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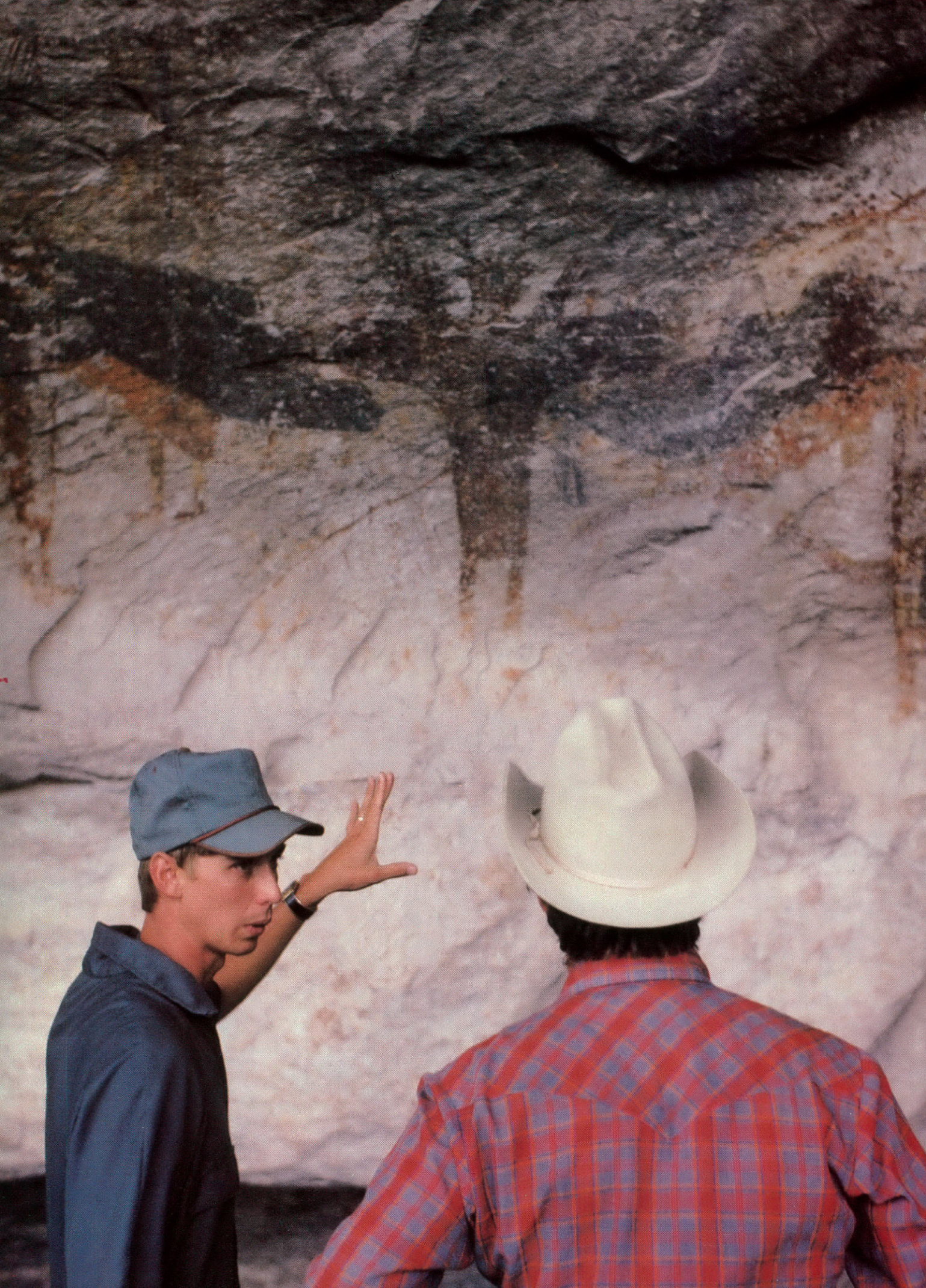
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PARKS & WILDLIFE



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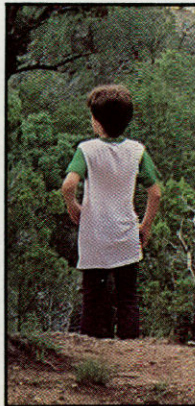


TEXAS PARKS & WILDLIFE

October 1983, Vol. 41, No. 10



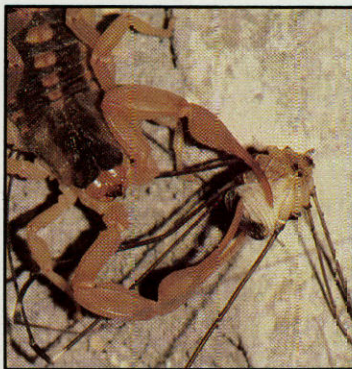
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Front and Back Covers: Scenes such as this characterize the relatively undisturbed wilderness of the Angelina-Neches Scientific Area in Southeast Texas. (See story on page 24.) Photo by Leroy Williamson.

Inside Front: Pictographs at Seminole Canyon State Park offer clues into the lives of prehistoric people who made their home on the Lower Pecos. Several sites in Texas are helping archaeologists piece together a story that covers hundreds of generations. (See story on page 2.) Photo by Bill Reaves.



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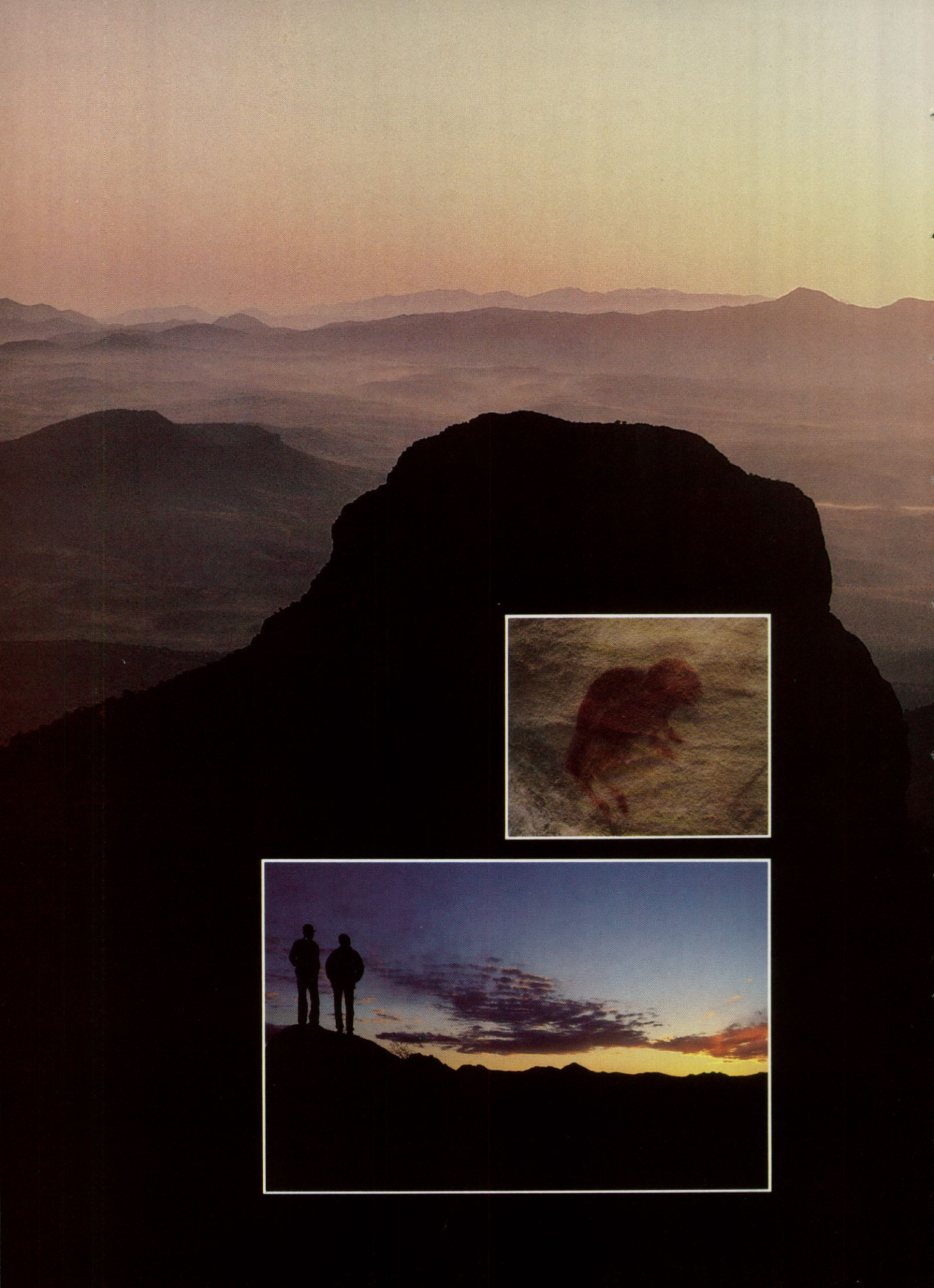
DEPARTMENT


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

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Article and Photos by Bob Parvin
Project sponsored by
Texas Historical Commission

A climber, at the end of his quest for the summit of a lonely Trans-Pecos mountain, settles back to enjoy solitude with the sun and the rock. Far below his mile-high lookout spreads the endless desert floor, a crust of yellows and grays that finally dissolves into the hazy outlines of faraway mountains.

One frosty summer morning some 3,000 years ago, another climber came quietly to this high place. Tightening the thongs of a heavy buffalo robe around his shoulders, he paused here, as the hunters of his tribe so often had done, to study the terrain for animal sign and absorb the spell of the place. He lingered, deciding to toss away the broken stone tip of his *atlatl* dart and chip another one, carefully shaping and notching the blade from a rose-colored flint that he preferred.

The long-ago hunter gazed out on a rolling plain of tall grasses bordered with pines and running streams—a landscape far different from today's. This was a territory that his small wandering clan had known for generations as they followed the buffalo southward from the plains.

Across the face of today's desert scene the slanting sun draws shadowy abstracts, and the modern climber looks downward and sees the shine of worked flint—Indian sign. Time stretches backward as he gazes at the rose-colored fragment. In the innocent delight of sensing a kinship with the past, he kicks the soil and knocks loose the broken dart point from its ancient bed. Unknowingly, he breaks the record that forever has tied the spirit and substance of man to this lofty spot. He pockets the find and moves on, taking away a page from the story of prehistory.

Far to the north of the mountain and desert province of Trans-Pecos Texas, an archaeologist wipes the sweat from her brow and gets back to her light-handed troweling at the base of a deep-site excavation. There, on the Llano

Remnant clues to the diverse and long story of prehistoric man unravel as archaeologists search the varied horizons of Texas. Investigation into this story, which covers 12,000 years, is troubled by the loss of some 4,500 Indian sites every year.

In Search of the First Texans



Pictographs seem to lend color and form to the sketchy outlines of former humans—if only the paintings' meanings could be truly deciphered before they fade away. Panther Cave at Seminole Canyon State Park (above) presents a dazzling gallery to study.

Estacado (Texas Plains), the links between vanished peoples, time and place are the object of concerned scientific study. Eighteen feet below the surface she brushes aside clay deposits that have preserved the leftovers of a big game ambush—fossil bones and flint that have lain here since the end of the Late Ice Age.

The dry and shallow canyon where she works was then a marshy waterhole. Her excavation cuts cleanly to show a banded profile of alternating soil colors and textures—evidence of how this ancient pond was later eroded by stream channels that eventually silted up to form other ponds. The succession was finally capped off by accumulations of

sand and dust. The layers of earth capsule more than 12,000 years of usually gradual, but sometimes drastic, climatic change on the Texas Plains.

The archaeologist reads the strata like a diary, punctuating the story by showing old bone fragments that jut from the earthy pages: the vertebra of a Columbian elephant, the tooth of a camel, the fossil rib of a giant bison and, over here, the shoulder blade of a bear that once must have towered over 12 feet. Mental pictures begin to form of a Kenya-like savannah stirred by cool, pine-scented air . . . not these dusty, dried-up plains.

Step by step, she reveals the episodes where man—always a hunter here—persisted throughout the eras of climatic change, the mysterious extinctions of the exotic large animals and the emerging dominance of modern species.

Most relics left by ancient humans turn to dust after thousands of years of burial or exposure to the elements, save for the stone or more resistive articles from their tool kit or arsenal. But a few spots in Texas yield human artifact

records that have been preserved well through time. From these unique places we can put together a picture of long-ago humans and their lives that is more than hazy speculation.

Over the chalky desert country west of Del Rio, an Egyptianlike climate has prevailed for centuries. The lower Pecos and Devils Rivers meander through deep and sculptured canyons to join the Rio Grande here. Spying over the river canyons are scores of soot-darkened shelter caves, their hollow eyes staring out beneath brows of overhanging cliffs.

For hundreds of generations, desert-adapted people found convenient homes in these rock shelters. And in the process of enjoying an eclectic yield of food and resources from the adjacent canyons and river, they managed to create a vivid picture of their spiritual world. As the artistic style matured, they became prehistory's Texas Rembrandts, using pigments derived from the earth to express their singular identity.

Cave walls became galleries, their limestone canvases colored with dizzying

compositions or figures that loom boldly from curving panels. This art, as yet undeciphered, is rapidly being lost to vandalism and the effects of humidity from Amistad Reservoir. Even in their fading glory, the ancient paintings give us a haunting look at how one culture from Texas' deep pool of antiquity perceived themselves and their world.

Such expressions of the creative and nonutilitarian side of prehistoric life are indeed rare. But three other Texas peoples also left as rich a legacy for archaeologists to ponder.

These groups were spectacular exceptions to the roving hunter-gatherers whose nomadic existence dragged through millennia in Texas. The first group, the Caddos, were mound-builders who brought a new lifeway to the woodlands of Northeast Texas. The Caddos had advanced to the western limits of their homelands among the allied confederacies of the gulfward forests and Mississippi Basin. Like the other two groups that pushed into Texas during the first millennium A.D.—the frontiersmen of their day in prehistory—they were settlers, farmers and wide-ranging traders; homebodies who built villages and substantial societies.

Archaeology offers more than a one-dimensional image of the Caddoan group, looking beyond artifacts to evidence of social systems and religious beliefs. Clues lie buried in the steep-sided mounds that are typical features of major village sites. The thatch-and-pole ceremonial lodges or temples that spanned the mounds were periodically destroyed by fires, then covered over with earth and completely rebuilt.

This sequence of building and demolishing eventually lifted some mounds more than 30 feet high. Other Caddoan mounds were used as burial places, reserved for interring high-ranking tribesmen and, perhaps in some cases, the victims of ritual sacrifice.

The trade territory covered by the Caddos, with their distinctive pottery, was excelled only by the long reach of the two farmer-villager groups of the Panhandle and Rio Grande regions of Texas. One group, probably nomadic southern plainsmen who settled down along the Canadian River and southeastern escarpments of the Texas High Plains, farmed in the river floodplains and quarried a particularly colorful flint—Alibates—which they crafted and distributed as trade knives and blades.

Speckled and banded with rainbows, the agatelite Texas Alibates flint has shown up at archaeological sites throughout much of North America. In return, these corn-growing merchants received

Prehistoric Texans

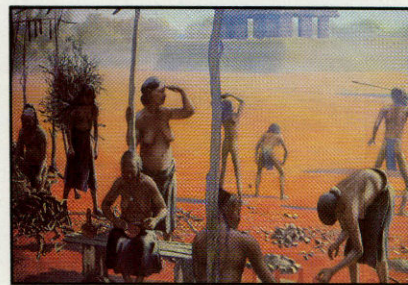
PALEO-INDIAN PERIOD (10,000 - 6,000 B.C.)

People first came to Texas about 12,000 years ago. These Paleo-Indians banded together in small groups, moving from camp to camp in search of food. Each group probably moved around in the same area year after year. They relied mostly on big-game hunting for food, but they also hunted smaller game and gathered wild plant foods. The spear was their most important weapon.



ARCHAIC PERIOD (6,000 B.C. - A.D. 500)

During Archaic times, people depended more on plants and smaller game animals for a food supply, because most of the large game animals that Paleo-Indians had hunted were now extinct. The projectile points that Archaic peoples made for their darts and spears are different from earlier kinds. An Archaic point has a stem at the base, and many different styles were made. Because plant foods were an important part of people's diet, grinding tools called the mano and metate are common in Archaic sites. Pit ovens were commonly used to bake plant roots, and these ovens survive today as features that are called burned rock middens.



LATE PREHISTORIC PERIOD (A.D. 500 - 1500)

Sometime after A.D. 500, new tools and new ways of producing food changed the lifeways of people in Texas. The introduction of agriculture led to village settlements. Pottery and arrowpoints are the main indicators of the Late Prehistoric period. Although some groups settled in permanent villages, many Texas Indians continued their nomadic lifeway, living much as they had lived in Archaic times.

HISTORIC PERIOD (After A.D. 1500)

The Historic period in Texas began with the arrival of the Spanish. The introduction of guns and horses, competition for land, and the introduction of new diseases altered forever the lives of native Texans. Although there are many Texans of Indian descent, only three groups live in the state today—the Alabama-Coushatta, the Tigua, and the Kickapoo.

Early peoples' adaptation was ruled by both gradual and sudden changes in climate. Was refuge always provided by such places as protected caprock canyons (far left) or the spring-fed Edwards Plateau (second from left)? Pieces of the story include a pictograph at Hueco Tanks (far right) and an etching on the rim of the Canadian River (second from right) where late prehistoric villagers lived for some 400 years.

imports. Turquoise, obsidian and Southwestern pottery styles, pipestone from faraway Minnesota, shell ornaments from both Pacific and Gulf coasts, and relics of Caddoan origin have been noted at their adobe and slab rock village sites.

The third member of these separate and advanced cultures were Puebloans who filtered down the Rio Grande between El Paso and Presidio. Their trade extensions have been traced through the distinctive ceramics they made, including thin-walled utility jars called *ollas*. These tall vessels may have been used to transport salt as a trade product. *Ollas* from the Rio Grande have been found far into New Mexico, the Texas Panhandle Plains and southward toward Casas Grandes, Mexico.

But the far corners of Texas were influenced only a short while by the extended arms of these groups. By the end of the 1300s, the Caddos abandoned their elaborate ceremonial centers and had purposefully capped their mounds with a final layer of earth. The footholds etched by the villagers on the Texas Plains also broke away. And the Rio Grande Puebloans began to lose their cultural identity in a confusion of other groups that migrated to their cultivated riverlands.

The ancient cultural scenes of Texas seem to have shifted often in response to natural changes. Climate sometimes rewrote the rules to upset the delicate balance between humans and their environments, shuffling out the old and adding new features to the multicultural stages of prehistory.

Periodic long-term droughts recorded in the Southwest, or interludes of both moist and dry arctic weather, must have impelled tribes to funnel toward Texas. Perhaps these episodes set up human pressure zones where intruding and established tribes competed across tenuous boundaries, or overlapped and successfully assimilated or kept moving on.

Curious evidence of such displacement comes from the Coahuiltecan groups of the South Texas Brush Country, one of the most difficult regions of Texas in

which to live. Modern linguists, using old Spanish records, have traced the Coahuiltecan dialect to the Hokan language sects of Southern California. Why the separation?

Our late-arriving Comanches form another example. Intruding from the northwest, these nomadic horsemen seized the Llano Estacado after 1700 with enough force to push Apache and Tonkawa tribes up against the gates of the Spanish mission builders. Perhaps the mounted Comanche cavalry were the last players of an age-old Domino Theory.

Were the ancestors of such plains people on the move far southward some 3,500 years ago, during a cool-moist arctic interval that restored tall grasses, pinyon pine and bison herds to the formerly arid Pecos-Rio Grande? Were villager groups of the Rio Grande the diffused remnants of the once-great Mogollon and Anasazi civilizations whose kiva cities caved in under a two-century Southwestern drought?

Were the spring-fed canyons of the Edwards Plateau, as well as certain islanded mountains of West Texas, the protected cradles where cultures could develop within themselves over a long continuum?

Whatever the answers turn out to be, one factor that prevails today in Texas gives a framework for understanding the past. Diversity, a Texas byword, is the key.

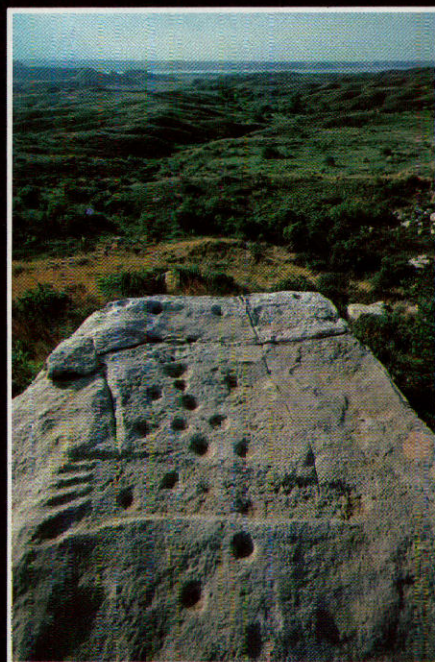
"Texas is a microcosm of North America," explains Bob Mallouf, Texas State Archaeologist. "Although there are many unanswered questions, and large areas still waiting to be investigated, Texas is yielding one of the most exciting prehistoric scenes to be found."

Geographical diversity is the mold of the odd-lot cultural settings of the past, just as it today forms a distinctive image of The Texan—a regionalized character. Like a keystone of the continent, Texas welds together the terminus of the Great Plains with gateways to the Southwest, South and East. It forms the crescent of the Gulf, the northern fringe of the tropics and creates in-between lands that are unique on the globe.

But the science tasked with deciphering and retelling the stories of ancient peoples and cultures is fast losing ground. Archaeology in Texas too often has to pit its tedious and methodical processes with the driving force of progress. It has become a tortoise and hare race that manages to plod along under an unusual set of circumstances.

On one hand, the barbed-wire-tight reality of private land ownership has





restricted the turf of archaeology. Texas is one of the few largely nonpublic states.

"Funding for archaeological work is the biggest problem," Mallouf explains. "While most landowners are interested and welcome our help, we can't cross over the fence without money. So, most archaeological projects come as a result of state or federally administered construction programs—on the narrower public domain of Texas."

On the other hand, the busiest period for the science has come since the 1969 passage of the Texas Antiquities Act, protective legislation that coincided with

the strengthening of federal antiquity laws. The Texas act led to a one-of-a-kind discovery last winter: the ritualistically buried skeleton of a 9,500-year-old woman (See "Leanderthal Lady," March 1983).

The so-called Leanderthal Lady, one of the few Paleo-Indian burials ever found in the Western World, was unearthed by teams of professionals. The site was identified during the survey of a county road extension near Austin.

The law requires a professional archaeological survey and excavations of significant sites that lie in the path of public construction projects. Mobiliza-

tion under the antiquities laws has led Texas archaeology through its most adventurous decade, what with superhighway construction gobbling up 40 acres per mile and easements granted for utility construction, mining and coastal development, to say nothing of reservoir projects, which have inundated tens of thousands of square miles of river drainages. Unfortunately, little or no archaeological information was recovered from many areas where dams were constructed in the earlier years of this century.

"Rivers such as we have in Texas were the essential connections between di-



verse regions and peoples," says Mallouf. "They were the highways of prehistory, the life zones."

Lake Meredith's silty waters now cover the Canadian River heartlands of the Panhandle's villager-farmers and flint traders. Only a few days were allowed for an archaeological survey of the basin prior to filling. Since then, more than 400 sites have been identified on dry shore, including the crumbled remains of apartmentlike pithouse complexes that are unique to the continent.

Cultural centers for the Caddoan mound builders of Northeast Texas are swamped by some 35 reservoirs totalling more than 630,000 surface acres. Amistad Reservoir began to back water up the Rio Grande, Pecos and Devils Rivers just as a few deep-site excavations

were bottoming out at the 12,000-year mark of mankind's continuous presence in the region. And then archaeologists watched helplessly as rising water scrubbed away priceless mural and messages from rock shelter walls.

Falcon Lake, farther down the Rio Grande, drowned the heritage landscape where the American cowboy evolved from the traditions of Spanish vaqueros. The list of squandered inheritances goes on and on.

The exercises of the past few years have strengthened the capacity of Texas archaeology, beefing up its techniques by including a range of related scientific specialities in its investigations. A complex excavation is likely to be studied by a team of botanists, geologists, geophysicists, cultural geographers, bone

experts, biochemists and even computer wizards.

"Now we're gathering vastly more information than ever before," says Eileen Johnson, director of the famed Lubbock Lake Site, an ongoing 30-year-old excavation that traces ancient man on the Llano Estacado.

The unwritten record of prehistory ended when Spanish walls arose, as at Mission San Bernardo on the Rio Grande (left). Its neighbors reflect the mixed ancestry at this gateway to history. Pictographs tell a story at Seminole Canyon (bottom center), but records prior to European contact lie buried for archaeologists to reassemble (bottom) or for looters to spoil forever (below).





"Techniques of the '40s, the '50s and even from the '70s are becoming obsolete," she adds. "And it looks as if we'll learn half as much today as we'll know tomorrow."

Yet, Texas still loses an estimated 4,500 archaeological sites every year, most of them obliterated without a record because of the numerous private land construction projects that are helping create the Texas Superstate. Some of this loss may be averted now that Texas has passed the Conservation Easement Act, a program that makes it advantageous for landowners and developers to set aside significant archaeological, historical or natural areas in return for tax benefits.

"Most Texans are shortsighted about the accomplishments of early humans here. Those people survived the ages by pure ingenuity and passed along an incredible store of knowledge that we're no longer privy to . . . and it sure would have helped us to know," says Ed

Mokry, Jr., an avocational archaeologist, from Corpus Christi. "Texans mostly think Comanches were about the only Indians who ever lived here."

In his spare time, Mokry has surveyed and recorded sites around the bay areas and inlets of his burgeoning coastal city, including vast Indian burial grounds. His reports are given to the Texas Historical Commission, to universities and as informational programs that he offers to schools and civic groups.

"In the coming 10 years, we'll lose all of the Indian sites in this section of Nueces County to subdivisions and streets, drainage and fill projects . . . the homeowners of a Gulf Coast people that we know very little about," he continues. "I doubt that one of us today could get along as well in the open environment here as those Indians did."

It isn't surprising that people who have never been face to face with a native Indian culture fail to comprehend such losses. Identity problems with the

past trace to before the 1880s when Texas effectively rid itself of its last 10 major Indian groups. The wars of extermination and banishment helped break the link of a 12,000-year-old process. By comparison, the history that we have added is but a fragment of the story of unique human adaptations to Texas—to its diversity and its extremes. The written archives available to us are only a partial, one-sided account.

Since Texas is 90 percent private land, laws designed to investigate only public sites are hardly enough to guarantee the addition of more volumes to our scant library of prehistory. And public indifference keeps unknown records from ever reaching the shelves.

It all adds up: The innocence with which the mountain climber retrieves a spear point from an unrecorded special site; the maliciousness of adults who spray-paint their initials over a panel of fading Indian rock art; the lust of an arrowhead hunter, claiming to be an

A sacred 17th-century drum helps keep alive traditions for El Paso's Tigua (left). The clannish Kickapoos of Eagle Pass (center) adhere to the past as a matter of tribal pride. Legacies of their antecedents are vanishing, such as the rock shelter that drowns in the waters of Amistad Reservoir (right).

amateur archaeologist, who scoops and sifts artifacts from a time-honored Indian campsite to hang meaninglessly on the walls of his den; the dusty cigar boxes full of arrowheads that grampa forgot about after he levelled the mounds and planted the orchard out back.

The story of loss is repeated in virtually all of Texas' archaeological zones. Perhaps the saddest example is the vanquished legacy of the Lower Pecos.

For a hundred years, since the Southern Pacific Railroad and sheep ranching opened this rugged country, arrowhead collecting has ripped open sites that have stored a human record since the end of the Ice Age. Archaeological surveys and some excavations were done during the '60s; however, as Amistad Reservoir filled, vandals moved in to pick over what was left on dry land. Most of the scores of Indian rockshelters left above the waterline have been destroyed in pursuit of arrowheads—the ripping out of the pages of time.

"From the little archaeological work that was done we got a pretty good two-dimensional image of former people in this place," explains Dave Dibble, an archaeologist who has concentrated on the Pecos. "But who knows what more would have come if the vandals had left sites alone?"

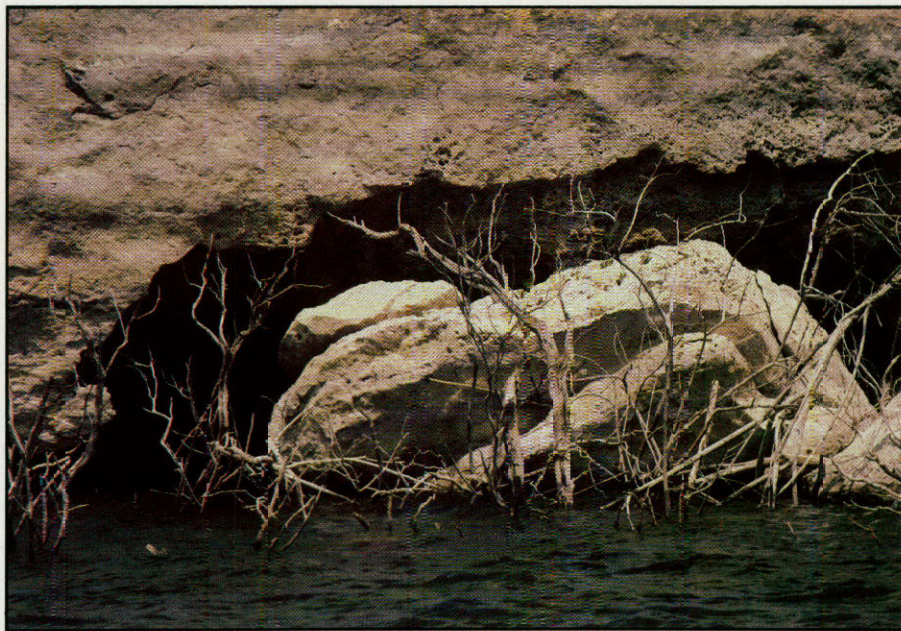
That other lost dimension is communication from the past—how the Pecos People *thought*. As Dibble explains, the keys to understanding the meanings of their artistic expressions lay buried in the ground—the accumulated carpets of human experience in rock shelters—that vandals have churned to meaningless heaps of debris.

So where does all this leave us?

"Preservation isn't a legal issue so much as it's a moral obligation," concludes the Historical Commission's Bob Mallouf. "Now it's a matter of making people aware of what they're doing when they collect artifacts or destroy sites.

"We're working with a legacy in pieces. They're making it impossible to retell the full story of the past. They're cutting themselves short. And they're cutting their children and their grandchildren short.

"What's going to be left of the past . . . for the future?" **



Parks Display the Past

Fortunately for Texas archaeology, several state parks are working toward preserving the stories of ancient cultures. At Seminole Canyon State Historical Park near Comstock, archaeological excavations have reconstructed the longest continuous story of man in Texas. In this part of the state where the Pecos River meets the Rio Grande, steep banks were undercut to form shelters in which early inhabitants lived. The dry and dusty floors of these shelters preserved a record of the most minute details of their daily lives. Tools, food, refuse and even a few dehydrated corpses of the people themselves were preserved by the dry climate. Peeling away the layers of refuse left by these early people, archaeologists have discovered a record covering nearly 8,000 years. These desert people also left visual records on the stone walls of their desert homes. Manlike figures, plants, animals and abstract designs are depicted.

Farther west, Hueco Tanks State Historical Park near El Paso also contains pictographs left by Indians who frequented that area. There are approximately 25 locations in the park where the pictographs have survived action of the wind and water. It is thought that at least two tribes were responsible for the majority of the paintings. The historic paintings, which usually depict action and include representations of white men, are attributed to the Mescalero Apaches. The older, more symbolic pictographs were probably the work of a prehistoric Pueblo people. At Caprock Canyons State Park in the Panhandle, archaeological studies have uncovered evidences of the Paleo-Indian culture of Folsom and Plainview man. Finds include projectile points and bones believed to be the butchered remains of an extinct species of bison.

Recently opened Caddoan Mounds State Historic Site near Alto in East Texas features extensive interpretation of Caddo Indian life that flourished at that locality between A.D. 750 and A.D. 1260 with murals, artifacts and a reconstructed Caddo Indian House. Years of archaeological excavation have uncovered skeletal remains and thousands of artifacts that have helped piece together the Caddos' complex life-style. Keep in mind that while artifacts at this park and pictographs at Seminole Canyon and Hueco Tanks are on display for the enjoyment of park visitors, removal of any object from a state park is against the law.

Funny Lookin'

Old-timers around the North Texas towns of Iowa Park, Crowell and Henrietta have seen "them funny lookin' rats" for years. They play in the road between the house and the cattle-guard. They run funny, look cute and don't hurt anybody. The rural people seem almost affectionate toward the little kangaroo rat and usually are surprised to hear it is currently listed by the Texas Parks and Wildlife Department as a protected nongame species and is on the "threatened" list compiled by the Texas Organization for Endangered Species.

The Texas kangaroo rat is found in only a handful of counties in northern Texas and southern Oklahoma. Although several other kangaroo rat species reside in Texas, there is no evidence that any greater range ever existed for this particular one. Only a 1953 report, which has never been clearly substantiated, places the rodent outside the north-central Texas region. Ord's kangaroo rat lives close by in the Red River bed, but the Texas kangaroo rat is easily identified by the white fluff on the end of its long tail.

According to sand-silt-clay analyses, the Texas kangaroo rat apparently lives only in soils with a high silt content, and its burrow systems usually are associated with mesquite trees. There are very few instances in which either or both of these criteria are not present.

The kangaroo rat's method of locomotion is better suited to cleared areas. Although only a few feet may divide their normal home ranges, the kangaroo rat usually is separated from a close neighbor, the cotton

rat, by their different habitat requirements. The kangaroo rat avoids the grass while the cotton rat favors its dense cover. Because of these stringent habitat restrictions, areas suitable to kangaroo rats are small, often less than two or three acres. However, their natural habitat is supplemented considerably by man-made terraces adjacent to agricultural land and dirt roads. These terraces provide loose dirt for burrowing, and the cleared areas are suitable for locomotion.

The Texas kangaroo rat digs an extensive burrow system for a home. In firm soils, the entire system may be only 18 inches deep with a complexity of interwoven tunnels, some of which are only an inch below an upper tunnel. The passageways may vary from two to four inches in diameter, the larger ones being close to outside openings. The tunnels contain occasional food caches on the sides, filled with grass and seeds from the surrounding area. A nest usually is located close to the bottom of the tunnel complex, and the rat may close off some tunnels inside the burrow system with loose dirt.

The burrow system protects the kangaroo rat from predators and harsh weather. For instance, a temperature probe placed inside a burrow system at a depth of seven inches in late spring varied only five degrees F. during a six-day period, while temperatures just outside the burrow at ground level varied 52 degrees F. during the same period. Temperatures in sandy burrows were less stable than those in burrows with greater clay structure.

The Texas kangaroo rat, like others of its genus, subsists on dry seeds. The assumption that kanga-



"Cute" usually isn't a word used to describe rats, but rural people familiar with the Texas kangaroo rat seem almost affectionate toward the little rodent. Its range is limited to north-central Texas and southern Oklahoma.

Rats

Article by Jim Roberts and Photos by Glen Mills





White fluff on the end of its long tail distinguishes the Texas kangaroo rat from other kangaroo rat species. It is listed as threatened by the Texas Organization for Endangered Species and protected by the Parks and Wildlife Department.

rod rats normally do not drink water under natural conditions has been supported by captive rats that obviously did not know how to lap water at first, but learned after water was made readily available to them.

Natural enemies of the kangaroo rat include the normal predators of semiarid regions, such as coyotes, bobcats, owls and illegal spotlighters. When surprised, the rat may jump straight up and hit the ground running. When confronted with a large open space, such as a cleared field or dirt road, it may resort to long bounds, using its large hind feet. When this happens, the rat may travel much farther than the extent of its normal home range, or enter a burrow system that is not its own.

However, it usually leaves the foreign burrow system shortly after entering it, sometimes within seconds.

The kangaroo rat is apparently a solitary animal. There have been no observations of more than one adult using the same burrow system and past attempts to keep pairs together in normal-sized cages in the laboratory have proven unsuccessful. In two instances, when pairs were placed in the same cage, the males died within a week. The females were observed harassing the males by nipping them on the body.

Texas kangaroo rats use barren clay sites where the dust is powdery for scratching and dusting. In these areas, footprints, tail-drag marks and scratched imprints of toenails easily can be seen.

Weather does not seem to inhibit the Texas kangaroo rats' activities, as they have been observed in conditions ranging from hot to cold, windy to calm and wet to dry. One

year, four inches of snow on the ground did not deter them. Tracks, including the characteristic tail-drag marks, were observed in the snow, and open burrow entrances indicated no cessation of activity. A nocturnal animal, the rat appears to be most active two or three hours after darkness.

If an observer is quiet and patient, the interesting behavior trait of thumping might be observed. After the animal enters its burrow, a few rapid thumps may be heard within a few seconds, then repeated after a short time. Although this behavior has been recorded for other rodents, its meaning has not been established.

The present population level of the Texas kangaroo rat does not look good. It apparently can live only in limited areas, and an entire population can be eliminated by either natural causes or man's activities. Two known populations were eliminated during a three-year study of the animal in the late '60s—one through inundation by a new man-made reservoir and the other by overzealous college students collecting specimens for a vertebrate natural history course. The combination of housing developments, land-clearing practices, illegal spotlighters and natural disturbances easily can add one more animal to the growing list of extinct wildlife.

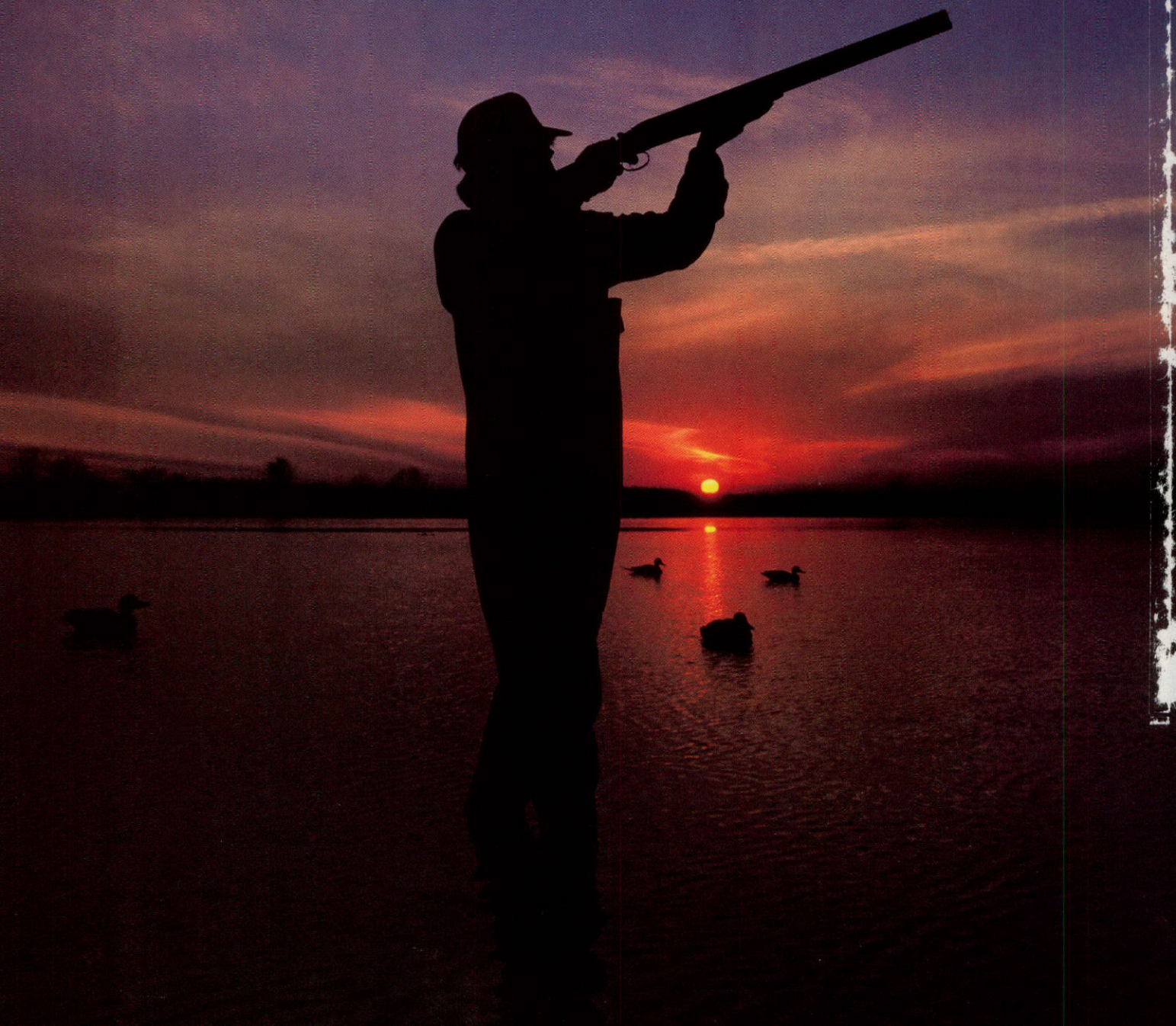
Unfortunately, few may care in an age when usefulness is equated solely with economic value. Apparently, kangaroo rats neither help nor hurt man. They do not provide any marketable products or destroy agricultural crops to any noticeable extent. They don't make good pets, are hard to procure, don't like to be held and may not live long in captivity. They exist, constituting a part of an ecological food web that too few appear to recognize as being important. They could be lumped together with other "worthless" things like green weeds, clear skies, and the long-gone joy of wading through a creek with no fear of broken glass. Man is continuing to prove his mastery of the planet, and the continuance of this species could be determined solely by man's economic priorities. **



Public Area Hunts

Best Waterfowling in the Country

by Ray Sasser



To a waterfowl hunter, the first dim glow of light in the eastern sky brings a rush of anticipation not unlike what a theater fan must feel when the curtain rises on a hit play. For the hunter, the anticipation is much stronger. He is, of course, a key player in a drama that's as old as man himself and has never been played exactly the same way twice.

My blind is at front row, center, for the 1983 waterfowl premier, a gala event where the celebrities all dress alike, not because it's chic but because camouflage is the duck hunter's uniform.

I see you've paid your dues. Haggard eyes from too little sleep, marsh mud under your fingernails, black dog—just a noisy shadow here in the dark—for a companion. Come on, sit with me. We'll watch the curtain rise on another duck season.

Here, sip this scalding coffee. It's the elixir of duck hunters. Fumble with the callers to make sure they're ranged just so around your neck. Relax now. It's about 20 minutes 'til rooting time. Let's talk in hushed tones so we can hear the old hens calling passing flocks beyond our vision.

Listen now to the rush of wind through rough wings as the stage lights come up a little brighter. Those were teal that whistled past like mini-jets on a strafing run. Hear the uncous quacks of the mottled duck sitting there in a pothole? Quite a contrast to the peeping whistle of aidgeon circling high.

Load up now. It's shooting time and I think that big wad of pintails is coming back for another look. What's that? You didn't bring a shotgun? Well, I understand. It's a grand show, isn't it?

Waterfowl hunting in Texas is a drama and show, one that plays year

after year to a full house of duck and goose aficionados. And, in a state where public hunting opportunities in general are rare, Texas offers some of the best public waterfowling to be found anywhere in the country.

Prime opportunities for waterfowling exist along the Texas coast on marshes owned by the Texas Parks and Wildlife Department and the U.S. Fish and Wildlife Service. A flurry of FWS acquisitions in the late 1970s combined with public properties already owned by TP&W to make the upper Texas coast the

public waterfowl hunting capital of Texas, if not the entire nation.

And the prognosis of additional public waterfowling properties is good, thanks to the Texas State Duck Stamp program, the proceeds of which largely will be used to finance new acquisitions.

For the average Texan, public hunting represents the salvation of a proud wildfowling heritage. In terms of construction, the Texas coast has become the new California. Wildlife habitat is disappearing at an alarming pace.

Ray Sasser



Dawn on the Texas coast brings a rush of anticipation as the curtain rises on another waterfowl season. A dog is an essential prop in this drama, as a companion and for retrieving downed birds.



Hunting rights on remaining private property are leased at prices far beyond the reach of middle-class sportsmen. Good private hunting spots are so rare that even those with the money to spend have trouble finding a quality lease.

The abundance of public marshes has shifted the emphasis from hunting on private property to hunting on public property. Moreover, state and federal ownership of vast coastal wetlands guarantees that condominiums will not spring up in the middle of your favorite duck pond.

And, while average success rates for public area hunters are deceptively low, some of the prime water-

fowling in America is readily available on Texas public hunting areas. Consider an experience I had on the McFaddin Marsh National Wildlife Refuge in Jefferson County.

It was late in the first half of the split duck season and a big cold front promised new flights of ducks in Southeast Texas. It was midweek and my hunting friends were unable to free themselves from the snarls of daily workloads so, with a sack of 20 decoys, I waded off into the McFaddin Refuge with a black Labrador retriever for company.

Weekend hunts on public areas often are crowded affairs and those fortunate enough to have free time

during the week would do well to concentrate on weekday hunts. That particular memorable day at McFaddin, I had a large section of prime marsh pretty much to myself.

I was familiar with that area and knew where the ducks liked to work on a northeast wind. Being very selective about shots, I killed a 10-duck limit of pintail drakes. A rare occurrence? Hardly. Limits of status ducks are not that rare in the coastal public hunting areas, at least not for hunters who know the area and the birds.

Take, for instance, J.A. "Buddy" Smith of Port Acres, who concentrates his efforts on the J.D. Mur-

phree Wildlife Management Area just outside Port Arthur. The Murphree Area is 12,000 acres of state-owned marsh. It's the oldest public hunting spot in this part of the state and has set the trend for other public hunting areas.

Smith, the recipient of the first annual Raymond Sidney Fisher Memorial Murphree Area Best Hunter award, averages about eight ducks per hunt. He concentrates on pintail drakes and shoots none of the species considered "scrap ducks" in this waterfowl-oriented society.

"I'm no expert," says Smith with characteristic modesty. "I just enjoy hunting. I've been on a lot of private leases over the years and never had the consistent quality hunting I've enjoyed at the Murphree Area."

Smith has a thorough knowledge of the Murphree compartment he hunts, a public hunting factor that cannot be overemphasized. In a few instances, public area hunters in Texas are assigned blinds and have no free choice in the matter. In most cases, hunters are simply turned loose in an area and allowed to go wherever they choose.

It's obvious that a waterfowler who knows specific hotspots and has alternate spots in mind should another hunter already have his first one staked out, is much more likely to be successful than a sportsman who enters an area in the pre-dawn darkness with no idea of where to go.

Most of the public hunting areas are open throughout the year to naturalists and the general public at large. Hunters should make every effort to scout these places in the off-season and learn to get around in the areas they plan to hunt.

Success "secrets" of sportsmen like Smith won't reveal any magic formula. Waterfowl hunting is basically hard work and hunters who work the hardest are usually the most successful.

Permanent blinds are not allowed on some public hunting areas, but a boat can be disguised as a roomy, comfortable blind (right). Pintails and mallard hens are just two of the species that grace the Texas coast each winter (left).

One of the keys, of course, is getting as far away from the competition as you can get while remaining in an area that looks good to the ducks.

"We always watch what the ducks are doing," hints Smith. "They know more about where they want to go. If they just keep going to a spot where nobody else is hunting, it's a good idea to move over there."

One tactic used by virtually all the successful public area hunters is a big spread of decoys. Smith uses six dozen decoys, half pintails and half coots. Depending on the spot he's hunting and the availability of mallards, he may supplement his spread with two dozen mallard dekes.

For most popular species of ducks and all geese, the more decoys you use, the more birds you'll attract. In a public hunting situation, most hunters will use about two dozen decoys. A spread three times that large is also three times as expensive and triple the trouble, but big spreads are highly effective.

Since waterfowl have sharp vision, it's also important to hide as well as possible. Camouflage clothing is a must and some hunters use camouflage paint or a headnet to make the deception complete.

Permanent blinds are not allowed in some of the public areas and sportsmen must be prepared for uncomfortable sessions standing or

sitting in cold water and trying to resemble a harmless lump in a thick clump of grass or bulrush.

Where boats are required for transportation, disguising the boat itself as a roomy, comfortable blind is an excellent idea. I hunted last season on the Murphree Area with David Lobpries, who then was Murphree Area manager.

Lobpries used his 14-foot aluminum flat-bottom as a boatblind, anchoring the craft firmly with aluminum rods pushed into the mud, then draping a tarpaulin and camouflage netting over a lightweight framework of electrical conduit to hide the craft. A two-by-six plank the length of the boat on the blind's backside made a comfortable seat.

Lobpries' boatblind makes a stable shooting platform with roomy comfort for three hunters. Draped with camouflage netting, the drab craft does not spook ducks. A boatblind has the added versatility of allowing hunters to set up where no natural cover is available.

On calm days such a setup would be ideal for the middle of a large open flat, a duck magnet that's otherwise impossible to hunt. The boatblind also allows hunters to segregate themselves from others.

The subject of avoiding the crowds has come up several times in this article. Crowded conditions have become a problem on some public

Ray Sasser



hunting areas and a future trend toward restricting the number of hunters on an area already has begun.

The Barrow Ranch tract of the Anahuac National Wildlife Refuge admits only 100 hunters per day. As this was written, consideration was being given to hunting plans that would restrict the number of hunters in portions of McFaddin Refuge and the newly acquired 4,000-acre addition to the Murphree Area.

Part of the problem is sheer numbers of hunters. There's also an increasing trend toward lack of etiquette among public area hunters, particularly younger hunters. In the popular Southeast Texas area, the older generation of public area hunters learned to hunt ducks and geese on controlled, private lease situations. They're familiar with quality hunting and what it takes to make a quality hunt.

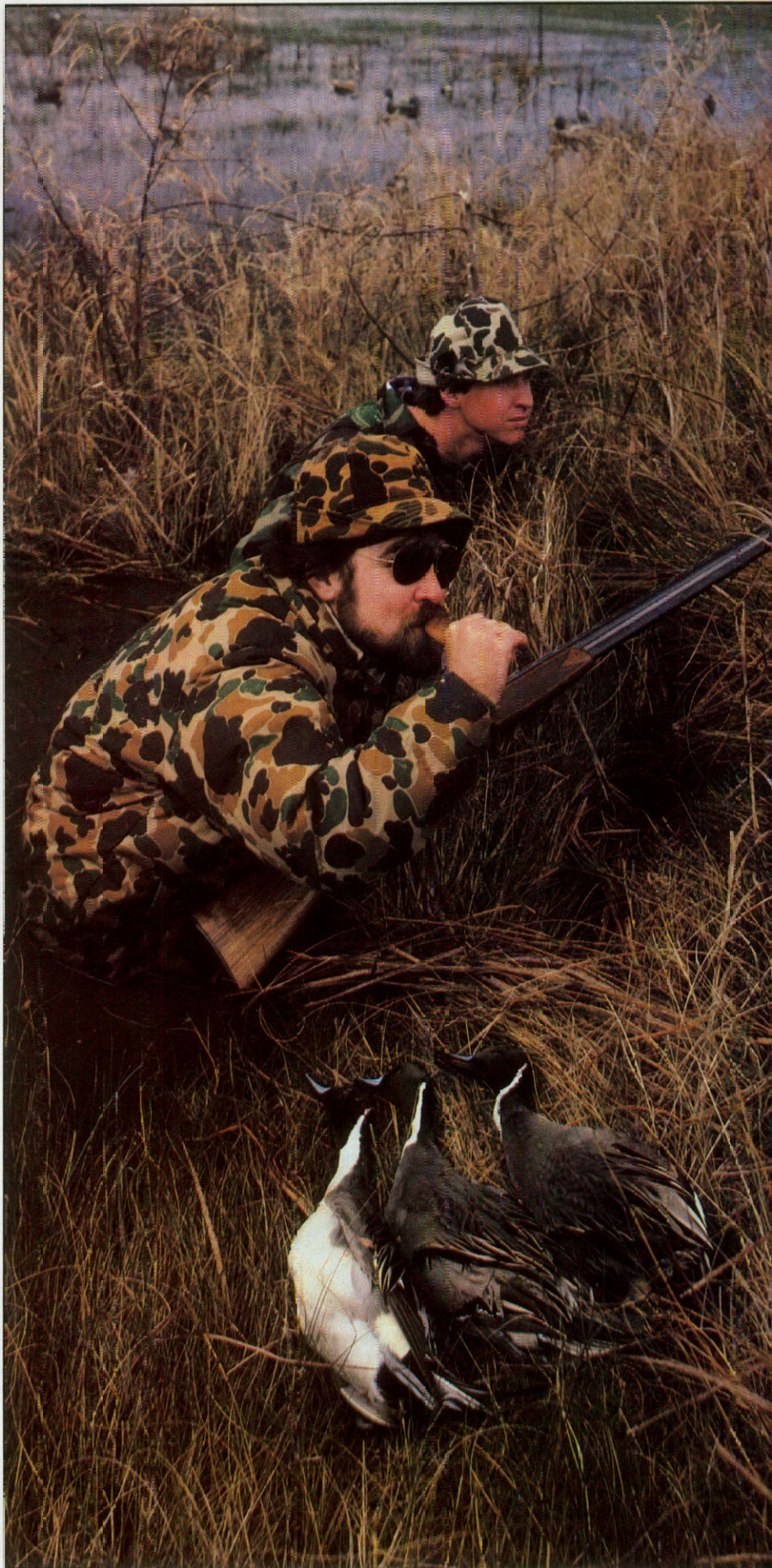
Many of the younger generation have no hunting experience except on public areas. They've largely taught themselves to hunt and think nothing of setting up 100 yards away from another party of hunters or skybusting birds way beyond range, birds that might actually be working someone else's decoys.

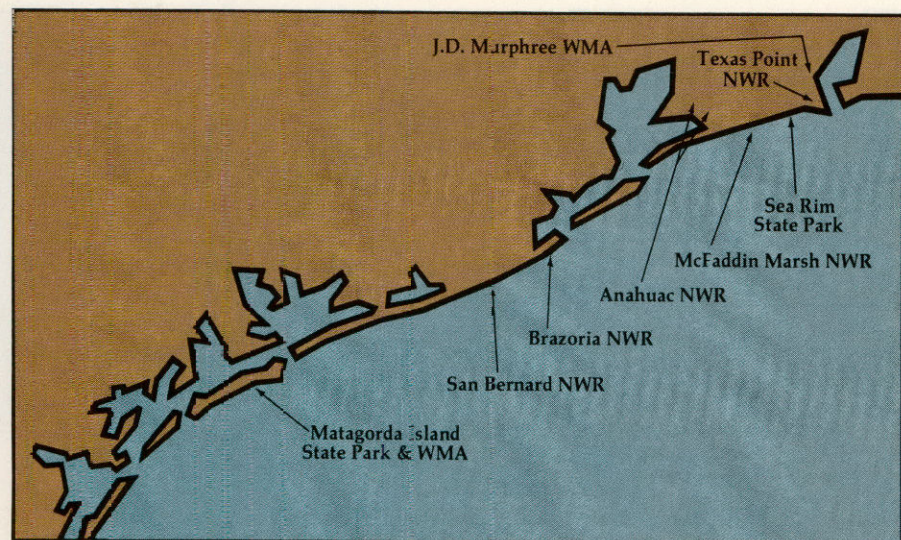
Such behavior also has caused public waterfowl hunting managers to consider requiring hunter safety courses. Such measures are inevitable as coastal waterfowl habitat continues to dwindle and the need for public hunting increases.

In the future, Texas public waterfowl hunters may have to wait in longer lines, take hunter safety courses, apply for public drawings well before the season and actually hunt less often than they'd prefer.

The abundance of state-owned and federally owned coastal wetlands assures, however, that the birds always will have a place to winter and the hunters always will have a place to hunt. **

Most people who enjoy successful hunts on public waterfowling areas took time during the off-season to scout the areas they plan to hunt. Texas has some of the best public waterfowl hunting in the country (see map).





Waterfowl Hunting Hotspots

- J.D. Murphree Wildlife Management Area just off Taylor's Bayou near Port Arthur is divided into two units. Hunting is allowed on Tuesdays, Thursdays and Saturdays during the duck season. A \$5 fee is required, along with registration and checkout.

Shallow-draft boats are required to hunt either the Big Hill Unit or the newly acquired Bruno Schulz Unit. As this was written, the state had plans to construct permanent blinds in the Schulz Unit. The blinds would be assigned on a first-come, first-served basis.

For complete information, contact Murphree Area Manager, 10 Parks and Wildlife Drive, Port Arthur, Texas 77660, or call 409-736-2551.

- Sea Rim State Park is a 15,000-acre marsh near Sabine Pass. A \$4 fee is charged per person for each day of hunting. And since it is a state park, a \$2 entrance fee also is charged, or you can buy an \$8 annual entrance permit valid for Sea Rim or a \$15 annual entrance permit valid for all state parks. Permits and check stations also are required at Sea Rim, which is open to hunting on Wednesday, Fridays and Saturdays.

Hunters need a shallow-draft boat for access. Permits can be purchased the day before a hunt. For complete information, contact Park Manager, P.O. Box 1066, Sabine Pass, Texas 77655, or call 409-971-2559.

- Matagorda Island State Park and Wildlife Management Area is a barrier island near Port O'Connor on the middle Texas coast. Developed as an Air Force facility, the U.S. Fish and Wildlife Service has allowed public hunting in 22 blinds in freshwater ponds on the island in years past.

Texas Parks and Wildlife now manages the island and the public hunting will be continued, although a hunting plan had not been finalized as this was written. Hunters paying a \$5 fee will be allowed to hunt the 22 blinds on the island itself. Free hunting will remain available in the tidal flats on the backside of Matagorda Island.

Hunters who try for ducks in the freshwater ponds on the island must provide their own boat transportation across seven miles of open bay from Port O'Connor. For updated information, contact Texas Parks and Wildlife, 4200 Smith School Road, Austin, Texas 78744.

- McFaddin Marsh National Wildlife Refuge lies just west of Sabine Pass and Sea Rim State Park. It's open to hunting on Tuesdays, Thursdays, Saturdays and Sundays with no permits and no fees.

As this was written, refuge managers were considering an assigned blind system in that part of the refuge east of the Shell Oil access road. There is some walk-in hunting available to sportsmen in good shape.

For updated information, contact Refuge Manager, P.O. Box 278, Sandlin Building, Anahuac, Texas 77514 or call 409-267-3337.

- Texas Point National Wildlife Refuge lies west of Sabine Pass and south of Hwy. 87 on that narrow strip of land between the highway and the Gulf of Mexico. Texas Point is open to hunting, with no fees, on Mondays, Wednesdays and Saturdays. Walk-in hunting is available.

For additional information, contact the same source as listed for McFaddin Refuge.

- Anahuac National Wildlife Refuge in Chambers County allows hunting on two separate parcels. Boat access is required for the Pace Tract off Oyster Bayou where hunting is permitted every day of the season.

The Barrow Ranch tract, an excellent choice for hunters without a boat, is open Saturdays, Sundays, Tuesdays and Thursdays. Weekday hunts are restricted to the first 100 hunters. Weekend hunters are selected on a permit drawing system.

For complete information, contact the same source as listed for McFaddin Refuge.

- Brazoria National Wildlife Refuge near Angleton allows public hunting every day of the season on a tract accessible only by boat.

As is the case with other refuge hunts in Texas, no fees are charged. For complete information, contact Refuge Manager, P.O. Drawer 1088, Velasco, Suite 10, Angleton, Texas 77515.

- San Bernard National Wildlife Refuge offers permit hunts with assigned blinds on Mondays, Wednesdays and Saturdays and also has two areas accessible by boat where public hunting is allowed every day of the regular waterfowl season.

For updated information, contact the same source given for Brazoria Refuge.

Keep in mind that the public hunting areas allow only half-day hunting and each of the places listed above will have closed areas where no hunting is allowed. Keep in mind also that steel shot is required on all state-owned and federally owned areas.



A desert bighorn ewe, one of 15 sheep received as a gift from the Nevada Department of Wildlife, is released into a pen at the Sierra Diablo Wildlife Management Area after being tagged and inoculated. A group of people interested in the restoration of the bighorn in Texas gathered to watch the release.

Raising Bighorns

by Charles Winkler
Big Game Program Director

Bighorn sheep have had a rough time in Texas for the past 100 years. But now, thanks to the work and generosity of many people, their lot soon may be improving.

In June 1983, a new brood facility was dedicated at the Sierra Diablo Wildlife Management Area in Culberson County for the production of desert bighorn sheep. The facility consists of four, 10-acre pens fenced with net wire 10 feet high to keep bighorns in and predators out. Each pen contains a feed station, water trough and several shelters.

However, the facility is much more complex than four simple adjoining pens. Each is a self-contained unit, separated from the others by a 24-foot buffer zone. Additionally, the entire 40-acre facility is surrounded by a 10-foot-high fence for further protection from predators. In all, there are three miles of fence in the facility, twice as many as might be contained in simpler designs.

Credit for the design of the facility goes to wildlife biologist Jack Kilpatric, who has been involved with the Parks and Wildlife Department's bighorn sheep restoration program since 1969. He evaluated the advantages and disadvantages of large brood pastures, such as the 422-acre pasture at the Black Gap Wildlife Management Area, and a small eight-acre pen that was used at the Sierra Diablo Area from 1973 to 1981. Kilpatric decided the small facility offered a much greater chance for successfully propagating bighorn sheep, but it would take too long to raise enough sheep for a release if only one pen were used. Therefore, he suggested the four-pen facility that would produce enough sheep to release 20 each year when stocked to capacity. Historically, larger releases of about 20 have been more successful than those involving smaller numbers.

Designing the facility was one thing, but getting it built was another. Funds for a project of this magnitude were not available within the budget of the Parks and Wildlife Department. Fortunately, the department has many friends—more than a few of whom are interested in the restoration of desert bighorn sheep. Several conservation groups, such as Game Conservation International and the Houston, Dallas and Panhandle Safari Clubs, had funded other wildlife projects and they, along with the Texas Chapter of the Foundation for North American Wild Sheep, expressed an interest in the brood facility project. However, the high cost of the project, originally estimated at \$150,000, precluded any one of these organizations from making a commitment to fund the entire project. Thus, the Texas Bighorn Society, under the stewardship of Dr. James H. Duke of Houston, was formed as a coalition of these sportsmen's conservation organizations to coordinate the fund-raising efforts and the construction of the facility. The society is dedicated to the restoration of the desert bighorn in Texas and, now that the brood facility is completed, will continue to fund projects and research necessary to attain that goal.

The facility was completed and then donated to the Parks and Wildlife Department on June 18, 1983. More than 150 people attended the dedication ceremony, including many of the donors, Parks and Wildlife Department officials, House Speaker Gib Lewis, area ranchers and many people just interested in the desert bighorn program.

The next step will be to stock the pens with bighorns. Fifteen sheep already have arrived at the Sierra Diablo Area, a gift from the Nevada Department of Wildlife, and more from other states are expected.

With the interest and dedication of people like those who helped build the brood facility, the desert bighorn sheep may see better days ahead. **



DONORS TO BIGHORN BROOD FACILITY

- Conroe Taxidermy
- Dallas Safari Club
- Duval Corporation
- Foundation for North American Wild Sheep National Chapter
- Foundation for North American Wild Sheep Iowa Chapter
- Foundation for North American Wild Sheep Texas Chapter
- Terry Fritcks
- Walter Fritschner
- Game Conservation International
- Gifford Hill Company
- Godfrey Butane Company
- H.B. Zachry Company
- H.K. Construction Company, Inc.
- Hermann Bennett Company
- Hermann Hospital, Houston
- Holloway Company
- Cecil Hopper, Sportsmen's Clubs of Texas
- Houston Pipeline Company
- Houston Safari Club
- Charles C. Jagou
- Joseph D. Jamail
- KTRK-TV, Channel 13, Houston
- William M. Ledford, II
- Leech Industries
- Jewel Lutich
- NL Industries
- NL Baroid/NL Industries
- Newman Bros. Trucking
- Norton Metals Products Co., Inc.
- Daniel Pedrotti
- Pennzoil Company
- Nelson Puett
- Safari Club International Paso del Norte Chapter
- Tom Tischler
- University of Texas Health Science Center at Houston
- Universtiy of Texas Medical School at Houston
- Clayton Williams

Angelina-Neches Scientific Area

Forks of the River

by Daniel W. Lay

One morning several years ago, two men slid a boat into the Angelina River at Bevilport in Jasper County.

A granite marker under a nearby sycamore marked a time past when bigger boats had bustled upriver from Beaumont. But now the water slid by quietly; only the call of a pileated woodpecker came from down the river.

The men started the motor. It sputtered and the boat moved to midstream. They headed downriver with the current.

Less than an hour later they swung the boat toward the right-hand bank. There, where a sign tacked to a dead cypress told them they were entering a state wildlife area, they nosed the boat into a hidden waterway called Bee Tree Slough. They cut the motor and took up paddles. Around the first bend they emerged to a vista of snags standing in the still water. Wood ducks squealed and rose above the trees.

They wound deeper into the forest, into a place called Forks of the River. It lay between the Neches River and the Angelina, just above where they joined. Dam B, seven miles downstream, kept its waterways flooded.

The Forks was wild country. Endless sloughs snaked among cypress and tupelo gum trees, and oaks lined the banks. Alligators sank beneath the water. A few years before, deer hunters on one of the sloughs shot a 'gator that weighed over 1,200 pounds. According to legend, ivory-billed woodpeckers still lived there.

Toward noon, near the confluence of the two rivers, the men found an ancient blackgum tree. It towered above its neighbors, catching the attention of the boatmen when they were still 200 yards away across an open slough. They paddled over to look.

It was big. They climbed ashore and measured it with the tie-rope of the boat. The trunk was nearly five feet in diameter. It was easy to see why early loggers had missed it. Sloughs separated it from easy access. Federal ownership of the land surrounding Steinhagen Lake above Dam B gave it final security.

The two walked around the blackgum and looked up at its branches, spreading 75 feet



Glen Mills

The Angelina-Neches Scientific Area is a place of relatively undisturbed wilderness, with still water and fragrant water lilies. The area lies between the Neches River and the Angelina, and once was known as Forks of the River. Access is only by boat.

above their heads. The tree probably had sprouted before Cabeza de Vaca landed on Galveston Island over three centuries before.

They speculated about bears foraging below it in earlier years for the fallen fruit or stretching to sharpen their claws on the bark; about passenger pigeons in its crown; and generations of squirrels in the cavity of a broken limb. Gray squirrels commonly bear two litters a year, so the one cavity may have yielded a thousand young since its beginning.

I was one of the men who had been close to the old gum in 1938. I had just started to work for the Game, Fish and Oyster Commission as a wildlife biologist with the assignment to map the distribution of game birds and animals in East Texas. The county judge at Woodville had told me about some turkeys and Mr. June Day, who lived on the west bank of the Neches River about two miles above its confluence with the Angelina River.

"Yes" said Mr. Day, "I can show you some turkey sign, if not turkeys." We walked down the bluff trail to the water's edge and untied his boat made of cypress boards. With a short paddle we propelled it across the river.

Walking away from the sandbar, we climbed a slight ridge and entered a large flat of willow oaks. We could see at least 200 yards because flood and shade had kept the understory





Autumn brings a touch of elegance to the area. The Angelina-Neches was established in 1972 as the first of a Texas System of Scientific Areas.

down. The recently fallen leaves circled shallow depressions which exposed the soil and scratch marks. Several acres of ground litter had been worked for acorns by powerful turkey legs and toes.

This was one of only five places which had native eastern turkeys in 1938. I was so excited about the "Forks" and its turkeys that I proposed state acquisition. The old Wm. Cameron Company of Waco gave an option for \$4 per acre but the option was not exercised.

Nearly 20 years later I returned to the same land with a new assignment: advise the Corps of Engineers how to manage the timber to preserve wildlife values. The 4,200 acres between the rivers was part of the area acquired by the government in 1952, when Dam B was built at Town Bluff.

A compartment was marked for sale. It favored the more merchantable species. Protests were made because all of the great shagbark hickories were marked with an "X", meaning they were to be cut down whether they were used or not. But the argument was moot.

Soon the ivory-billed woodpecker diverted attention from timber sales. This was in 1966 when John Dennis reported seeing one of the birds just north of the old June Day place. Such notables as Herbert L. Stoddard came to try to see one. Gradually, the lack of confirmation forced doubts and Dennis' report became discredited. But the area remained the most likely place for ivory-bills because it supported more of the large oaks and gums said to provide the ivory-bill's favorite food of wood grubs in their dead limbs.

Turkeys were restocked, but did not prosper. The old turkey pattern of wintering in the river bottom and nesting on the adjacent hills had been distorted. Fires no longer kept the hills green with grass and forbs under the longleaf trees which was



Dale Bounds

ideal nesting and rearing territory.

The area no longer is subject to flooding as in the past, so high waters don't replenish the fertility as they once did. When the Angelina flooded, one could tell as far downstream as Evadale by the red color of the water. The redlands of Nacogdoches and San Augustine counties contributed their part to the fertility of the bottomlands, all the way to the estuary at Sabine Lake.

The Angelina now runs clear and stays within its banks. Sam Rayburn Lake traps the products of erosion. But there is a tide sometimes and certain sloughs in the Forks may flow and ebb according to whether the engineers are releasing water and generating power at the dam.

Dead snags are reminders of the trees drowned by rising waters of Steinhagen Reservoir, about 13,700 acres of them in all. Other trees on the edges of the water have wet feet and are susceptible to blow-downs. Some new cypress stands are forming.

White and blue great herons and anhingas nest at one place, in a clump of old cypress. The same trees may host wood storks in the fall.

The Neches River is about the same as always, but it flows under a threatening cloud: Rockland Dam, a few miles upstream. Proposed and authorized more than 30 years ago, Rockland awaits funding, as one of many new dams planned by the water managers.



Great blue herons (above) nest in a clump of old cypress trees on the Angelina-Neches. The area is operated as a natural laboratory with an advisory committee of scientists. It is open to hunting.

In 1972 the area became the Angelina-Neches Scientific Area, first of a series of units envisioned by proponents of a law passed in 1967. It would be operated as a natural laboratory for study and demonstration with an advisory committee of scientists. The Parks and Wildlife Department held a public hearing in Jasper to discuss new regulations for management of the area. Soon local hunters who considered the Forks more important for their recreation overwhelmed the "scientific area" concept. A second hearing was held and new rules were announced: no vehicles in the area, no camping, but the area would remain open to hunting. Access is only by boat.

What to Look For

The old blackgum tree remains on a ridge near the union of the two rivers. On "S" slough there is a veteran cypress which measures 108

inches above the butt-swell. Its squirrels are so high they seem less wary and most guns can't reach them. Nearby is an old stump of a cypress tree cut long ago, when the method of moving the large trees was to fell them in summer and float out the logs in the next flood. The notches which supported the two men who pulled the cross-cut saw still may be seen.

Some specimen trees were numbered and measured: sycamore, 55 inches in diameter; cherrybark oak, 36 inches; tupelo, 61 inches; overcup oak, 45 inches; swamp chestnut oak, 47 inches, and magnolia 35 inches.

Notice the fine young stands of saplings where a veteran fell and left an opening. This forest probably has a better proportion of cherrybark, hickory, blackgum, cypress and tupelo than any. It is such a good example of natural forest because it is so inaccessible; loggers took only the most valuable trees when they last entered in the early 1950s.

East Texas once had 1.8 million acres of such bottomland hardwoods. A survey in 1976 revealed that only 46,100 acres remain mediumly well stocked with desirable trees.

What happened to the rest? Some supported the first sawmills in Texas, most of which cut cypress into shingles. Then, after the railroads arrived about 1900, great hardwood sawmills were built at Pineland, Bessmay, Call and Diboll. In about 1908 the Southern Pine Lumber Company was advertising such presently unattainable lumber as knot-free white oak boards 19 inches wide



and 16 feet long. The hardwoods brought higher prices than pine until about 1920. Hickory, ash, and white oak were among the most prized species.

Logging for the early sawmills was selective, but today remaining stands may be clearcut for chips to make paper, leaving squirrels a long wait between acorn crops.

The final fate for more than a third of the 1.8 million acres of original hardwood bottomlands was drowning under East Texas impoundments. Tracts which have survived overcutting, clearing for agriculture or inundation presently exist under several threats, the worst of which is construction of additional lakes.

These are where wood ducks breed or winter. Mallards love the acorns and arrive in late winter followed by several other kinds of ducks.

Watch for the 11 kinds of warblers which have been listed, including American redstart, Louisiana waterthrush, prothonotary, black and white. The Texas barred owl will talk to you early and late, and the great horned owl may be heard also. Red-shouldered hawks are numerous and the high number of such predators denotes abundant prey species such as woodrats, flying squirrels, crayfish and frogs.

Beware of the paint-marked trees and flagging, which, along with litter, are commonplace. They may or may not mark the correct route to return to the river. They may lead to trotlines or other private places. Take matches. If all of your choices are incorrect, as to which turns to take among the waterways, you may have to defy the rule of no camping and wait for the next day. **

Editor's Note: Dan Lay retired from the Texas Parks and Wildlife Department in 1979 after 43 years as a biologist. The first part of this article is also the first pages from a new book about early East Texas wildlife and forests, "Land of Bears and Honey" by Joe C. Truett and Daniel W. Lay. The book will be published by the University of Texas Press in Spring 1984.



STATE'S DEER HARVEST INCREASED IN 1982-83

A 10-year decline in the statewide deer harvest appeared to be reversed during the past hunting season, with an estimated 337,600 deer taken by hunters during the 1982 season. This was the highest total since the 1975 season, when 348,000 were harvested.

Texas Parks and Wildlife Department officials recently completed a mail survey of 25,000 licensed hunters to determine the harvest.

Generally good habitat conditions, high deer populations and favorable weather during the hunting season were some of the reasons for the improved harvest, officials said.

P&W COMMISSION OBJECTS TO MATAGORDA DREDGING

The Texas Parks and Wildlife Commission has asked the Texas Attorney General's Office to initiate immediate legal action to prevent the U.S. Army Corps of Engineers from placing dredge spoil in East Matagorda Bay.

Parks and Wildlife officials said dredging operations being conducted by the Corps in the Gulf Intracoastal Waterway have caused excessive flows of spoil material across a wide area of the bay, covering the bottom with silt and damaging fish and shellfish habitat.

The commission's letter charged that the Corps' dredging project exceeds allowances set in a 1975 environmental impact statement. The commission further expressed concern that additional dredging projects planned by the Corps farther down the coast may cause similar negative impacts on adjacent bay systems if the spoil cannot be contained.

The portion of East Matagorda Bay currently being affected by the spoil is a productive nursery area for shrimp, red drum and spotted seatrout, according to the department's surveys.

Outdoor Roundup

COMPILED BY THE
PARKS AND WILDLIFE
DEPARTMENT'S NEWS SERVICE



HUNTING, FISHING REGULATIONS SET FOR 66 TEXAS COUNTIES

Expanded opportunity for hunters was one of the primary results of action taken by the Texas Parks and Wildlife Commission when it recently adopted hunting and fishing regulations for 66 counties.

The commission was given authority for managing wildlife resources in all counties by the Wildlife Conservation Act of 1983 passed by the Texas Legislature in its recent session. The new regulations are effective October 1.

The 66 counties included 13 general law counties in which all hunting and fishing regulations formerly were set by the Legislature, and other counties having various exceptions to the Parks and Wildlife Department's regulations.

In many cases, hunting regulations in these counties will be standardized to conform with

those in adjoining counties, unless biologically inappropriate.

Complete information on hunting and fishing regulations in each of the 66 counties will be contained in a free supplement to the department's hunting and fishing regulations guides. The supplement will be available at department offices and hunting and fishing license outlets by October 1. The department's toll-free number, 1-800-792-1112, also may be used.

Deer and turkey hunters will benefit from special October deer and turkey archery-only seasons and spring turkey gobbler seasons in some counties where such seasons were not permitted before. Officials said antlerless deer permits also may be issued in some of the counties, and spike bucks will not be protected from legal harvest in any county having a deer season. This already was in effect in regulatory counties, resulting from department studies showing that spike bucks are inferior deer.

HURRICANE DAMAGES SEVERAL STATE PARKS

Hurricane Alicia had dramatic effect on Texas' state park system, with more than 1,900 evacuees taking shelter in 24 parks while the storm wreaked havoc in others.

Galveston Island State Park caught the brunt of the hurricane's force. Officials said high winds ripped off part of the park headquarters roof, blew down electric lines and damaged most other facilities in the park. High tides swept away an undetermined number of picnic tables and boardwalks. No sand dunes remain on the Gulf side of the park facilities.

The Galveston Island facility may remain closed until early 1984 as a result of the storm.

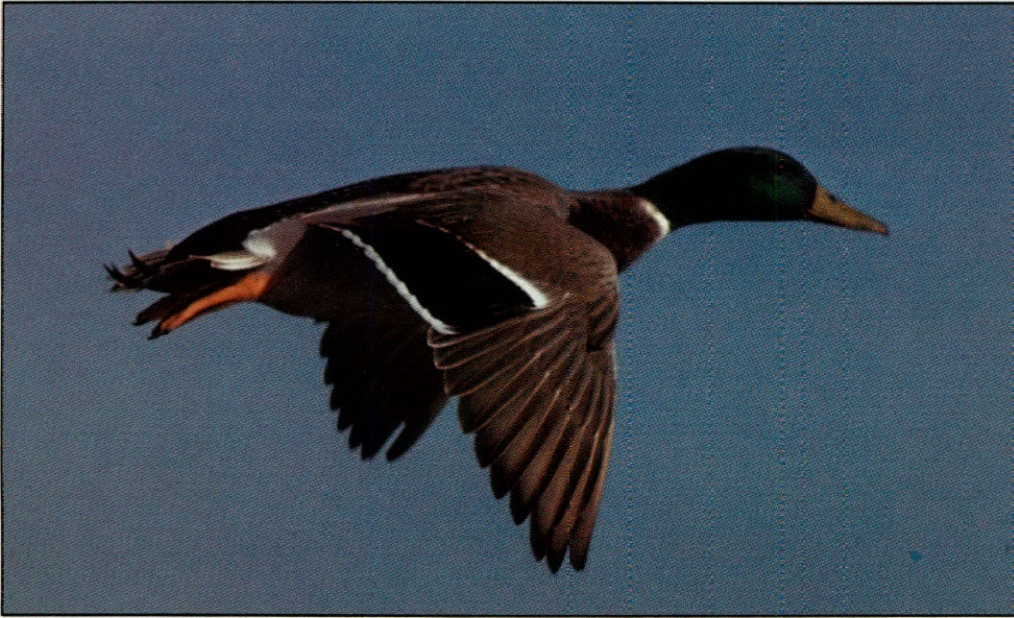
Several hundred trees were blown down at Huntsville State Park near Huntsville as the hurricane moved inland past Houston. The falling trees ripped out electric lines virtually throughout the park and damaged a number of screened shelters and other facilities. Electrical service has been restored and the park reopened.

Other state park facilities affected were Sea Rim State Park near Sabine Pass and San Jacinto Battleground near Houston. The storm stopped electrical service to the battleground and shoved the Battleship Texas upward and backward about two feet. The nearby San Jacinto Monument State Historical Park also lost electrical service. San Jacinto Monument and Battleground and Sea Rim have reopened.

Sea Rim State Park damage mainly consisted of high water problems, with fences and power lines down in some sections.

When the severity of Hurricane Alicia became apparent, parks officials announced that evacuees could camp in inland state parks free of charge. Families from the coast streamed into parks as far as 200 miles inland.

Officials recommend that persons anticipating visits to Southeast Texas area parks telephone the park to determine the extent of cleanup operations.



COMMISSION SETS WATERFOWL SEASONS

A three-segment split duck season for the central and eastern portions of the state has been adopted for the 1983-84 season.

Department staff told the commission the three-segment split will give hunters opportunity to hunt early-arriving pintails, teal, gadwalls and widgeon and also sufficiently extend the season to take advantage of late-arriving mallards.

The duck season dates are November 5-11, 1983; November 19-27, 1983, and December 10, 1983, through January 22,

1984. As in the past, shooting hours will be one half-hour before sunrise, to sunset, with bag limits governed by a 100-point system unchanged from last year.

In the High Plains Mallard Management Unit of West Texas, the duck season will be November 1, 1983, through January 22, 1984.

This year's goose seasons are similar to the previous year. West of U.S. Highway 81, the season will be November 1, 1983, through January 22, 1984. The bag limit is five geese, not to include more than two Canada geese, black brant or white-fronted geese in the aggregate.

East of Highway 81, the season is November 5-11, 1983,

and November 19, 1983, through January 22, 1984. Bag limit will be five "light" geese (snow, blue, Ross') and one Canada goose or black brant and one white-fronted goose, for a maximum daily bag limit of seven geese.

The season on Canada geese is closed in Anderson and Henderson Counties.

Other migratory bird seasons adopted were for common snipe (Wilson's or jacksnipe), November 1, 1983, through February 12, 1984, bag limit eight per day, possession limit 16; and woodcock, November 26, 1983, through January 29, 1984, bag limit five, possession limit 10. Shooting hours for both species is one half-hour before sunrise, to sunset.

THIRD ZONE ADOPTED FOR SANDHILL CRANES

Sandhill crane hunters will be able to pursue their sport in a wider area of the state this winter.

The Texas Parks and Wildlife Commission has established a third zone covering most of South Texas, the prairie region west of Houston, southern portions of the Edwards Plateau and as far west as Sonora and Del Rio.

The new zone, named Zone C, will have open season dates of January 14-February 12, 1984. Shooting hours and bag limits will be the same in all

three sandhill crane hunting zones: 30 minutes before sunrise to sunset; three sandhill cranes per day, six in possession.

Boundaries for Zones A and B are unchanged from last year. The Zone A season will be November 12, 1983, through February 12, 1984; the Zone B season will be December 3, 1983, through February 12, 1984.

The new Zone C boundaries include a buffer zone along the coast to assure protection for endangered whooping cranes which spend the winter in and near the Aransas National Wild-

life Refuge at Austwell.

Establishment of the third zone in effect opens roughly the western half of the state to sandhill crane hunting.

As in the past, hunters in all zones are required to obtain free sandhill crane hunting permits from the department. To obtain the permits, write Bernie Rittenhouse, Texas Parks and Wildlife Department, 4200 Smith School Road, Austin, Texas 78744, and provide name, address and county of residence for all persons who intend to hunt.

NIMITZ HISTORICAL PARK PARTIALLY CLOSED

The Steamboat Hotel and museum portion of Admiral Nimitz State Historical Park in Fredericksburg has been closed during weekdays for restoration and exhibit work.

However, both the hotel and museum will be open for visitation on Saturdays and Sundays. Weekday visitors to the historical park still will be allowed to tour the Japanese Garden of Peace and the Pacific War History Walk.

Officials said no entrance fees will be charged on weekdays when the museum and hotel are closed.

Restoration of the Nimitz Steamboat Hotel and museum began several years ago and is nearing completion. When completed, the hotel's exhibits will depict Fleet Admiral Chester W. Nimitz' life and military career, including his important role in World War II.

NOVEMBER IN . . .

TEXAS PARKS & WILDLIFE

Not too long ago, people would have laughed at the idea of hunting deer in East Texas. Whitetails had virtually disappeared from that part of the state by the late 1930s, but restocking and a new East Texas awareness concerning whitetail conservation have made the deer herd there one of the most dynamic in the state. In the November issue we'll take a look at the whitetail's comeback in East Texas, and offer some tips on how and where to hunt in the Pineywoods. We'll also have a wrap-up of the 1983-84 hunting seasons and bag limits for the state, and a list of the names and telephone numbers of all the game wardens. Other stories in the November issue include Guadalupe River State Park and Honey Creek Preserve, dressing for cold weather and phalaropes.

Alternative to Crowded Campgrounds

Primitive Camping

by Mike Herring

The passing of an autumn thunderstorm left a cool crispness in the air and the late afternoon sun heightened the color contrast between the deep green of the junipers and the rich reds of the canyon walls. It was one of those moments that makes us appreciate the beauty and solitude of a wilderness experience.

If you think this scene couldn't possibly have taken place in a Texas state park, you're wrong. A dozen state parks offer primitive camping areas as alternatives to the usually crowded campgrounds. Ten of these are open now; two will open soon.

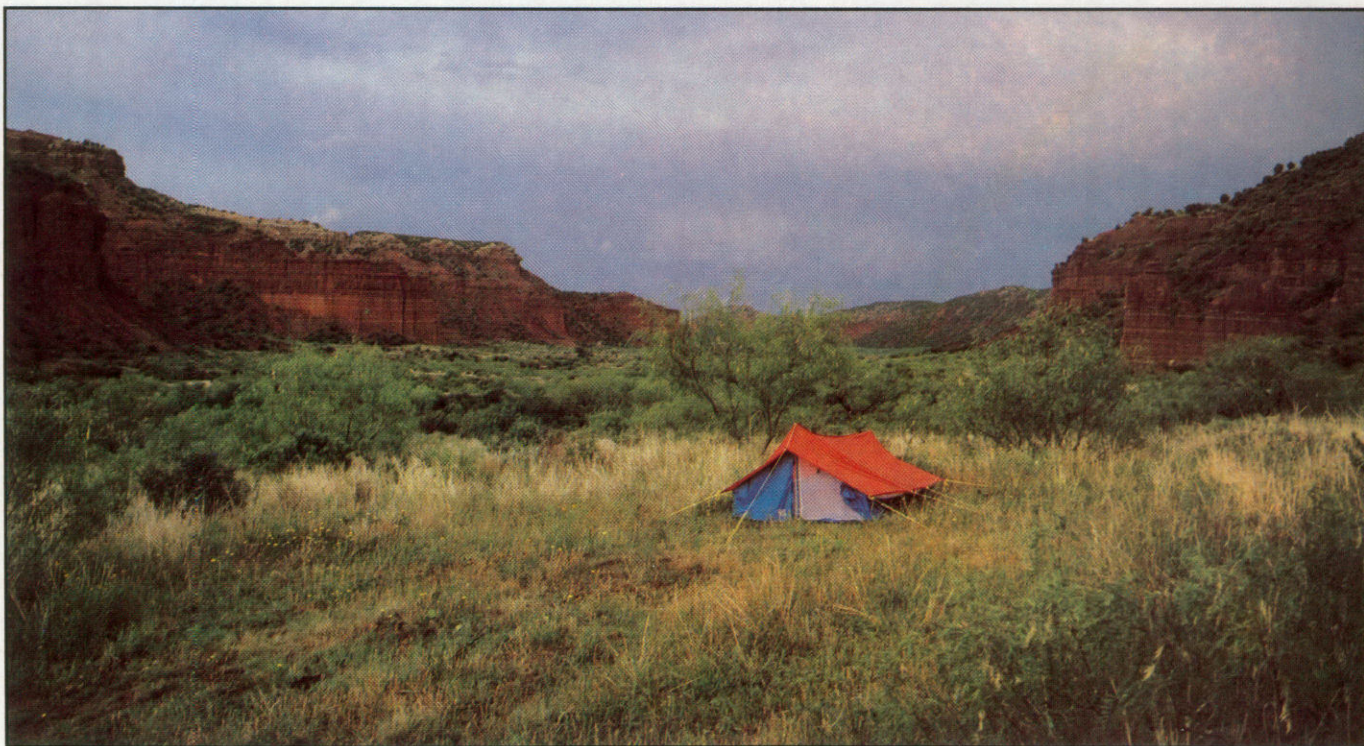
While admittedly not true wilderness, they do offer campers an opportunity to have an isolated, backcountry experience.

Primitive camping areas, by definition, are "primitive." First, they cannot be reached by automobile. Most require a hike of at least one mile, and all require that everything needed for a comfortable stay be carried in. Secondly, while water and toilet facilities are provided at some, most provide nothing more than a place to set up a tent. Certain rules and guidelines should be observed in primitive camping areas to preserve their appeal. Since a wilderness experience means seeing little

evidence of man's presence, it is important that backpackers leave no signs of use. The native landscape should not be rearranged, but rather campsites should be chosen to take advantage of natural topography and drainage. Because of the shortage of wood in some areas, the danger of wildfires and the ground scarring caused by camp fires, primitive campers should use only containerized fuel stoves for cooking. It is

Caprock Canyons State Park, pictured on these two pages, has more than 14 miles of trails. Campers in the two primitive areas should be aware of flash flood potential during heavy rains.

Mike Herring







Mike Herring

difficult for park staff to patrol regularly in primitive areas, so users should pack out all garbage and litter for disposal in trash receptacles usually located at the trailhead parking area. Burying garbage is not acceptable. When toilet facilities are not provided, standard field disposal of human wastes should be followed.

Just as important as any of the above rules is common courtesy. Be considerate of others when camping. Don't crowd fellow campers and remember that noise is out of place in a primitive area.

While you usually can find a spot to yourself in most of the state primitive camping areas, some are more popular than others and may be full on some weekends or holidays. The fee for primitive camping is \$3 for a group of up to eight people, plus the \$2 park entry fee per vehicle. The more heavily used areas are pointed out in the descriptions that follow. Next time you get the urge to really get away from it all and rough it, but don't have a week's vacation, try one of the state park primitive camping areas. **

BASTROP STATE PARK

The recently completed 8.5-mile Lost Pines Hiking Trail is probably one of the least improved of the state park trails. It was designed to offer the least intrusion into the area's natural beauty, and is intended to be a primitive foot path only. Currently, the trail makes a loop in an undeveloped portion of the park, but future plans call for an extension to Buescher State Park along the Park Road 1 right-of-way. The Lost Pines Trail is presently the only state park trail that allows campers

to choose their own campsites along the trail within a specified area. This procedure is being allowed on a trial basis and its outcome will greatly influence the expansion of this practice to other parks. There are no water or toilet facilities along the trail.

CAPROCK CANYONS STATE PARK

More than 14 miles of trails provide access to the spectacular scenery and isolation in the undeveloped portions of this park. Trails through the erosional canyons and ridges vary from easy to difficult depending on the terrain. Trailhead parking lots provide access to two primitive camping areas, both of which are located within one mile of the trailheads. Horseback riding also is allowed on portions of the trail and an equestrian camping area is provided. While toilet facilities are available at each primitive camp, drinking water is not and should be obtained before leaving the main park camping area. Camping along the caprock escarpment is not without its hazards, and campers should be aware of poisonous snakes, flash flood potential and hazardous climbing conditions.

DINOSAUR VALLEY STATE PARK

More than five miles of varied trails are available to hikers in Dinosaur Valley State Park. Most trails begin at the trailhead and parking lot located in the camping area. Drinking water is provided there, but not along the trail. The trails are located in an isolated portion of the park which requires crossing the Paluxy River. High water, which usually occurs during the winter and spring, sometimes limits access to the area and makes crossing dangerous. The trails, which include intimate views of Denio Creek and scenic vistas of the park, are sometimes narrow and steep, but are very well marked. Seven individual primitive camping sites are scattered throughout the juniper-oak woodlands and are not heavily used.

FAIRFIELD LAKE STATE RECREATION AREA

The primitive camping area at Fairfield Lake is unique in that it can be reached either by hiking or by

boat. It is located in an isolated area of the park across an arm of the lake from the boat launch and day-use area. A trailhead and parking area are provided just inside the park entrance near the headquarters. The trail winds through a mixed hardwood forest along an arm of the lake for the first 1.75 miles and then across Big Brown Creek along the park entrance road. The remaining 2.25 miles alternate between the hardwood forest and more open areas of small second growth timber. Deer and birdlife abound, and the trail is wide, level and well main-

tained. The primitive camping area is easily accessible to the lake and has some 12 individual sites. A restroom and drinking water are available in the area. This is an out and back trail with no loop alternatives.

INKS LAKE STATE PARK

The seven miles of hiking trails at Inks Lake provide many pleasant surprises. In approximately 500 acres, primitive campsites are scattered along a creek under an overstory of large pecan trees, spectacular views of the Hill Country and the lake and an opportunity to hike amid the unusual granite outcroppings of

Trails in Lake Mineral Wells State Park (below) wind through dense stands of trees and across grassy fields. There are two primitive campgrounds for backpackers. Dinosaur Valley (left) has seven individual primitive campsites.

Mike Herring





the Central Mineral Region. The Pecan Flat campground is located across Park Road 4 from the main portion of the park and is about one mile from the trailhead parking area adjacent to the park headquarters. There are nine campsites in the area, and a toilet facility is provided. Water should be obtained at the headquarters. Although the trail is marked, some of the lesser used portions may be difficult to follow.

LAKE MINERAL WELLS STATE PARK

The upper reaches of Lake Mineral Wells, and portions of the old Fort Wolter's military base provide the setting for the 13 miles of hiking and horseback riding trails available at Lake Mineral Wells State Park. Portions of the hiking trails cross or utilize old military roads, but for the most part they wind through dense stands of oak and elm trees, or

across grassy fields of wild flowers and scattered mesquite trees. A trailhead parking area is provided near the equestrian campground, where drinking water, restrooms and showers are available. The two primitive campgrounds, which are for backpackers only, have 28 campsites and are approximately two miles from the trailhead. Camping is most pleasant in spring, fall and winter when insects are not as prevalent.

LAKE SOMERVILLE STATE RECREATION AREA

Located along the upper reaches of Lake Somerville, the Somerville Trailway is a 21-mile system that forms the longest single trail in any Texas state park. It connects the Birch Creek Unit on the north side of the lake and the Nails Creek Unit on the south, and there are opportunities for both backpacking and equestrian camping. Equestrian

campers are located at the trailheads in each park. Wide and easily hiked, the trail winds through post oak woodlands and yaupon thickets, along the lake shoreline and the banks of Yegua Creek and Flag Pond. Wildlife is abundant, especially white-tailed deer and fox squirrels. There are five different camping areas, each of which has trash and toilet facilities. Two water wells, one on each side of the lake, provide potable water for trail users.

LOST MAPLES STATE NATURAL AREA

The 10 miles of hiking trails at Lost Maples are well marked and color coded for easy orientation. Several trail loops offer options for distance and degree of difficulty. There are eight primitive camping areas with three portable toilets located along the trails. The trail offers spectacular views of the big-

tooth maples' fall color, and portions follow the Sabinal River and Can Creek. Other sections offer impressive vistas from high canyon rims. Drinking water should be obtained from the main park campground. The park is usually extremely crowded in the fall when the maples are in full color.

PEDERNALES FALLS STATE PARK

Although it is only a 2½-mile hike from the trailhead to the primitive camping area at Pedernales Falls, the Wolf Mountain Hiking Trail offers more than seven miles of trail for serious hikers. The moist sheltered canyons and drainages, and the many seeps and springs stand in marked contrast to the dry cedar- and oak-covered hillsides and uplands. Camping is allowed only in a designated area on the bluff above the river; one mile long and one-half mile wide, it is bordered by the trail, the river and two creeks. The clear flowing Pedernales River offers swimming, fishing and nature study

opportunities. There are two chemical toilets provided along the trail, but drinking water is not available. This is one of the most popular primitive areas and often is full on weekends. Caution should be exercised during inclement weather; the river and low areas are subject to flash flooding and rising water.

SEA RIM STATE PARK

Although it does not offer hiking opportunities in the traditional sense, Sea Rim State Park does present a unique opportunity to experience the diversity and beauty of the Texas coastal marsh. Maintained canoe and johnboat trails provide access to the many inland lakes and waterways of this park which has more than 15,000 acres.

Soon to open:

BRAZOS BEND STATE PARK

Located along the Brazos River in Fort Bend County just 45 minutes from Houston, this 4,897-acre park initially will provide more than 10 miles of trail and one primitive camping area. The primitive area will be

located just off the main loop trail around Elm Lake, which offers excellent waterfowl viewing during the fall and winter. Bank or pier fishing only is permitted; no boating, wading or swimming is allowed.

ENCHANTED ROCK STATE NATURAL AREA

Primitive camping should be very popular when Enchanted Rock is reopened since developed park facilities have been kept to a minimum. Three primitive camping areas are planned; two on the north side of the park near Moss Lake and one at the east end near the Buzzard's Roost rock formation. Park construction is currently ongoing and an exact reopening date has not been established.

Many of the views from Lost Maples' hiking trails are spectacular (left). Several trail loops provide differences in distance and degree of difficulty. At Pedernales Falls (below), camping is allowed in a designated area on the bluff above the river.

Larry G. Hobbs





Young Naturalist

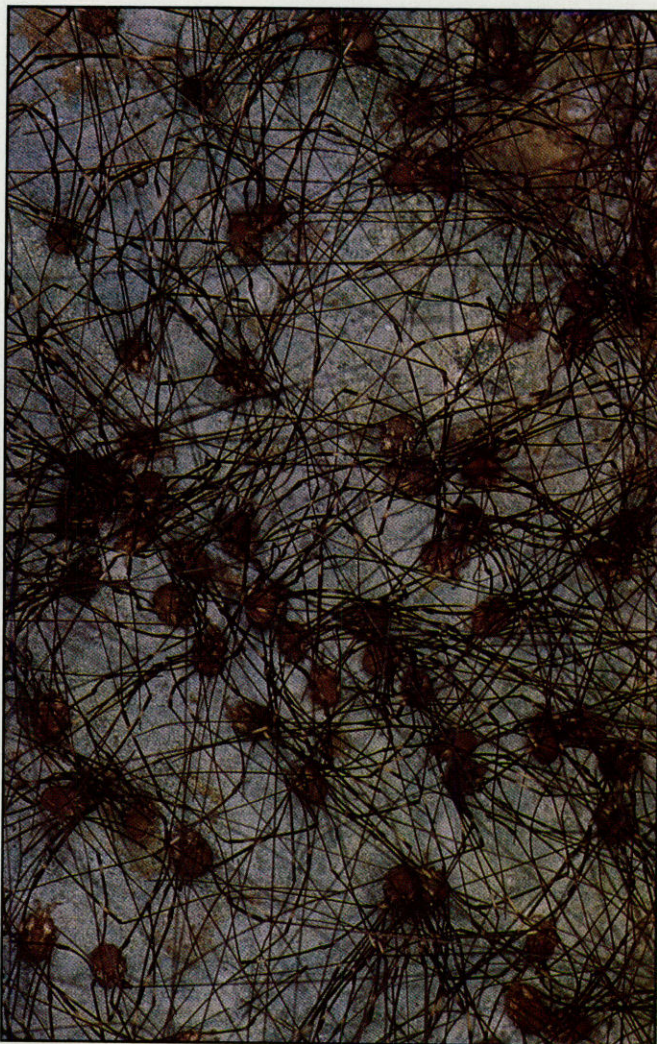
Daddy Longlegs

by Ilo Hiller

At first glance the daddy longlegs, known as the harvestman because it is so common in fields during the harvest, appears to be just another long-legged spider. However, a closer look will show it is quite different from its spider cousin. Its small oval body has no "waist" between the head and abdomen as the spider's does, and its abdomen is segmented. Its eyes—two instead of eight—are mounted on knobs, called tubercles, located atop its back instead of on a face. These eyes can form no images, but they do sense light intensity as they face to the sides.

Unlike the spider, which can survive long periods of starvation, the harvestman must eat frequently. Fortunately, it eats almost anything and can swallow small bites of solid food torn into pieces by its pincerlike jaws. Worms, pillbugs, insects, spiders, other harvestmen, rotting fruit and juicy plant materials are suitable food. The spider, on the other hand, is restricted to a more liquid diet—the body juices it sucks from freshly killed prey.

Liquids are a very important part of the harvestman's diet, too, and a lack of them will cause the creature to become stiff and sluggish. Sipping water from



Jim Whitcomb

It's amazing that harvestmen manage to keep their long legs untangled when they cluster together in large masses. A touch to any individual will start a chain reaction that turns the whole group into a heaving mass. Their small bodies bounce suspended from thin shock-absorber legs as if they were doing pushups—daddy longlegs style.



puddles, ponds or dewdrops and sucking juices from fruits and other vegetation provides the fluids it needs to remain healthy.

The harvestman spins no silken web and has no venomous bite. Any live prey it eats must be stalked and captured. But how does it capture what it cannot see? Two of its legs, the second and longest pair, contain sensory organs and tactile hairs that enable the harvestman to smell, taste, feel vibrations and locate objects in its path. Like an insect's antennae, these legs wave through the air or reach out and tap the ground, gathering information about the immediate area

Keeping the sense organs on its legs in good

working condition means keeping them clean. To do this the harvestman pulls each threadlike leg through its jaws and removes any attached dirt or bits of food. This grooming process takes place after every meal.

Loss of the use of its eyes would be no big problem for the harvestman, but loss of its feeler legs is a definite handicap since they serve as its eyes, ears, nose, tongue and hands. Movement is slow and hesitant when these legs are missing as the harvestman must blunder about blind and deaf. Since it cannot grow new legs (regenerate) as some creatures are able to do, the loss of a leg is permanent.

If one of its other legs becomes detached—something that happens all too often during its hazardous

As the harvestman climbs over vegetation, ambles along the ground or crosses a rock ledge, it must be alert for the many predators that would make a meal of it. The unfortunate harvestman below cannot make its escape by merely shedding a leg. Its body is held fast by the scorpion's claws.

lifetime—the harvestman merely adjusts to walking on fewer legs. Losing a leg is actually one of the harvestman's methods of escaping from danger. The predator that grabs one usually ends up holding only a twitching leg while the harvestman scurries to safety. The problem with this method of escape is that over a period of time the creature may have so many close encounters with birds, toads, spiders, centipedes, scorpions and other predators that it is left with nothing to walk on. It is not unusual to find harvestmen wobbling along on three or four legs come fall. Occasionally one is found balancing itself on only two.

Fortunately, losing legs is not the harvestman's only method of defense. The creature also uses chemical warfare on its enemies. Glands located on either side of its body near the front legs secrete a foul liquid that can be sprayed at the enemy or picked up by a handy leg and thrust into the enemy's face. The chemical smells and tastes bad to most predators and often discourages them from making a meal of the harvestman.

Another defense method, which may or may not be successful, is playing possum. The harvestman lies with its legs sprawled out in unnatural positions and pretends to be dead. A predator interested only in prey it has killed itself may pass up the dead-looking faker for a more lively creature—or it may not.

When the breeding season rolls around, harvestmen spend no time on courtship. In fact, they mate whenever they meet a member of the opposite sex and then each goes its own way—the male in search of other females and the female in search of other males. By the end of the summer or early fall, the female is ready to lay her eggs. Using a telescoping egg-laying mechanism (ovipositor) that extends several times the length of her body, the female deposits her eggs deep in the soil or into crevices in the bark of a tree. The small, pale eggs have no set incubation period and receive no care. Hatching time depends upon the species and the temperature of the spot in which the eggs were laid. Those placed in warmer areas can hatch in a couple of weeks while others laid in cooler spots may lie dormant through the winter and then hatch the next spring.

The newly hatched harvestman is a colorless miniature version of its parents and is capable of looking after itself. Within an hour of hatching, it has grown too big for its skin and must shed it (molt). Hanging upside down, it pushes, shoves and twists its body

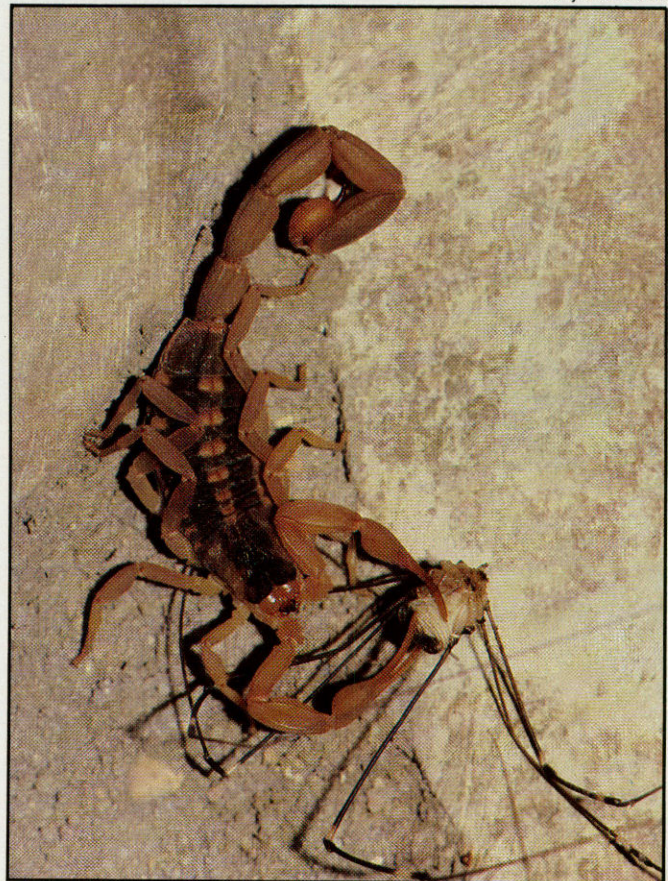
until the skin splits down the back. The body slips free with no difficulty, but stripping those long legs from the old case takes a bit of pulling and tugging. In time, with the help of its jaws, the legs are released. The new skin, no longer colorless, will continue to be changed whenever it becomes too tight as the harvestman grows to adult size.

With such a small body hanging suspended in air from its eight, arched legs, the harvestman is no threat to humans—a fact most children learn quickly. The touch of its legs as it crawls across a hand or up an arm is feather light. And who can help but be amused to see a cluster of harvestmen, bodies bouncing in place, doing daddy longlegs "pushups." A touch to any member of the group will set the whole mass into heaving motion.

Small and almost insignificant on its own, the harvestman goes its way, scrambling up and over any obstacles in its path, eating and being eaten in turn as is the way in nature.

**

Perry Shankle Jr.



Announcing

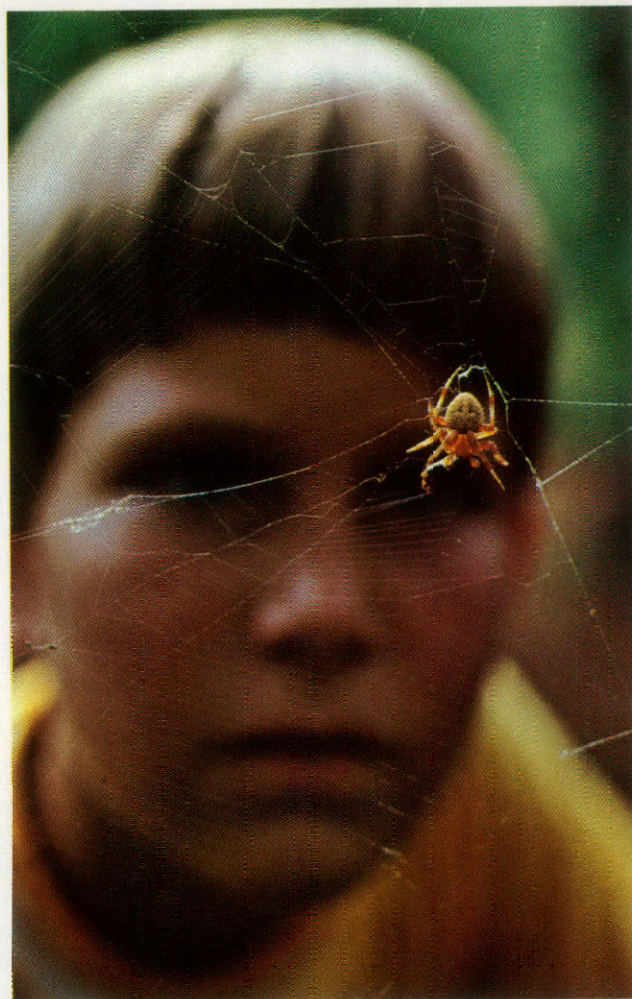
YOUNG NATURALIST

From *Texas Parks & Wildlife Magazine*

By ILO HILLER

Here at last is a book of nature articles written especially to inform and entertain young audiences. Ilo Hiller has brought together essays on some forty subjects, grouped under the categories animals, plants, and earth sciences. Along with the essays are puzzles, quizzes, and suggestions for outdoor activities, all designed to encourage children to participate in nature study. Enhanced by beautiful color photographs, Hiller writes engagingly about rainbows, snowflakes, wildlife babies, frost flowers, meteors, geodes, and a potpourri of other topics gleaned both from reference materials and from personal observations. This collection will be treasured not only by children but also by all adults who still retain some of their childhood curiosity.

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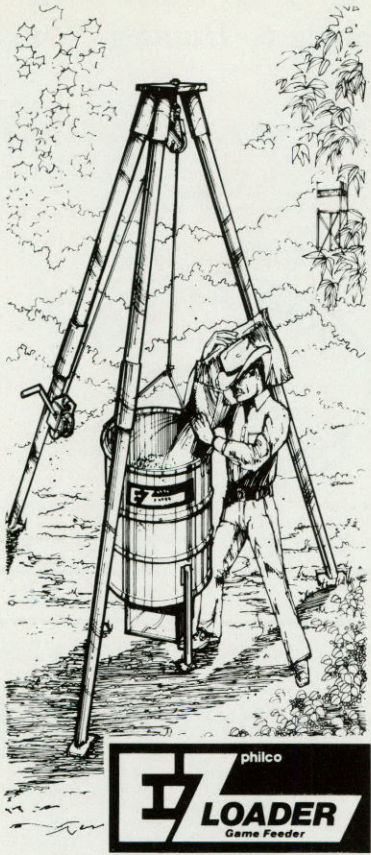
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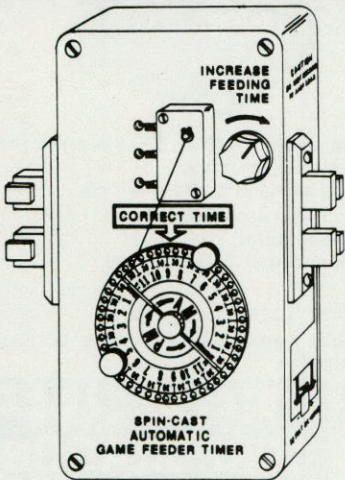
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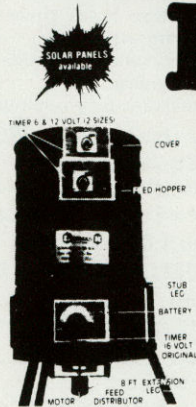
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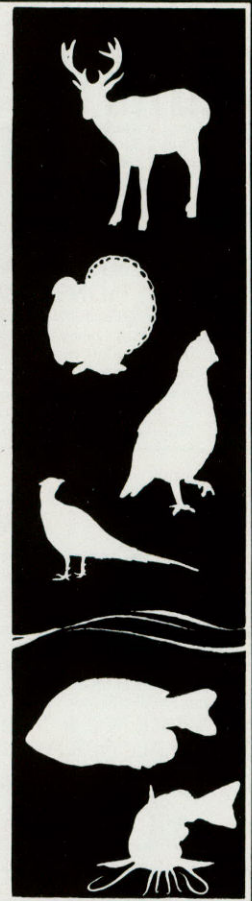
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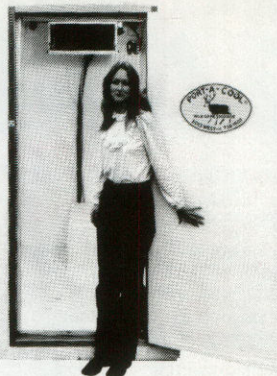
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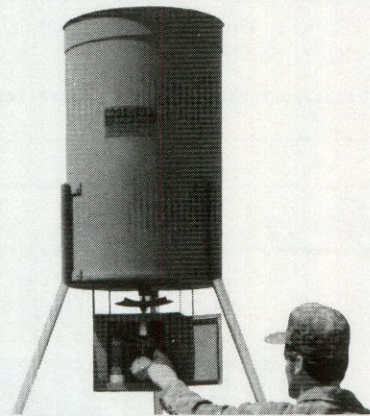
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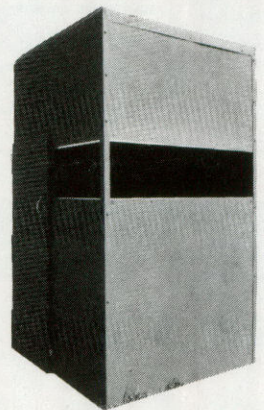
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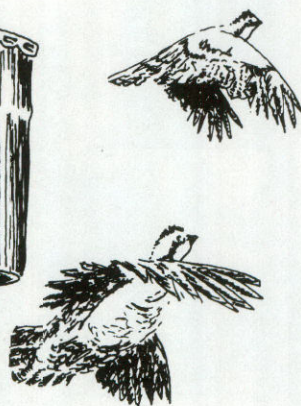
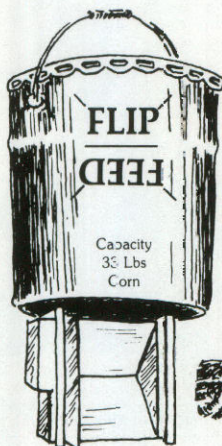
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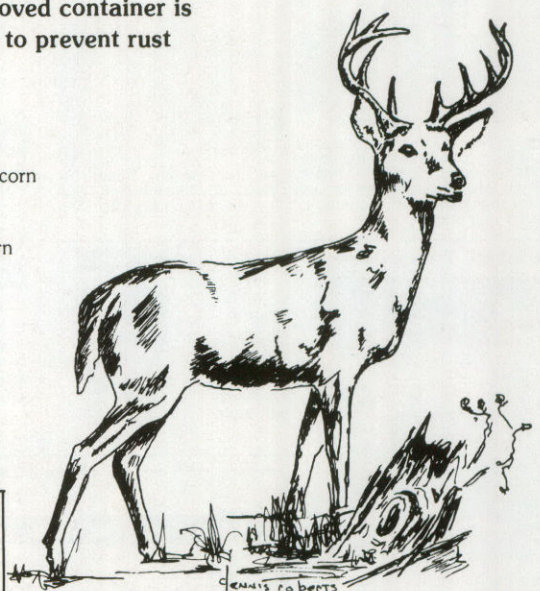
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Letters to the Editor

We ran a letter in the July issue from Joycelene Odum of Brookshire, who stated that she would enjoy the magazine more if it had "articles about parks and wildlife and not about killing animals." She went on to say, "The title of your magazine is misleading, because its content is of interest only to people who like to kill animals while rationalizing that it is necessary to 'thin the herds.'" We heard from a number of our readers after that letter appeared. Some of them agreed with Ms. Odum, but the majority of them did not. A sample of these letters follows.

For some 40 years I have enjoyed the outdoors and its wildlife as a nature photographer, student and teacher of nature, habitat and wildlife. And I have used your magazine as a resource for my photo-naturalist programs of a nonhunting nature.

Ms. Odum could easily find considerable material of a nonhunting nature in your magazine. Such material has appeared consistently over the years. But she apparently is more interested in attacking hunters and hunting than in enjoying your magazine for its considerable nonhunting value.

Allen Perry
San Antonio

You cannot stockpile animals. There is a limit to the carrying capacity of the land. A rancher can permit only the number of livestock to graze his land that will assure him a healthy herd. Uncontrolled population from breeding or introduction of more stock on a limited range would be foolish and irresponsible management of both land and animals. The herd would grow to an all-time high, but as the demand for food surpassed the land supply all the animals would suffer. Failure to reduce the herd would soon cause starvation and many animals would die.

While it is true that wild animals are seldom confined to one pasture as are livestock, the limit of available habitat would serve as a boundary just as a fence would. Many animals in an uncontrolled population would die and others would be left weak and diseased if a specific number were not removed. Nature does have a seemingly harsh and cruel way of

balancing things out. To die slowly of starvation or disease would be a far more inhumane death than to die of a quick, clean kill.

Those of us to whom Ms. Odum refers as liking to kill animals are commonly called hunters. I do not know any hunters who do not hold a deep respect and admiration for the animals hunted. I would not want to hunt with anyone who I thought felt differently. When I hunt I am helping to control wildlife populations. I do not thirst for blood, nor do I kill for pleasure. Most of all, I am fascinated by the wildlife I hunt. As I approach a downed animal I have mixed emotions about what has taken place: sympathy, pride and, above all, a sense of thanks to the animal and God for letting me experience it all. I am not ashamed of my emotions because I believe that these feelings are what separate a would-be animal killer from hunters such as myself.

J.T. Geddes
Arcadia

If Ms. Odum and her family would take the time to actually read some of the issues, she might be surprised to find out that the legal harvest of game is one of the most efficient and humane methods of wildlife management. The authors of many of these articles are not professional writers but wildlife biologists. If it were not for "animal killers" as she calls us, there would not be very much money for the state to use on wildlife management, because the bulk of the money comes from license fees.

Chris Malone
Houston

Joycelene Odum apparently doesn't understand that most all animals are food for other animals. Even the fox, hawk, robin and largemouth bass kill other animals to survive. It is only natural, and no more natural than man's killing game to eat. He has been doing so for hundreds of thousands of years.

When I was growing up in Cass County in the 1950s, there were no deer

and no hunting season. Now there is a deer hunting season and the deer are so thick there is hardly a square yard of ground without a deer track. Hunting and killing deer has not hurt the herd.

Many people like Joycelene Odum are on the "natural food" bandwagon, and wild game is the most natural of natural food.

Charles W. Reynolds
Little Rock, Arkansas

I just started my subscription three months ago, but I must say I tend to agree with Ms. Odum.

Kathy Cox
Houston

I totally agree with Joycelene Odum. I began subscribing to *Texas Parks & Wildlife* a few months ago, thinking it would be about parks and wildlife. Instead, I was appalled to see it was mainly about killing animals with the usual "thinning the herds" justification. I was misled too.

Richard A. Payne
Alvin

Your magazine title seems accurate to me. I feel you have always dealt with all aspects of Texas' parks and wildlife. From the legal taking of game animals to the information on state parks, you've covered it all, and well. I read your magazine from front to back and feel I am rational enough to enjoy every page for what it offers.

Tommy Stubblefield
Pasadena

INSIDE BACK COVER

Its glossy green head and narrow white collar make the male mallard one of the most easily recognized duck species. The less showy females are mottled brown with dark bills. Mallards can be recognized in flight by their characteristic wing strokes—slower than most ducks with a downward sweep not much below body level. (See Outdoor Roundup for waterfowl seasons.) Photo by Bill Reaves.



