was picked up by department biologists in a survey some five miles north of San Marcos. The department stocked 40,000 of the species in that area in May 1977.

"This represented possibly the best growth in a stream that we have experienced thus far for smallmouth bass," said Wade Butler, smallmouth bass program leader. "Whether this is typical or not remains to be seen, but it certainly looks as though the fish was doing well."

The department began stocking smallmouths in 1974, starting with Lake Meredith and Stillhouse Hollow Reservoir. Fisheries biologists consider the smallmouth a promising nonnative game fish because it does well in steep-sided reservoirs and rocky areas of lakes where it is not a threat to large-mouth bass and other species.

Stocking Stuffers for the Outdoorsman

Long after Christmas stockings have been emptied *Texas Parks & Wildlife* magazine will bring cheer to the outdoorsman on your shopping list.



Bill Reaves

Hunters, fishermen, birders, backpackers, nature photographers—they'll all find something of interest on the magazine pages each month. And for \$5 for one year (12 issues) and \$9 for two years (24 issues), it's hard to find a Christmas present at those prices that gives so much enjoyment so long after it's received.

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Acres for the Asking

Texas has over one million acres available to hunters free of charge—a little more land than the size of Delaware and District of Columbia combined.

Various government agencies and private landowners in compliance with state and federal laws open this land to hunters with valid licenses.

Most agencies have printed maps indicating boundaries and specific information for the hunter's convenience. Sportsmen should contact the agencies for location, type of game available and any restrictions on hunting.

In wooded areas, boundaries are not marked by fences. Instead, trees are marked with red or white paint, depending on the owner. The Corps of Engineers has placed small monuments at various intervals to mark its boundaries. The hunter should be alert and not stray onto adjacent property. Also, the Corps of Engineers generally restricts hunting to the use of bow and arrow or a shotgun loaded with shot. The hunter must also obtain a permit to construct a duck blind on the water and pay a deposit.

Although hunting on National Forest land is free, a noncommercial vehicle permit must be purchased for overnight camping in most developed recreational areas.

Sportsmen are urged to use extra caution while hunting on unfamiliar land because other hunters will be out at the same time. To prevent accidents, it's wise to wear fluorescent orange vests and caps.

Also, the hunter should pay close attention to his location and be watchful for residential areas or houses. Most of the agencies prohibit hunting within 200 yards of the land and water boundaries, parks and developments.

The order of the day is "leave only your tracks behind." To insure clean hunting land for the following year and to show appreciation for the property, leave a tidy area.

The sportsman is not guaranteed a bag. But who can go wrong with more than a million acres of land to hunt on free? For more information concerning game and maps, the hunter is urged to call or write each of the agencies and companies which make this land available. Happy hunting!

Acres for the Asking

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ph. 817 694-3189
14,221 acres available

NATIONAL FOREST LANDS

658,000 acres total

HEADQUARTERS

U.S. FOREST SERVICE

P.O. Box 969
Lufkin, TX 75901
ph. 713 632-4446

Game hunted on all national forest lands:
squirrel, deer, rabbit, dove, ducks and
quail.

ANGELINA NATIONAL FOREST

District Ranger
P.O. Box 756
1907 Atkinson Dr.
Lufkin, TX 75901
ph. 713 634-7709

SAM HOUSTON NATIONAL FOREST

San Jacinto Ranger District
P.O. Box 1818
Cleveland, TX 77327
ph. 713 592-6462

DAVY CROCKETT NATIONAL FOREST

Neches Ranger District
East Loop 304
Crockett, TX 75835
ph. 713 544-2046

SAM HOUSTON NATIONAL FOREST

Raven Ranger District
P.O. Box 393
New Waverly, TX 77358
ph. 713 344-6205
Camping is restricted to designated areas
during the deer hunting season.

SABINE NATIONAL FOREST

Tenaha Ranger District
Sparks Bldg.
101 S. Bolivar
San Augustine, TX 75972
ph. 713 275-2632

DAVY CROCKETT NATIONAL FOREST

Trinity Ranger District
P.O. Box 130
Apple Springs, TX 75926
ph. 713 831-2284

SABINE NATIONAL FOREST

Yellowpine Ranger District
P.O. Box F
Hwy. 83
Hemphill, TX 75948
ph. 713 787-3870

RITA BLANCA NATIONAL GRASSLAND

P.O. Box 38
Texline, TX 79087
ph. 806 362-4254
Plains game only (no deer or waterfowl).

CADDO & LYNDON B. JOHNSON NATIONAL GRASSLANDS

P.O. Box 507
Decatur, TX 76234
ph. 817 627-5475

NATIONAL WILDLIFE REFUGES

61,140 acres

LAGUNA ATASCOSA

Refuge Manager
P.O. Box 2683
Harlingen, TX 78550
ph. 512 423-8328
19,240 acres available
Game hunted: deer only on first three
weekends in October with bow and arrow only.
Hunt may be canceled during some years depending
on management programs; however, during most
years it will be held.

ARANSAS

Refuge Manager
Austwell, TX 77950
32,000 acres available
Game hunted: deer (three deer—only two bucks)
and wild hog with bow and arrow only during
special archery season (no javelina).

BRAZORIA/SAN BERNARD

Refuge Manager
P.O. Box 1088
Angleton, TX 77515
ph. 713 849-6062
9,900 acres available
Game hunted: ducks, geese and coots.

NATIONAL PARK SERVICE RECREATION AREAS

26,700 acres

AMISTAD RECREATION AREA

Superintendent
National Park Service
Amistad National Recreation Area
P.O. Box 1463
Del Rio, TX 78840
ph. 512 775-7491
1,700 acres available
Game hunted: dove, quail, waterfowl and deer
by bow and arrow.

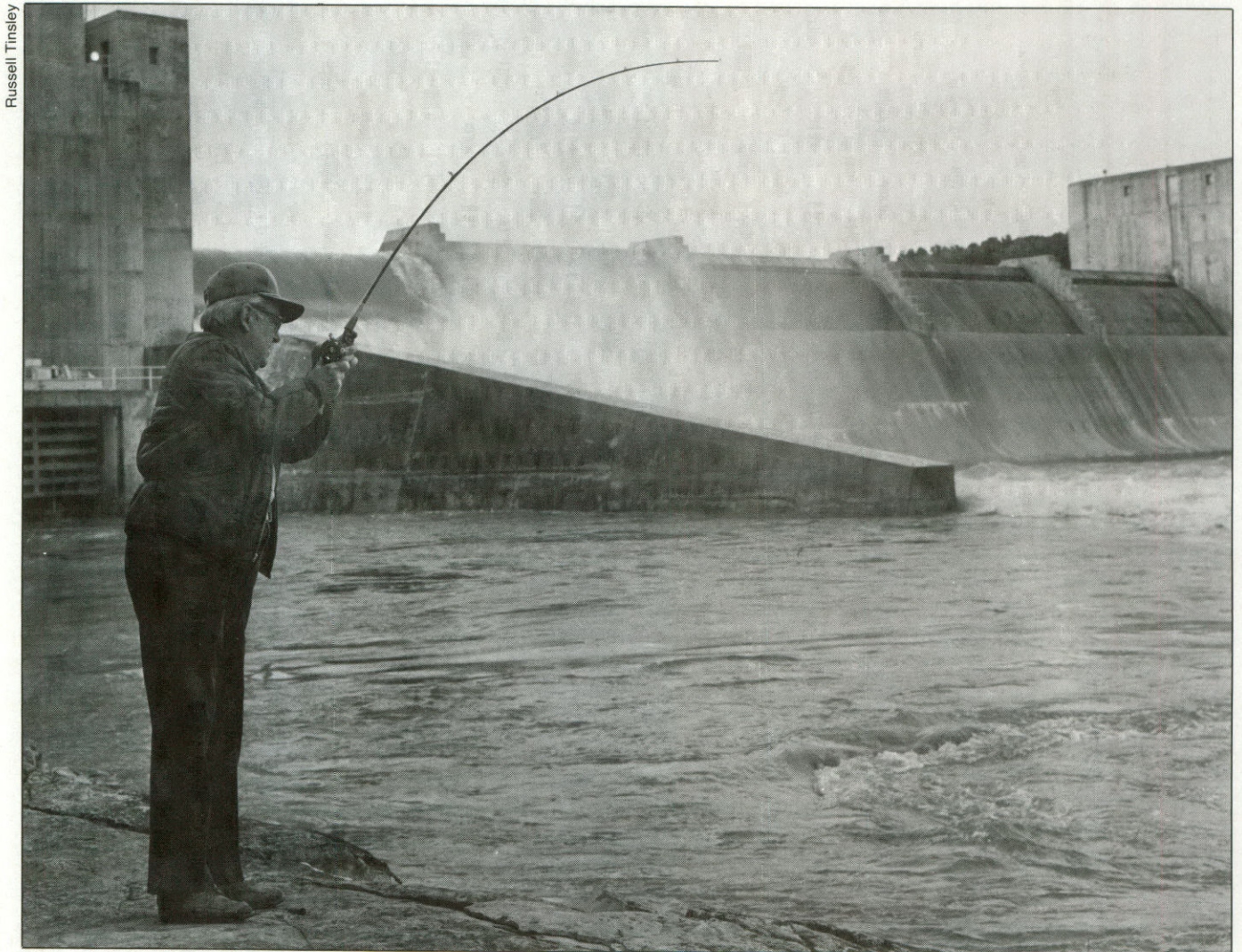
LAKE MEREDITH RECREATION AREA

Superintendent
National Park Service
Lake Meredith Recreation Area
Box 1438
Fritch, TX 79036
25,000 acres hunting land
7 to 10,000 acres by water
Game hunted: mule and white-tailed deer,
quail, turkey, dove and assorted waterfowl.
Hunting pressure is extremely heavy during
the deer season and chances of bagging a deer
or turkey are very slim.

Gaspergou

Freshwater member of the drum family

by Rhandy J. Helton, Fisheries Biologist



Russell Tinsley

With the variety of game fish available in Texas reservoirs, little thought usually is given to the freshwater drum, a fish relegated to nongame status.

Common to all of the river systems in Texas, the drum or gaspergou is the lone freshwater member of a predominantly saltwater family. It is related to the redfish, black drum and speckled trout and can be an excellent fighter on rod and reel.

A characteristic of this group of fishes is the ability to produce a drumming sound with their air bladder. Scuba divers have reported hearing this sound when swimming near a school of them, but most anglers become familiar with the sound when hearing it under a boat or when a drum is landed.

The drum is a silvery iridescent color, but in some waters it may take on a dark or almost black hue. Its grayish opaque eyes give it a distinctive look.

An internal anatomical feature of the freshwater drum is its otoliths, which are calcified bonelike structures that occupy part of the cranial cavity. Otoliths are not rare, as all fish have them; however, all fish do not have otoliths as large as those in the freshwater drum. Otoliths from large drum have been found in

Indian mounds and campsites. Whether they were used for decorations, charms or for grinding stones by the Indians is still a matter of conjecture.

Angling for the freshwater drum can be enjoyable almost any time of the year. Sophisticated fishing gear is not necessary. Because the drum is well suited to the river environment many enjoyable hours can be spent bank fishing on your favorite stream. Although not restricted to streams, most freshwater drum caught in our lakes are incidental while fishing for other species.

Drum can be caught on a variety of bass plugs such as swimming baits, spinner baits and crappie jigs. Serious drum fishermen prefer to stillfish using bait fished on the bottom. Crawfish, shrimp and minnows are excellent baits. A staple of the drum's diet is the freshwater clam. The drum feeds extensively on freshwater clams, using powerful, molarlike pharyngeal teeth to crush the shell and then feasting on the soft inner parts. Possibly many fishermen are missing out by not using the innards of clams as drum bait.

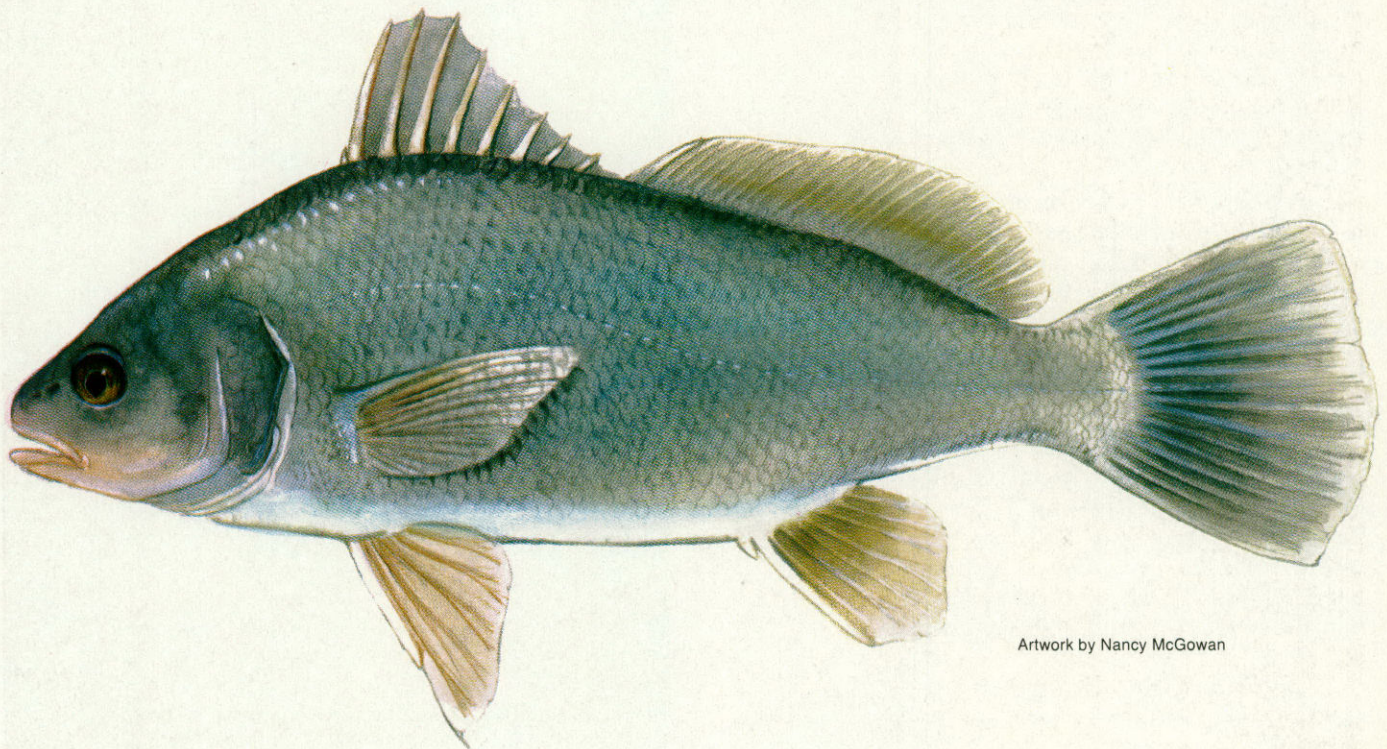
Since drum are bottom feeders, the bait needs to be fished on or near the bottom. Drum congregate

in huge numbers below dams and these tailrace areas are the most likely places to make a good catch. A one-ounce sinker or heavier should be used to put the bait on the bottom. In reservoirs, trolling with a deep-diving lure or live bait such as a crawfish or minnow is a good fishing method. By using a walleye trolling rig, you not only will catch drum, but probably many other game fish. Another common method of catching drum is by jigging crawfish or minnows around brush tops, fallen logs or other cover or by fishing on the bottom of deep pools just below riffle areas.

Freshwater drum are among the few species of fish which may be speared from inland waters. As such, they are fair game for skin and scuba divers.

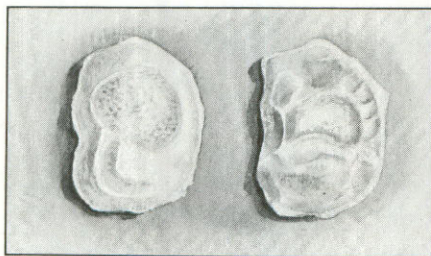
The state record freshwater drum caught on rod and reel weighed 25 pounds nine ounces and was taken from Eagle Mountain Lake near Fort

Drum congregate in large numbers below dams, so these tailrace areas are the most likely places to make a good catch. Be sure to use a sinker heavy enough to put the bait on the bottom where the gaspergou feeds. Crawfish, shrimp and minnows are excellent natural baits. Drum also can be caught on bass plugs, spinner baits and crappie jigs.



Artwork by Nancy McGowan

Otoliths, calcified bonelike structures found in the cranial cavity, are used to detect sound vibrations in the water and maintain the fish's balance. All fish have them; however, none have otoliths as large as those of the freshwater drum. When handling a drum, use caution. Its gill covers are sharp and can cause painful cuts.



Worth in 1976. A 55-pound drum was caught on a trotline in White Rock Lake in Dallas in 1924. These are extraordinary sizes as the average weight usually runs from one to three pounds. A three pound drum is a match for any fisherman. Don't expect an aerial display of acrobatics when one is hooked because the drum exercises its strength in powerful, deep runs. Play the fish carefully, wearing it out and then netting it. Care must be used when handling drum because the gill cover is sharp and can cause painful cuts.

Considered by many as a rough fish, the freshwater drum often is overlooked for its food value; hence the resource is wasted. Since drum are relatively easy to catch, the problem becomes not so much how to catch them, but convincing yourself to take them home for supper.

In the eastern half of the United States the freshwater drum is an important commercial food fish. Drum fillets have no "Y" or intermuscular bones, and whether baked, broiled, fried, or pickled, the fish is reported to be a delicacy on the table.

In addition to the ways you usually prepare fish, here are some other recipes to try.



Drum Recipes

Oriental Fish Bake

1 pound fillets
1 can mandarin orange segments (11 ounce)

1 can cream of mushroom soup
1 cup sliced celery
½ cup chopped onion
½ cup chopped salted peanuts
½ teaspoon salt

1 can chow mein noodles

Cut fish into 1-inch pieces. Drain orange segments; saving ¼ cup syrup. Put back a fourth of the orange segments for garnishing. Combine soup, orange syrup, remaining orange segments, fish, celery, onion, peanuts, salt and half of the noodles. Spread mixture into shallow 1½-quart casserole. Cover with foil, crimping it to edges of casserole. Bake in moderate oven, 350° F., for 30 minutes. Uncover and sprinkle with remaining noodles. Cook another 10 minutes or until hot and bubbly. Fish should flake easily when tested with a fork. Garnish with orange segments.

Oriental Fillets

1 pound fresh fillets
1 small onion
1 slice ginger
½ cup sherry
1½ teaspoons sugar
½ teaspoon salt
1 egg
1½ tablespoons cornstarch
3 tablespoons flour
Sesame seeds
Oil for frying

Cut fillets into narrow strips. Mince onions and ginger; add sherry, salt and sugar. Pour mixture over fish and let stand for 15 minutes, turning fish occasionally. Drain. Beat eggs lightly and blend in cornstarch and flour to make batter. Dip fish in batter and roll strips in sesame seeds. Heat oil. Add strips of fish a few at a time and fry until golden brown, about one minute. Drain and serve.

Creole Fish with Rice

1 pound fillets
1 cup sliced onion
1 cup sliced celery
2 tablespoons margarine or cooking oil
1 tablespoon flour
1 can tomatoes (16 ounce)
½ cup chopped green pepper
1 teaspoon garlic salt
½ teaspoon chili powder
dash of pepper

4 servings hot cooked rice

Cut fish into 1-inch pieces. Cook onion and celery in margarine or oil until onion is tender but not browned. Stir in flour. Add tomatoes, green pepper and seasonings. Mix and cover to simmer about 20 minutes. Add fish and simmer uncovered about 10 minutes or until fish flakes when tested with a fork. Serve over rice.

Spanish Fillets

2 pounds fillets
2 tablespoons salad oil
2 tablespoons soy sauce
2 tablespoons Worcestershire sauce
1 teaspoon paprika
½ teaspoon chili powder
½ teaspoon garlic powder
dash hot pepper sauce

Place fillets in a single layer in well-greased casserole dish. Combine remaining ingredients and pour resulting sauce over fillets. Broil four inches from heat source until fillets flake easily when tested with a fork, about 10 to 15 minutes. Baste once during broiling with sauce in dish. Garnish with lemon wedges.

Pickled Fish

2 cups vinegar
1 cup sugar
¼ cup salt
2 tablespoons pickling spices
Onions, sliced
Fish, skinned and cut into bite-sized chunks

Pour vinegar into quart jar. Add sugar, salt and spices. Screw lid on jar and shake mixture until salt and sugar dissolve. Place alternate layers of onions and fish chunks into pickling solution. Screw lid back on jar and put jar in refrigerator. In a week or two the fish will be ready to eat. **

Sitting undetected in a blind while a wild animal passes a few feet away is about as close to being invisible as a human can be. This cloak of invisibility has been used for centuries by hunters and wildlife observers. With the advent of modern photographic equipment and blinds, it also can be used to good advantage by the wildlife photographer.

By carefully constructing a blind, picking the site and using some type of bait or lure to bring in subjects, a photographer is in more control of the situation and the odds on success are better than when wandering around the woods, camera in hand.

Since most animals respond to movement instead of form and color, modern photographers don't have to go to the extremes that bird photographers did in the early 20th century. They sometimes disguised themselves as tree trunks, cows or sheep in an effort to get photos undetected.

A good blind can be nothing more than a few branches piled up around the base of a tree. Such impromptu blinds obscure the photographer, but do not completely conceal him. Movement in such a hastily constructed blind at ground level will be detected by a white-tail or wary turkey gobbler. Place the blind in shadow and avoid backlighting that will cause a silhouette.

Camouflage clothing and makeup is vital to the photographer who depends on improvised blinds. Camouflage-patterned clothing is widely available. Grease-stick cam-

ouflage paint commonly used by bow hunters and spring turkey hunters is ideal for wildlife photographers. A note of caution to those photographers afield during hunting season: if you're sharing an area with hunters, be sure they know where you are and stay in one spot rather than slinking about in camouflage clothing. Some manufacturers also sell camouflage patterned jackets in blaze orange which easily can be detected by humans but are just as effective on color-blind white-tailed deer as the usual green and brown combinations.

Construction and design of more permanent blinds is limited only by

your imagination and pocketbook. Light-weight portable metal blinds are available which can be moved from one site to another. Wooden structures covered with natural or man-made materials usually are set up with the intention of leaving them in one spot.

One disadvantage of the rigid frame blinds is they are limited to use on level ground. A way to get

This yellow-breasted chat appears to be in a natural setting, but it was attracted to a camouflaged fiberglass pool constructed 12 feet from a permanent blind. Portable blinds (right) are handier for photographers who must shoot in different locations.



Barth Schorre

Hidden Photographer



Glen Mills

around this is to use telescoping tent pole legs as the frame with some type of crossmembers to hold them rigid. Adjust the tent poles to the terrain, cover with camouflage fabric or natural material and you're in business.

If you do use fabric to cover the blind frame make sure it is securely fastened. Windblown movement of even camouflage material will spook animals. Don't forget to leave yourself an entrance and plenty of openings or slits in the material to offer a wide photographic range.

Location of the blind is more important than construction or materials. The blind has to be in an area frequented by animals. This could be a feeding area, water hole, nest site, booming or mating ground. Many photographers use bait to bring in subjects, especially birds. Correct habitat for your subject is the best bait. If the animals' needs for food, water and cover are provided near your blind site, you'll get photo opportunities.

Elevated hunting stands common to many parts of Texas can double as photo blinds, both during and after hunting seasons. Movement inside the blind is not as critical as in those at ground level since these elevated stands usually are above the field of vision of most animals.

Some photographers object to the angle of pictures taken from elevated blinds. Unless you are taking photos of birds on much the same level as the blind, most of your pictures will be looking down on the backs of the subjects. Dramatic impact of a trophy buck's rack is not as great when looking down on it as when the photo is taken from ground level with sky in the background to outline it.

Since blinds offer a wildlife photographer the most control over his subjects, short of zoo specimens, they lend themselves to techniques such as strobe flash. If you have a baited spot where you know for certain that a bird will land, it's possible to set up a pair of strobes and prefocus the camera on that spot. This might be useful early or late in the day and when the baited area is in shadow.

Cumbersome equipment such as tripods, which many photographers are reluctant to haul around all day, could prove useful in a permanent blind, if there is enough room for the tripod and photographer. Large format cameras—2¼ and even 4x5—also can be used successfully from a blind.

Baits or lures of one type or another work well in photography from blinds. However, success of food as bait depends on its natural availability. In the winter when food is scarce, birds are easily attracted to feeders. Replace the wooden dowels on feeders with twigs or small limbs to make the setting more natural.

Be an opportunist; take advantage of natural shortages to get photos. In dry spells, set your blind close to water holes or stock tanks.

Predators can be lured to a blind with trapping scents, fish, chicken parts or anything else a fox or coyote might find tasty. The coyote on the August 1978 cover was brought into camera range with a predator call.

Hunters call up white-tailed bucks by rattling antlers together, and there's no reason why the technique shouldn't work for photographers as well. Many birds such as crows, hawks and owls can be called in with recordings.

There are other blinds designed to fit special situations—floating ones built on rafts for photographing waterfowl, elevated platforms close to bird nests with developing young and those at the entrances to animal dens.

Regardless of the type of blind, the key to success is patience. **

Perry Shankle Jr.





This three-sided blind obscures the photographer but does not completely conceal him. In such a blind the photographer must keep movements to a minimum and avoid backlighting that will reveal a body silhouette. Placing the blind in a shadowed area would improve concealment. Using a blind does not guarantee you will get spectacular wild-life shots, but the cloak of invisibility does give you an advantage.

Perry Shankle Jr.



Editor's Note: Under current Texas laws, handguns which use center-fire ammunition are legal means of taking game. Some municipalities have special ordinances on handguns and we suggest you contact local law enforcement officers before hunting any game with a handgun.

Throughout Texas it is illegal to use a .22 caliber jet gun or rocket gun or any firearm using rimfire ammunition in taking deer, antelope, elk and desert bighorn sheep. Ballistics of modern large-caliber handgun rounds make them as adequate for taking whitetails at close range as

some of the smaller rifle rounds. Excise taxes from the sale of handguns and ammunition contribute funds to this and other state game departments for conservation work and hunter safety instruction. Hunters using handguns in the field should always carry them where they are plainly visible. When transporting handguns to and from hunting areas they should be unloaded—as with all firearms—and locked away in a box in the trunk of your car. Hal Swiggett is a San Antonio outdoor writer and authority on handguns and hunting with them.

Hunting with Handguns

Article and Photos by Hal Swiggett



Ruger's Blackhawk
.357 magnum



Thompson/Center Contender
.22 Hornet with Bushnell 2 1/2 X scope



Charter Arms Pathfinder
.22 rimfire with Hutson 1X scope



Star Model B
9mm semiautomatic
with Hutson scope



Ruger's Blackhawk
.45 Colt with Hutson 1X scope

Hunting with handguns is one of the most fascinating challenges of the sport.

Rifles tend to be used for long shots, often at such a distance the animal is only a small object on the landscape. Shotguns seldom are fired at anything motionless, and as a result, the target isn't viewed closely. But with a handgun, most shooting is at targets less than 50 yards away. Occasionally longer shots are taken, but they should be made only under the best of circumstances and when the shooter is a skilled handgun hunter.

A handgun's effectiveness is limited because of its extremely short sight radius, the distance between front and rear sights. Just because a shooter can't keep a full cylinder of shots in a circle the diameter of a washtub at 100 yards doesn't necessarily mean it's the gun's fault. Sometimes that's true, but more often than not, misses are the fault of the shooter. The guns themselves can be accurate at that distance.

I own a .22 Hornet with a 2.5X scope that will put five shots in two inches all day long at 100 yards. This is accomplished with carefully tailored handloads but, nevertheless, the gun and ammo combination will produce constant groups of that size. Another of my guns, a .357 Auto Mag, has on many occasions put five shots in 10 inches at 200 yards.

To be practical handguns are intended for short range work. I've mentioned these two guns only to show they can be used farther than many might think, and long-range shooting with handguns isn't nearly so hard to learn as we often have been led to believe.

How do you get into hunting with a handgun?

Easy!

Buy or borrow one and start shooting on a range. Soon you will be able to hit your target at 45 or 50 yards.

There are certain things to look for in a gun if you intend to use it as a serious hunting handgun. I prefer a gun with at least a six-inch barrel. This puts more distance between front and rear sights and makes for better sight alignment between the two, which is critical to handgun

hunting. It also helps to have a ramp front sight with a red face and a wider-than-normal rear sight with a good square-cut notch featuring a white line inset into the blade around that notch. Trigger pull should be not less than three pounds nor more than four pounds and the stock should fit the hand. To bring down white-tailed deer I want a gun large enough to handle a .44 or .45 caliber handgun bullet.

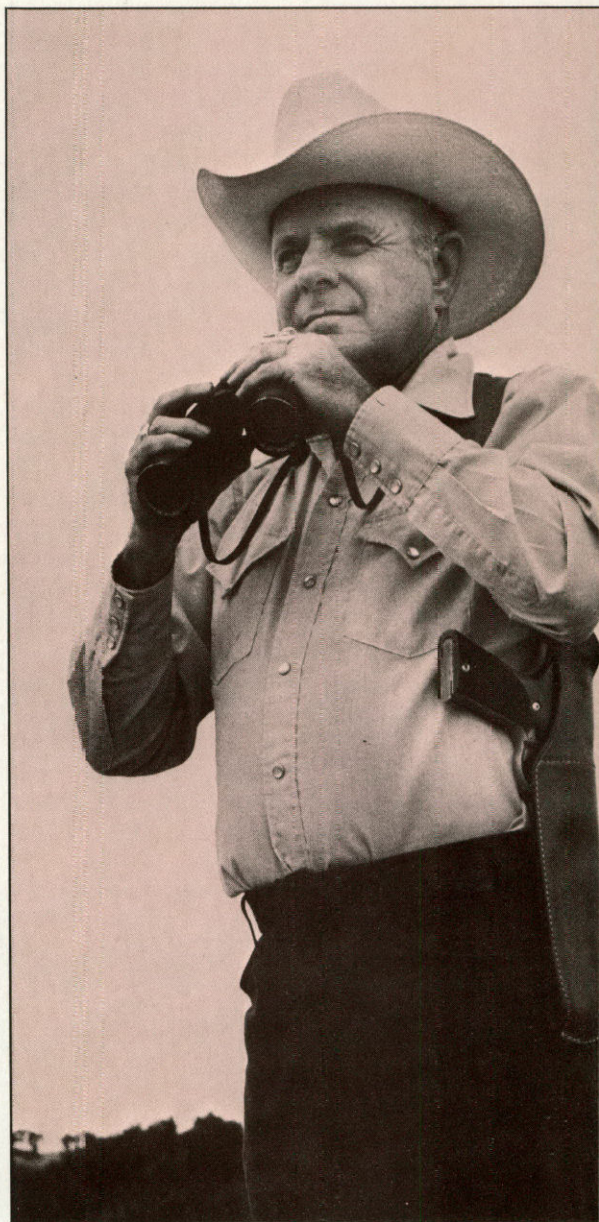
There are modern innovations where rifle cartridges are chambered in handguns to produce near rifle characteristics. In these cases my wants change, but for revolvers, the above requirements pretty well state my case.

Although not legal for taking deer and other large game, a .22 rimfire handgun is an excellent place to start and gain experience through target practice. It makes little difference whether the gun is a semiautomatic, revolver or single shot. Probably more self-loading .22s are used, but for the sake of safety, I suggest your first one be a revolver or single shot. Autoloaders are fine for the experienced shooter. Each time they are fired, the empty hull is ejected as the slide pushes back the hammer to full cock. A fresh cartridge is chambered as the slide goes forward. In other words, it is always ready to shoot instantly.

Revolvers have to be cocked to get a fresh cartridge under the hammer, which leaves them with an empty chamber once they are fired, and makes them a good deal safer.

If you're taking up handgun shooting for the first time, hold the gun with both hands; that's right—two hands. Grip the gun firmly in one hand, applying enough pressure to keep from dropping it. Place the gun-holding hand in the cupped palm of the other hand with cupped fingers forming around the lower three fingers of the shooting hand.

Push gently forward with the gun hand. This causes the support hand to pull back with the same amount of pressure. Only slight pressure is required, with no tensed muscles. You will find this the most solid off-hand shooting stance available to handgunners.



Because of the size of the .357 Auto Mag pistol, a shoulder holster is the only practical way to carry one in the field. In the hands of a skilled handgun hunter, the Auto Mag is capable of placing five shots in 10 inches at 200 yards; however, handguns are intended for short range work, usually less than 50 yards.

Start with targets close to the gun. Public ranges limit a shooter but five or six steps is enough if you are out in a pasture shooting at paper targets or cans. Never use bottles as targets. Regardless of the target, make sure you have a backstop such as a round of dirt or other material which will stop the bullet and not cause a ricochet.

It's hard to create an interest in something if at least a tiny degree of success doesn't come quickly. Hold the gun as mentioned above. Place the front sight in the rear notch so the top of each forms a solid line across the top of the rear sight. There should be equal daylight on each side of the front sight in the rear notch.

Hold this sight picture and place it on the target while gently squeezing the trigger. Done as described here, your first shot will be a hit.

As proficiency increases, let distance do the same. Before you know it cans easily can be kept rolling out to 25 or 30 yards.

When this happens you are ready for small game hunting. Cottontails are excellent game for .22 handguns and make fine meals. Squirrels are more demanding and jackrabbits are too large for .22s.

Those who shoot autoloading pistols will find the 9mm Luger and .38 Super great for jackrabbits and varmint hunting. The .45 ACP fits well here, too. No military type bullets should be used in any of these self-

loaders. Use either soft-point or hollow-point ammunition.

Revolver owners often graduate to a .357 magnum because it gives sufficient killing potential for game up to the size of deer. When a lighter load is needed, or for practice shooting, .38 Special ammunition can be used in .357 magnum guns, but not conversely.

My opinion is that the .357 isn't adequate for white-tailed deer but many are taken with the round every year. If you can place your shot with authority, you shouldn't have any trouble.

Use of scopes is argued pro and con throughout the handgun shooting fraternity. I happen to be highly in favor of them. Besides doing away with the open sight picture, they offer a clean view of what's going on. Many of us past 40 years of age have a hard time seeing handgun sights, and scopes are made to order.

For the sake of argument, why should a rifle shooter use a scope to more efficiently place a bullet and a

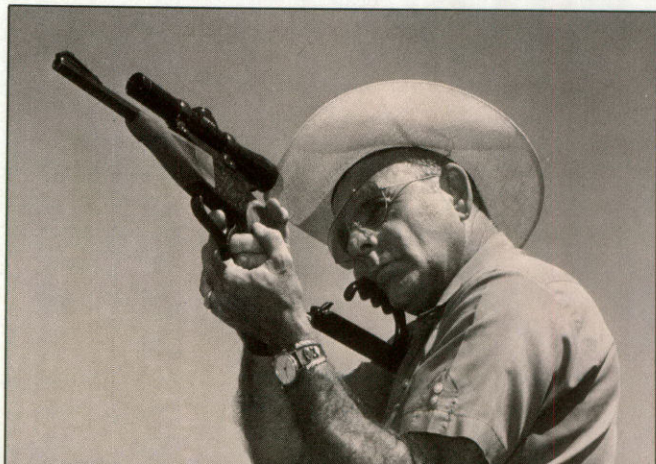
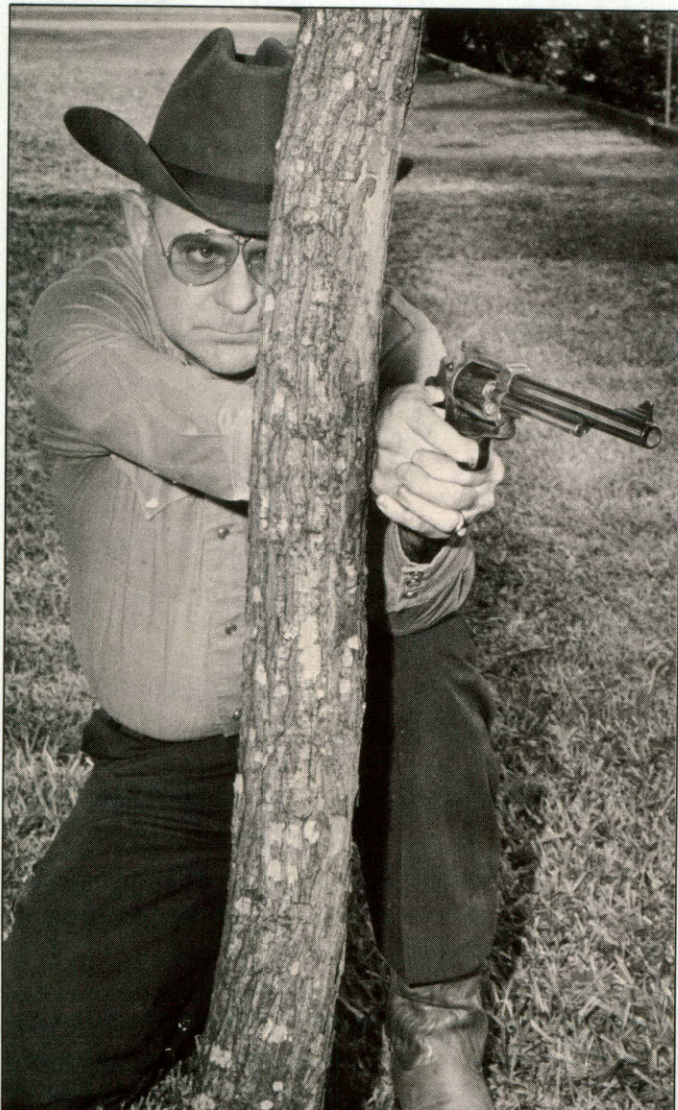
handgun shooter not use one for the same reason?

Handgun scopes are not meant to increase range. A handgun is a gun with limited range at best, so let's keep it honest. Use scopes for more efficiency in placing bullets and nothing more.

Take a crack at handgun shooting if you aren't familiar with the sport. If you shoot on ranges, get out and try a little pasture plinking. It's a lot more fun seeing cans fall over than watching tiny little holes appear in a piece of paper. Just make sure other people, houses and livestock are in no danger from a direct shot or ricochet.

First thing you know a cottontail will look big as a barn when you see him over the sights of your handgun. And he'll be just as easy to hit. **

Use a rest or brace of some type whenever possible. Bracing the off-hand against a tree will steady a handgun, but when shooting big bores, it's a good idea to wear gloves. That tree bark can rake off a lot of skin when the gun recoils.



LONG SHOTS SHORT CASTS

compiled by David Baxter

Politicians Tinkering with

Penn. Wildlife—Legislation is afoot in Pennsylvania apparently to end the autonomy of the state's two conservation agencies— Pennsylvania Fish Commission and the Game Commission. The state senate has passed a bill which gives the governor authority, with advice and consent of the senate, to appoint the agencies' executive directors. Outdoor editors in the state's press call the move an attempt to make the resource agencies "political footballs."

Matagorda Island to Feds.—

The U.S. Fish and Wildlife Service has obtained a permit from the Air Force to manage its property on Matagorda Island for one year, from July 1, 1978, to June 30, 1979. The land includes the 18,992-acre former bombing range and the 6.9-acre Port O'Connor dock annex. Matagorda Island has been identified as one of the most important wintering grounds for migratory waterfowl on the Texas Coast, and included on President Carter's list of key barrier islands worthy of preservation. Its freshwater ponds, grasslands, marshes and beaches provide habitat for a wide variety of wildlife. Matagorda will be open for public recreation, including fishing, swimming, beachcombing, wildlife observation and backpack camping. Visitors to Matagorda will have to provide their own transportation to and from the island. No special facilities will be available, except water and temporary shelters near the dock annex.

Whooping Crane Habitat

Designated—Nine areas in seven states have been determined as critical habitat for the endangered

whooping crane. They include: Aransas National Wildlife Refuge in Texas, Gray's Lake National Refuge in Idaho, hatching site for transplanted whooper eggs; Bosque del Apache Refuge in New Mexico; Salt Plains Refuge in Oklahoma; Quivera National Wildlife Refuge and Cheyenne Bottoms State Waterfowl Management Area, both in Kansas; 55 miles of state and privately owned Platte River bottoms between Lexington and Shelton, Nebraska; Alamosa and Monte Vista Refuges, both in Colorado. Designation of these areas means that under the federal Endangered Species Act federal agencies cannot authorize funds or carry out any project that adversely affects the species' habitat.

"Mexican Duck" off

Endangered List—Remember all the flap last fall about Mexican ducks and closing portions of West Texas to duck hunting because of their presence? Well, forget all that because what were once known as Mexican ducks in the United States have been removed from the endangered species list because their existence is not threatened. The birds in the U.S. have been determined to be hybrids of the common mallard and the true Mexican duck. Decision to remove the so-called Mexican ducks from the endangered species list came after a review of the species in Arizona, Texas and New Mexico. No threats were found to the existence of either the 50,000 pure species in central Mexico or the 5,000 hybrids in the U.S. and northern Mexico.

1977 License Sales Set—

Hunters and fishermen spent a record \$329 million on licenses, tags, permits and stamps last year. California led the nation in sales of fishing licenses and Pennsylvania in sales of hunting licenses. Texas ranked sixth in fishing licenses and fourth in hunting licenses.

Texas Fish and Salamander

due more Protection—The U.S. Fish and Wildlife Service has proposed that the San Marcos gambusia be included on the Endangered Species List and the San Marcos salamander on the Threatened List. Both the fish and salamander live only in the San Marcos Spring and that area of the spring which flows into the upper portion of the San Marcos River.

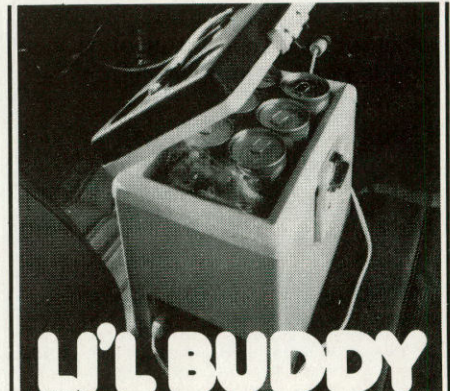
Both species are jeopardized by the threat of lowered stream flows caused by pumping of ground water in the area. The San Marcos gambusia lives only in shallow, slow water without dense vegetation. The salamander lives mainly in dense mats of algae in a small part of the San Marcos Spring Lake.

Duck Populations Up—

Surveys done during the latter part of the summer of duck breeding areas show an eight percent increase in the breeding population over last year. A larger portion of this year's ducks was found nesting in the prairie potholes of the Dakotas, Alberta, Saskatchewan, Manitoba, Montana and Minnesota. These areas receive highly variable amounts of rain and their capability to support breeding ducks varies from year to year.

510-million-year-old Fossil

Found—Discovery of the bony, fossil remains of a primitive, jawless fish makes us all a little older. The 510-million-year-old fossil was found in northeastern Wyoming and extends the age of the earliest known fossils of vertebrate animals by about 40 million years.



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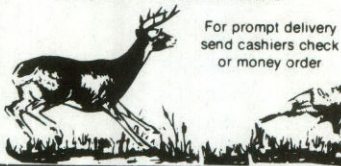
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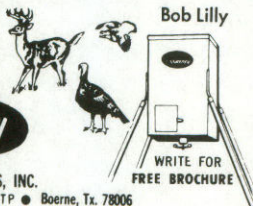
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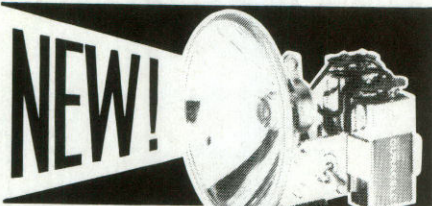
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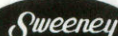
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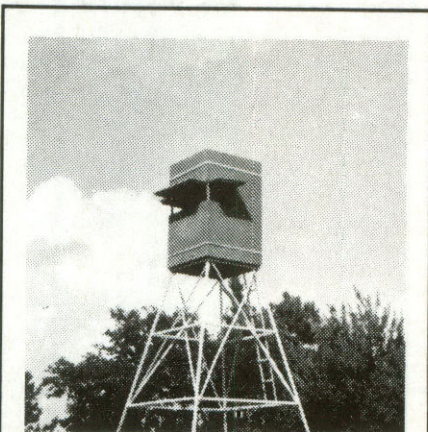
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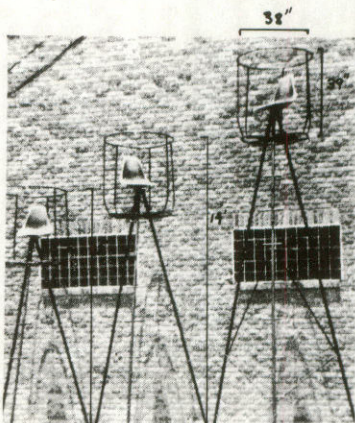
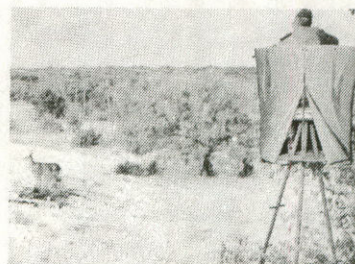
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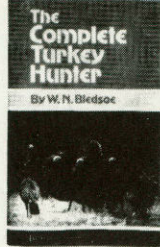
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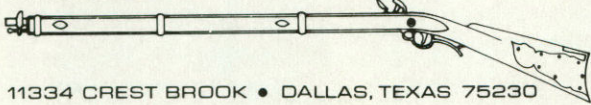
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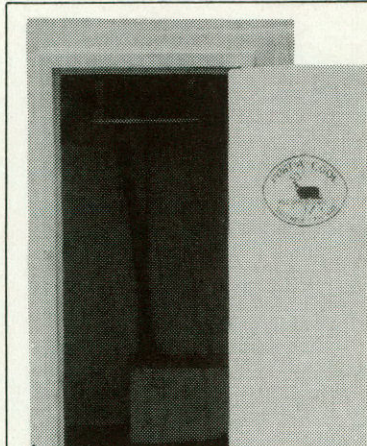


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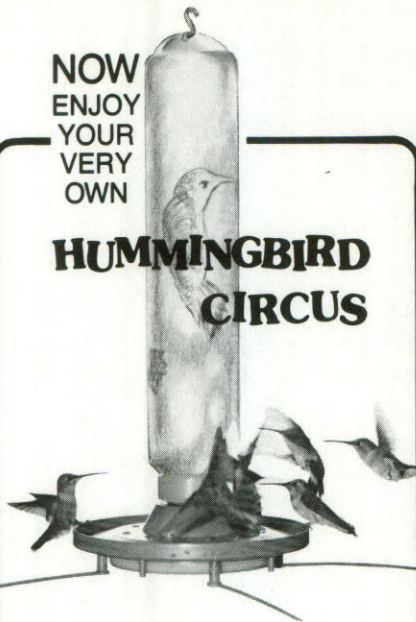
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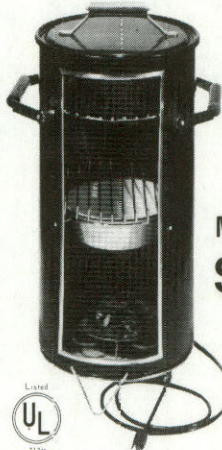
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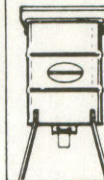
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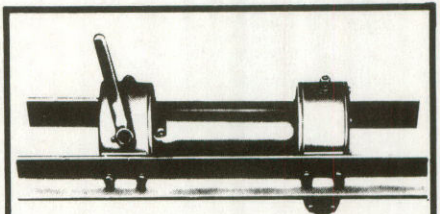
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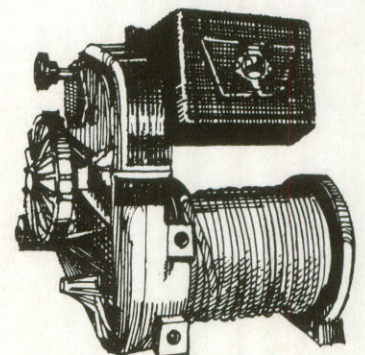
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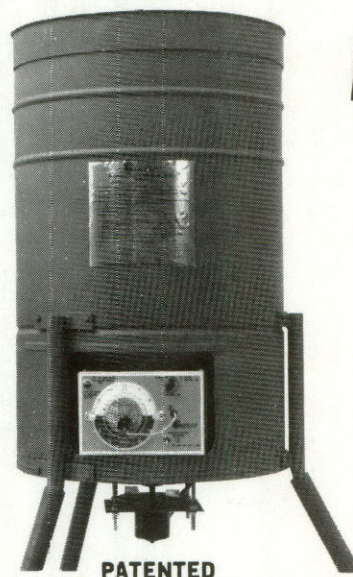
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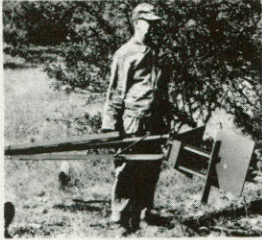


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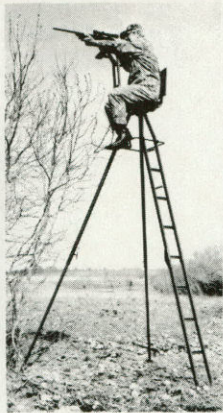


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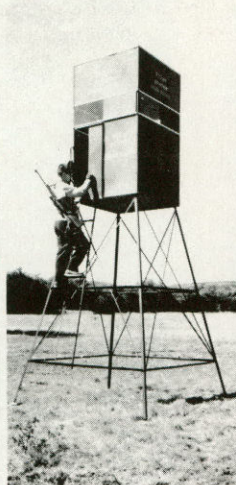
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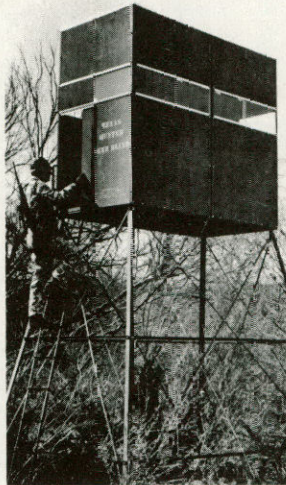


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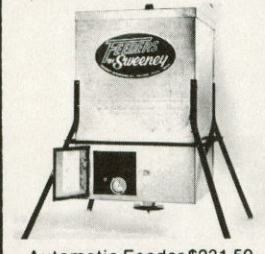


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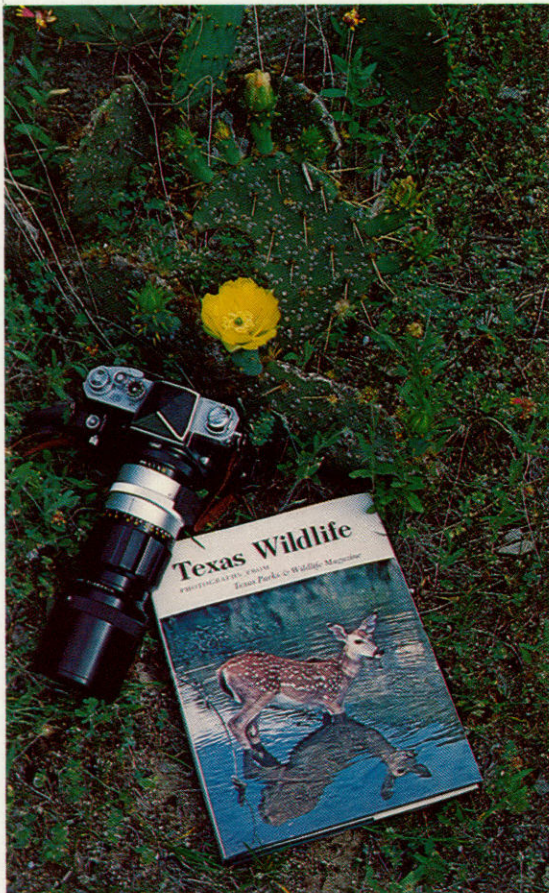
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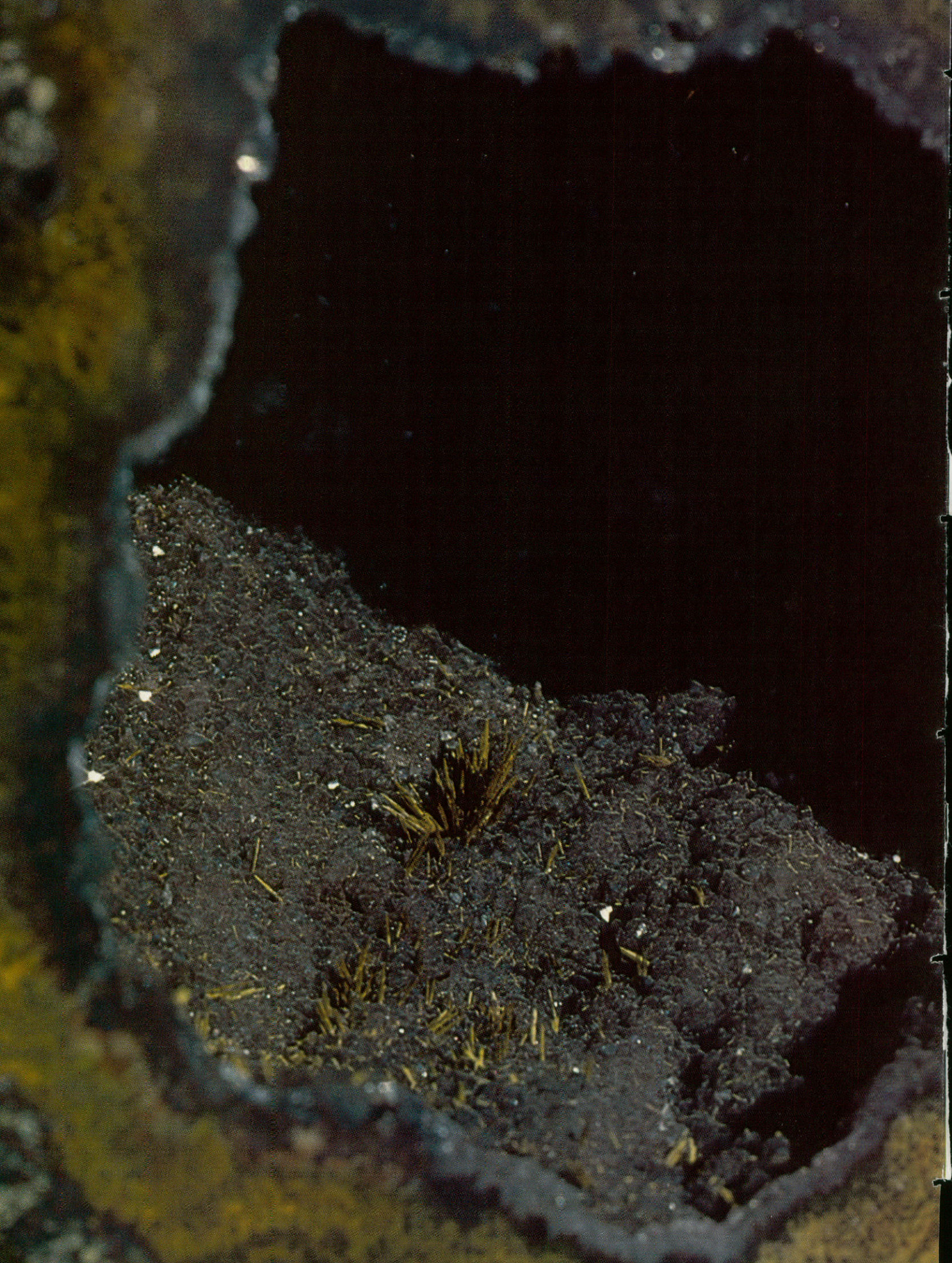
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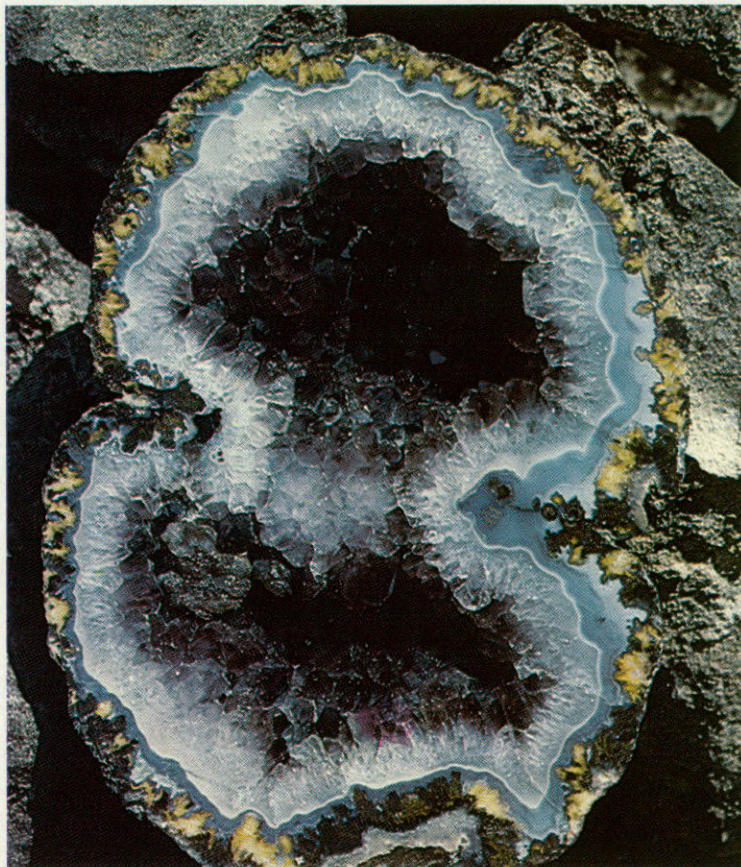
Scattered throughout the limestone deposits of the world can be found interesting geological phenomena called geodes (GEE-odes), which might be called miniature caves.

These geodes are hollow, rounded rocklike or clay objects lined with crystals of various types. Their rough, dull-looking outside surfaces give no clue to the beauty that lies within. Some may look like the petrified eggs of a prehistoric beast, while others more closely resemble mud balls. They may be as small as a walnut or larger than a basketball. Geodes several feet in diameter have been found, but the average is about baseball size.

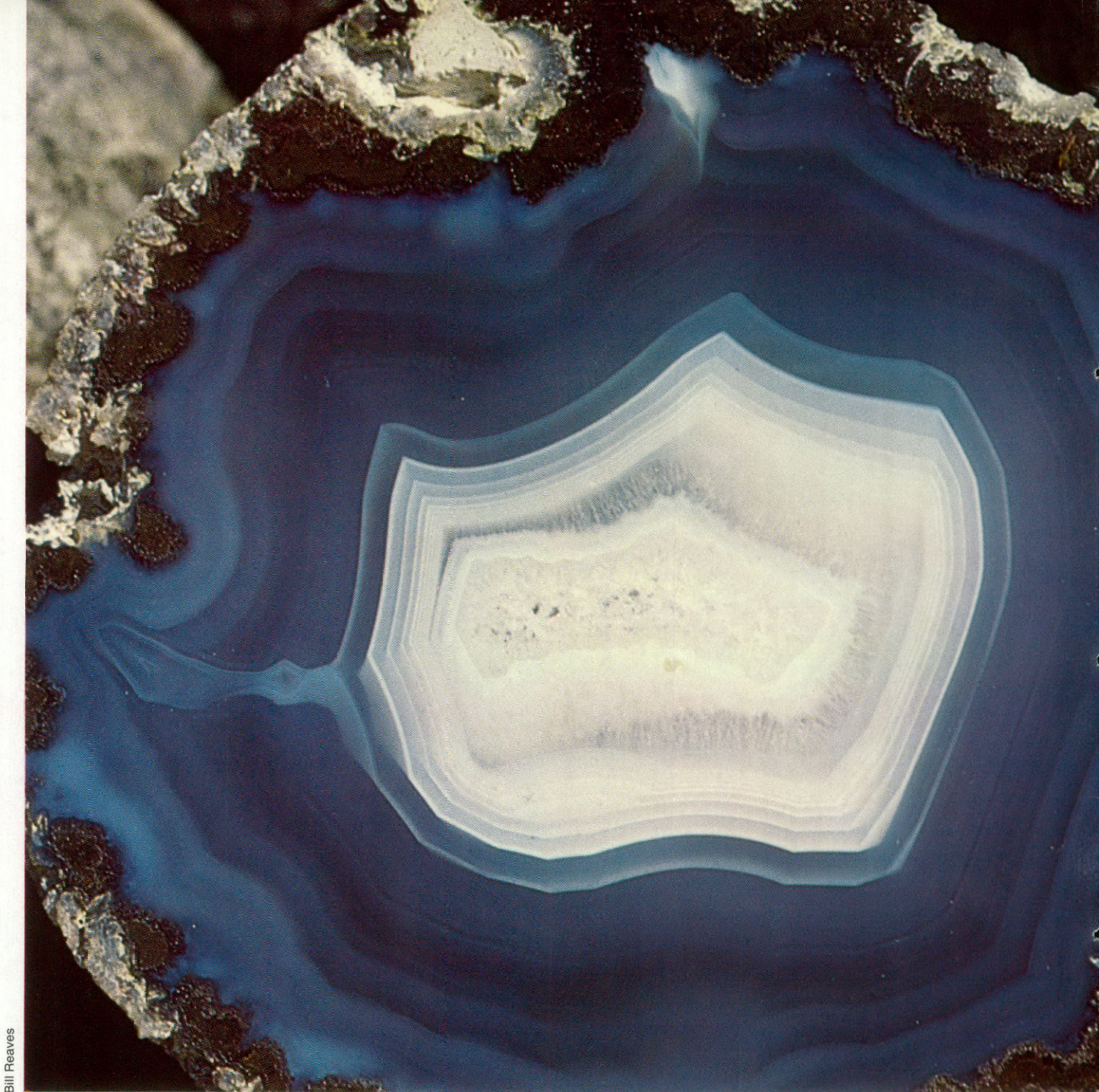
In order for a crystal-lined geode to form, there first must be a cavity or hollow space in the limestone. This cavity may have been formed when a mineral deposit such as iron dissolved, when a buried animal decayed or when the earth shifted a bit. When ground water carrying dissolved minerals seeps into this resulting cavity, the minerals crystalize on the inner surface. As time passes and more minerals are deposited—new layers growing on old—the hollow interior is almost filled with inward projecting crystals.

Calcite (KAL-site) is the most common mineral found in Texas geodes and its usual crystal formation is called the dogtooth spar. Most calcite is white, but impurities may tint it other colors. It often is fluorescent, and may appear pink or red under ultraviolet light. The limestone deposits of Central Texas and the Edwards Plateau are good locations to hunt for calcite-filled geodes.

Photos by Bill Reaves



Until a geode is opened, it is impossible to tell what type of crystals it contains. Needlelike rutile crystals (left), an unusual butterfly calcite formation (above) or smoky quartz (right) are merely samples of the beauty that lies hidden within.



Bill Reeves

A highway cut through a limestone hill may expose buried geodes, but before you go collecting, be sure to get the landowner's permission. Don't trespass.

Another crystal that forms in Texas geodes is the brittle celestite (sa-LESS-tite). Celestite crystals are mostly white or colorless near the base where attached, but their tips are a clear blue of gem quality. Since they are brittle, they are very difficult to facet (cut into a gemstone) and are considered unsuitable for jewelry. Fine specimens have been found in geodes near Lampasas and Brownwood, and at Mount Bonnell and other localities west of Austin. Celestite geodes, containing little gem-quality material, also have been found in parts of Coke, Fisher and Nolan Counties.

Some of the more colorful geode crystals are quartz, a substance from which many gemstones are formed. Beautiful amethyst is merely purple quartz. The presence of traces of other minerals during the formation period causes the clear quartz crystals to develop in various colors. Quartz can be purple, yellow, rose, blue, smoky gray and clear.

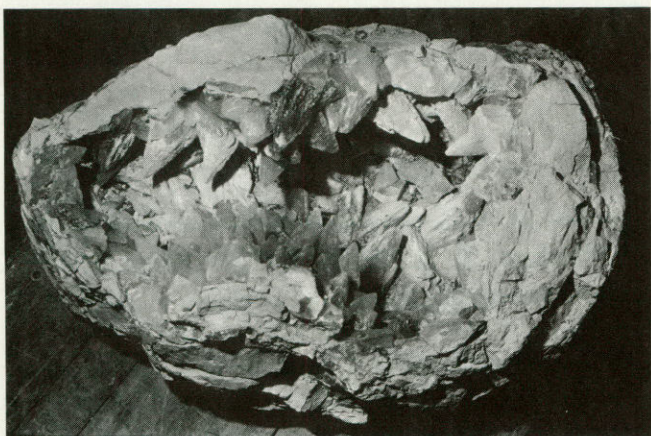
Often a chalcedony (kal-SED-en-e) layer lies between the inner projecting crystals and the outer geode shell. This chalcedony layer consists of bands of tiny interlocking quartz crystals too small to be easily distinguished under a light microscope. In fact, the structure of this type of quartz is so minutely developed that the material is never able to mature as actual crystals with definite outward shapes. In this banded form, the chalcedony is known as agate. Geodes almost completely filled with colorful agate have been found.

In recent years the term geode has been expanded to include the crystal formations found in gas cavities in volcanic rocks. Known as amygdules (ah-MIG-dules), these “geodes” also hold quartz and calcite crystals and layers of chalcedony. Often they are filled almost entirely with banded agate chalcedony, and range in size from microscopic to about eight inches in diameter. The southern part of the Quitman Mountains in Hudspeth County contains the type of volcanic rocks in which these amygdules form.

The next time you go out on a field trip in a limestone area, keep your eyes open for geodes. If you happen to find what you think might be one, there’s only one way to find out—split it open. Many geodes filled with calcite can be broken open with a chisel and hammer, but if you want nice smooth edges and do not want to damage the crystals inside any more than necessary, take the geode to someone who has a diamond saw designed to slice rocks and let them cut the geode open.

Whether your geode contains beautiful amethyst or common calcite, you can take pride in having found another example of the hidden beauties of nature. **

Glen Mills



Bill Reaves



Bill Reaves



Bill Reaves



Calcite-filled geodes are not as pretty as those with quartz (left) or agate (opposite page), but they are the ones most commonly found. The two-foot specimen (top left) is quite spectacular. The calcite geode (above) has just been opened, but the other one (top right) has been thoroughly cleaned.

LETTERS TO THE EDITOR

Bass Stamp

I read your comments on stocking of black bass in Texas lakes and would like to make a suggestion on how some additional revenue could be generated for the bass stocking program. I would like to see development of a \$5 bass stamp which would be purchased in addition to the regular fishing license. This money could then be earmarked for black bass stocking programs and for no other purpose. If a fisherman is caught with a black bass in possession and no bass stamp he would be in violation of the law. If a person is not a bass fisherman and does not care about the stocking program, he certainly does not have to participate. I do not think any bass fisherman in the state would mind the \$5 if he knew it was being used for the betterment of the sport.

Robert Vernor
Robert Lee

first I have seen in several years although they used to be common all over the state. What has happened to decimate these helpful reptiles?

Paul O. Cardwell
Bonham

■ Our nongame biologists say the decline of the Texas horned lizard is due for the most part to pesticides and reptile collectors. In an effort to protect this creature, the 60th Legislature passed a law prohibiting the injuring, killing, taking or possessing for "sale, barter or commercial exploitation" the three forms of horned lizards found in our state. The three forms are the Texas horned lizard, *Phrynosoma cornutum*; the mountain short-horned lizard, *P. douglassi hernandesi*; and the bleached horned lizard or round-tailed horned lizard, *P. modestum*.

Hunt Information

Ever since the end of World War II I've bought a hunting license and have never received a ticket for violation of state hunting laws. But each year it be-

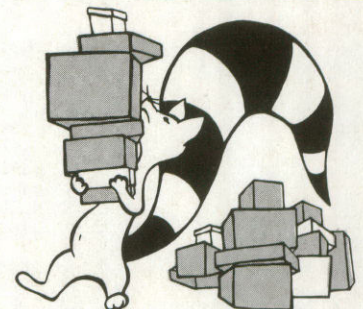
comes more difficult to learn what hunting seasons and laws are. Last year we learned on the third day of dove season that shooting was permitted before noon. It has been several years since we were able to get information concerning September teal season dates. Please print such information in the magazine to help hunters comply with migratory game bird laws.

Ray Rogers
Briscoe

■ We'll do the best we can with our "Around the State" feature. Our biggest problem is the magazine's 60-day production schedule; we often are ready to go to press before the hunting regulations and season dates are set. For the latest information on Texas hunting and fishing regulations and seasons, call toll-free 1-800-252-9327; Austin residents call 475-4895. Both numbers are operational during regular business hours.

Horned Lizards Scarce

I saw a horned lizard in Denison during the summer. This one was the



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BACK COVERS

Inside: Sparkling in the early morning light, this dew-covered dragonfly hangs from a twig and waits for the sun's warm rays to dry its wings for flight. While in this flightless condition, the insect is vulnerable to any passing predator. Photo by Bill Reaves.

Outside: Throughout most of its range, this fox squirrel is an important small game animal. A mature oak-hickory woodland with an intermixture of pine, elm, pecan, maple and other food-producing trees provides the best habitat for its needs. Along the western part of its range, the fox squirrel is restricted more or less to the river valleys where pecans, walnuts, oaks and other required trees grow. Photo by Leroy Williamson.





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