

Natural Resources of

# TEXAS

Prepared by the - United States Department of the Interior - Stewart L. Udall , Secretary









(Left) Looming skyward, Texas' refining plants have become as much a part of the landscape as the Rio Grande, sagebrush, and the Guadalupe Mountains.



# Natural Resources of Texas

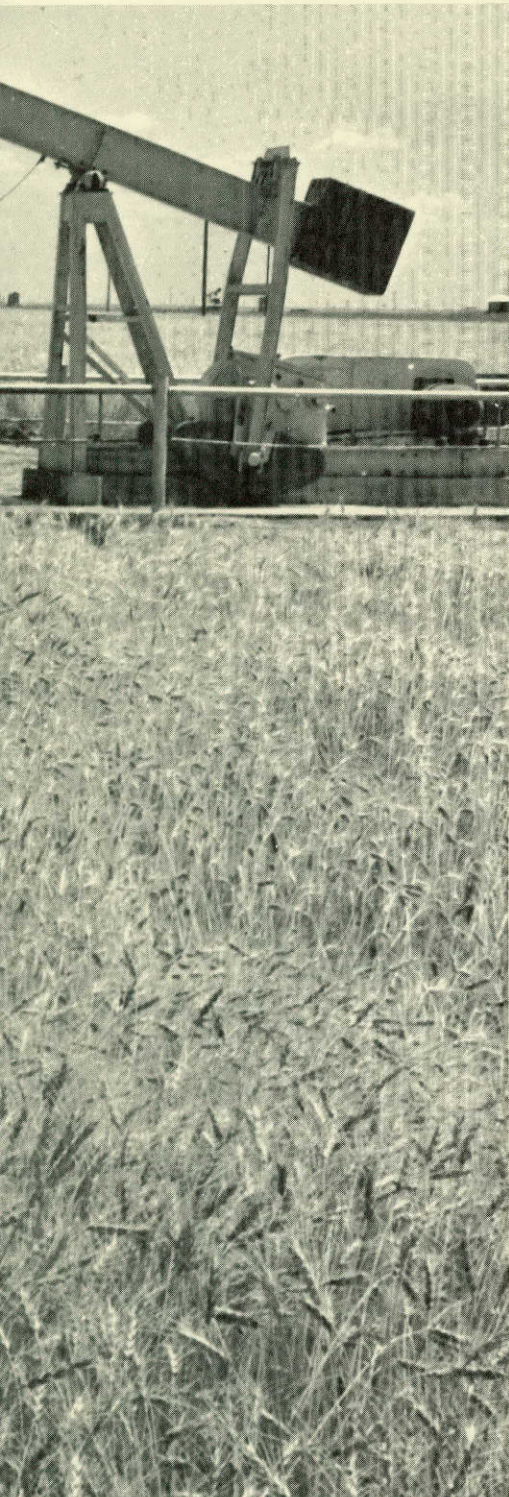
“The Lone Star State”





There exists a harmony between the agricultural and mineral resources of Texas as shown by this oil well in the midst of the vast wheat-growing area of the Texas Panhandle Plains region.





The purpose of this booklet is to bring a new awareness on the part of the American people of our rich natural resource heritage, its history, its present, and its future. To know our land is to love it and cherish it and protect it from the ravages both of nature and man.

A handwritten signature in cursive script, reading "Stewart Udell".

Secretary of the Interior.

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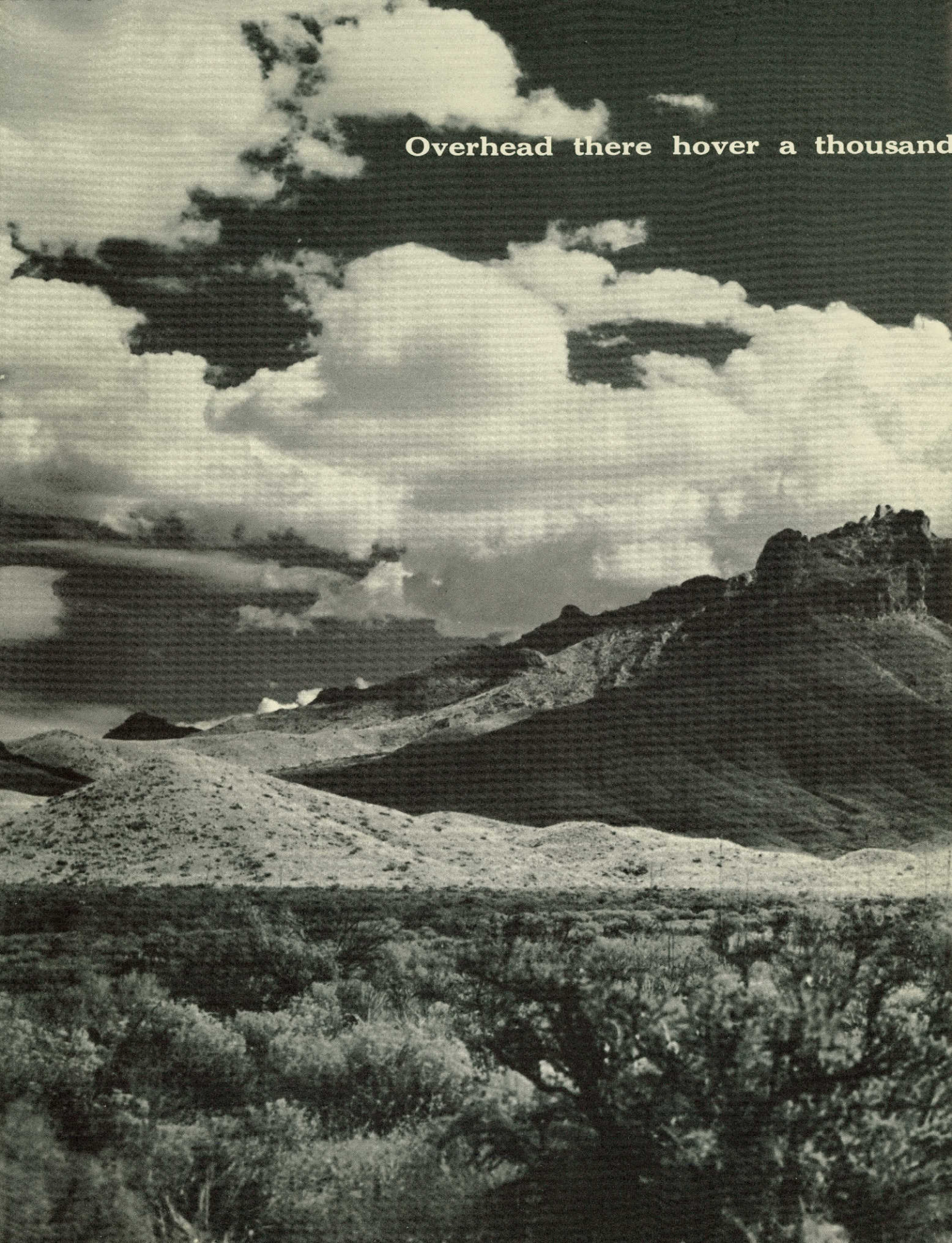
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Overhead there hover a thousand





white faces in the blue Texas sky.





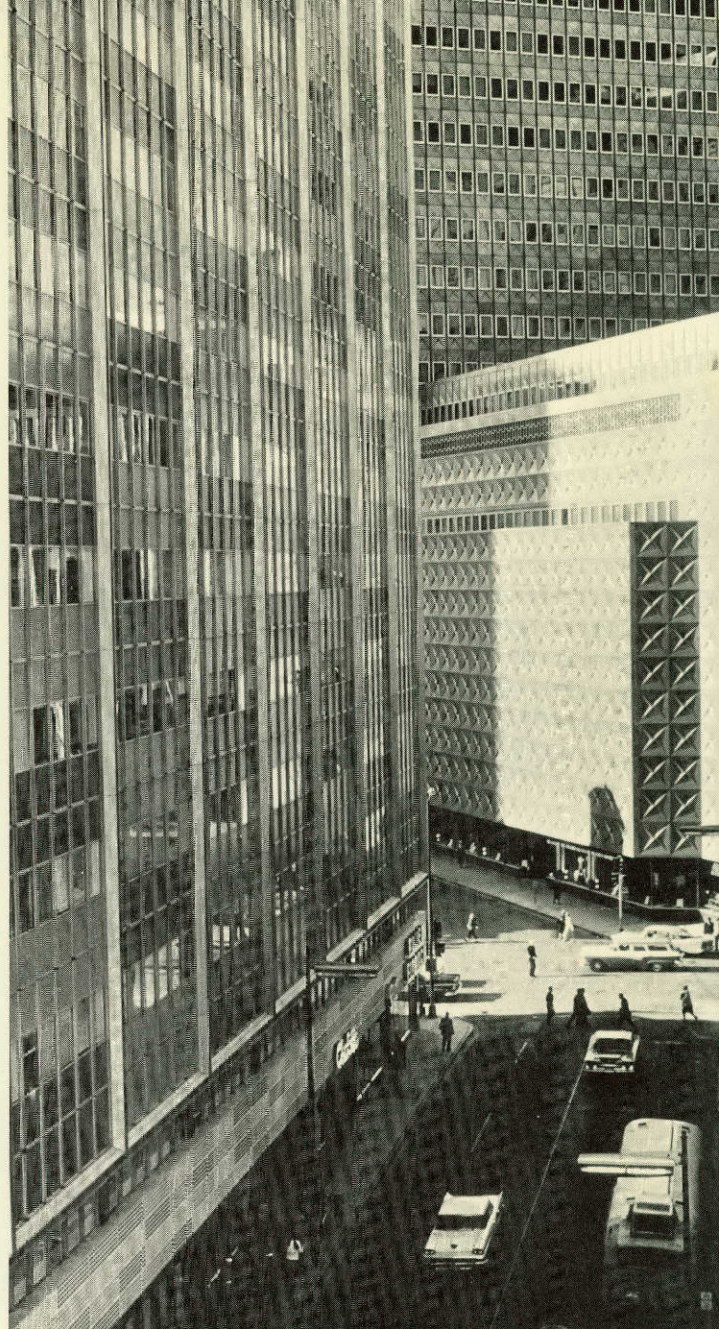
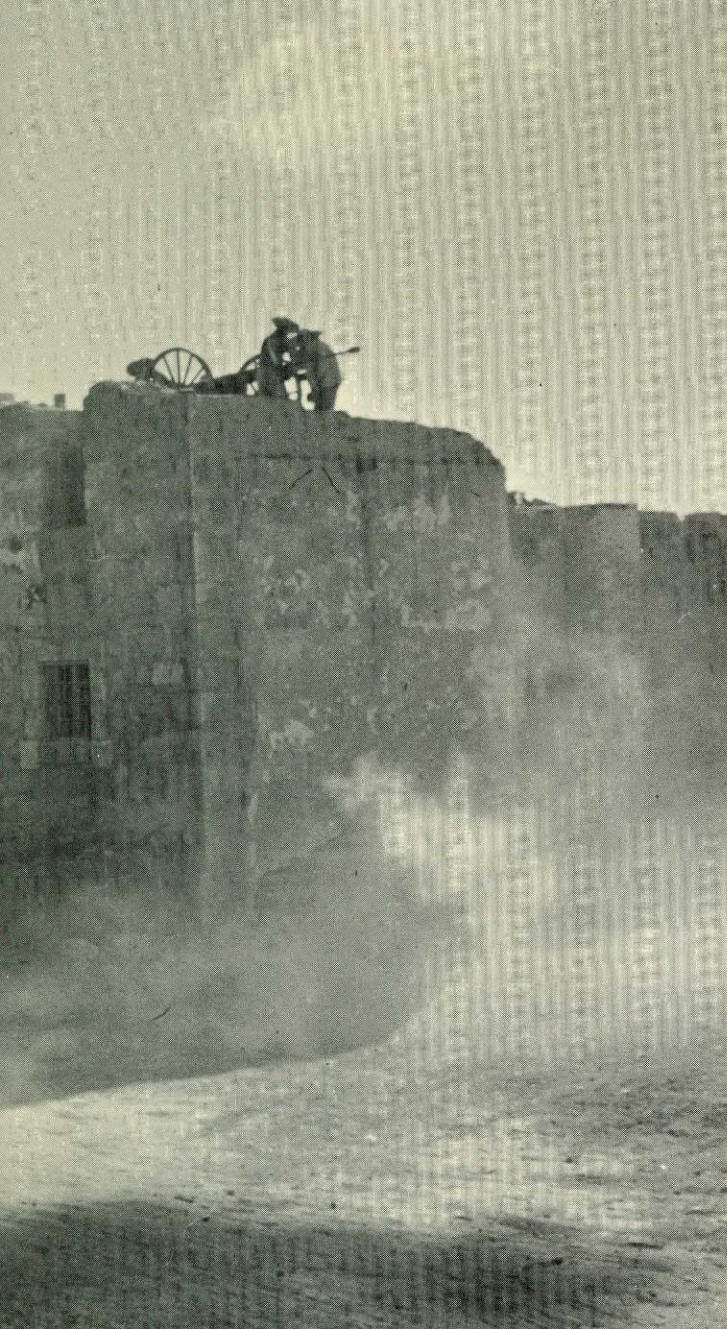


## A Legend Grows Up

Texas is a land of myth and tall tale . . . of Pecos Bill and Old Coffinhead. But it is also a place where truth seems as incredible as legend. There's a ranch in Texas larger than the State of Rhode Island . . . One of Texas' cities—Dalhart—is nearer to the State capitals of New Mexico, Oklahoma, Kansas, Colorado, Nebraska, and Wyoming than to the Texas capital at Austin . . . More than a billion barrels of crude oil were pumped from Texas wells in a single year . . . And so on.

Eighty-five percent of the land is devoted to agriculture—mainly ranching—yet three-quar-





ters of the State's 10 million people live in cities. Compared with revenue from other industries, manufacturing is number one in Texas; the State is an important supplier of food, chemicals, wood, and electronics-aerospace products. Yet Texas leads the Nation, not in manufacturing, but in mineral production. Texas has large forests and fertile croplands, but also vast plains and cactus-studded prairies. Texas once seceded from the Union; Texas has given the Nation its 36th President. Texas, in other words, means diversity and contrast.

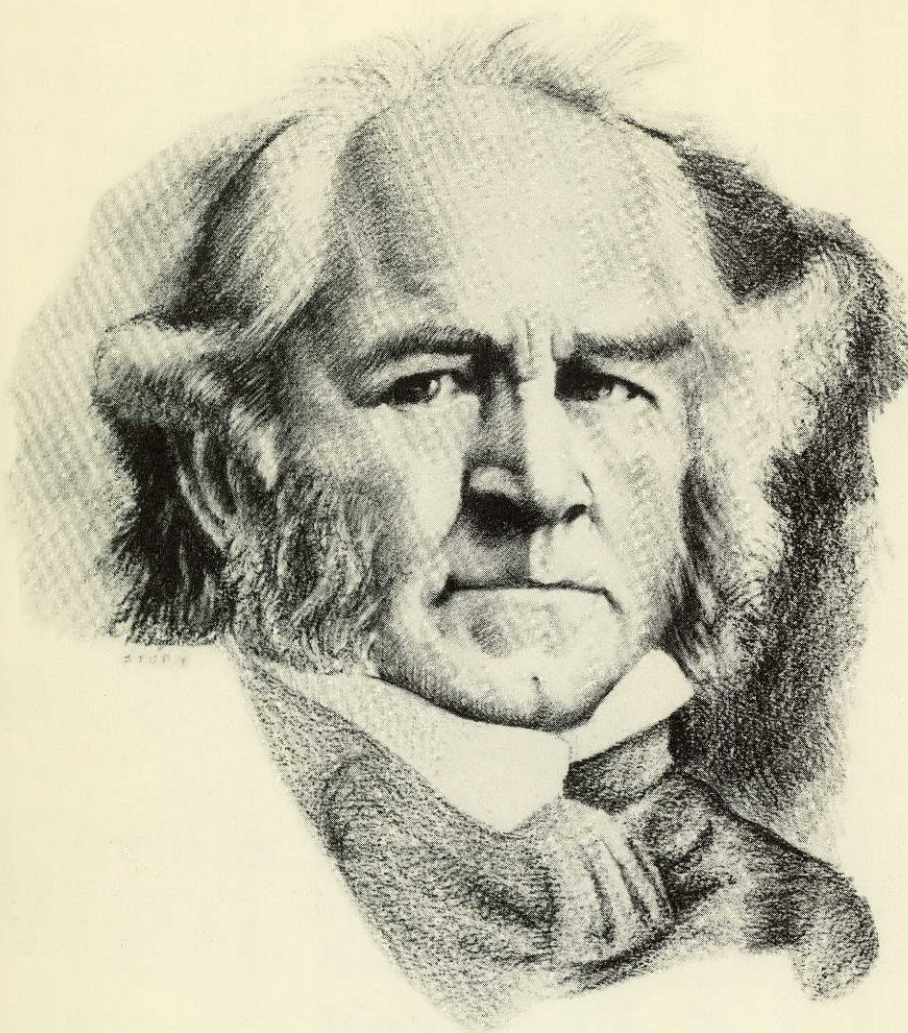
Six flags have flown over Texas—the Spanish,

The heroism of the fighting men at the Alamo is a vivid part of Texas' past. Hardly a trace of frontier days can be found in the soaring glass and metal symbols of progress in the cities of 20th-century Texas.

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French, Mexican, Lone Star Republic, Confederate, and United States, and each flag has represented a different hope and dream. Sixteenth-century Spanish explorers, including Coronado, expected to find the legendary Seven Cities of Cibola in Texas. The seventeenth-century Frenchman, La Salle, tried to establish





Sam Houston, first President of Texas, is also known as the "father of Texan independence" because of his victory over the Mexican army at San Jacinto.

The great dome of the capitol at Austin dominates the surrounding buildings which comprise the University of Texas.

a colony in Texas but was ultimately killed there.

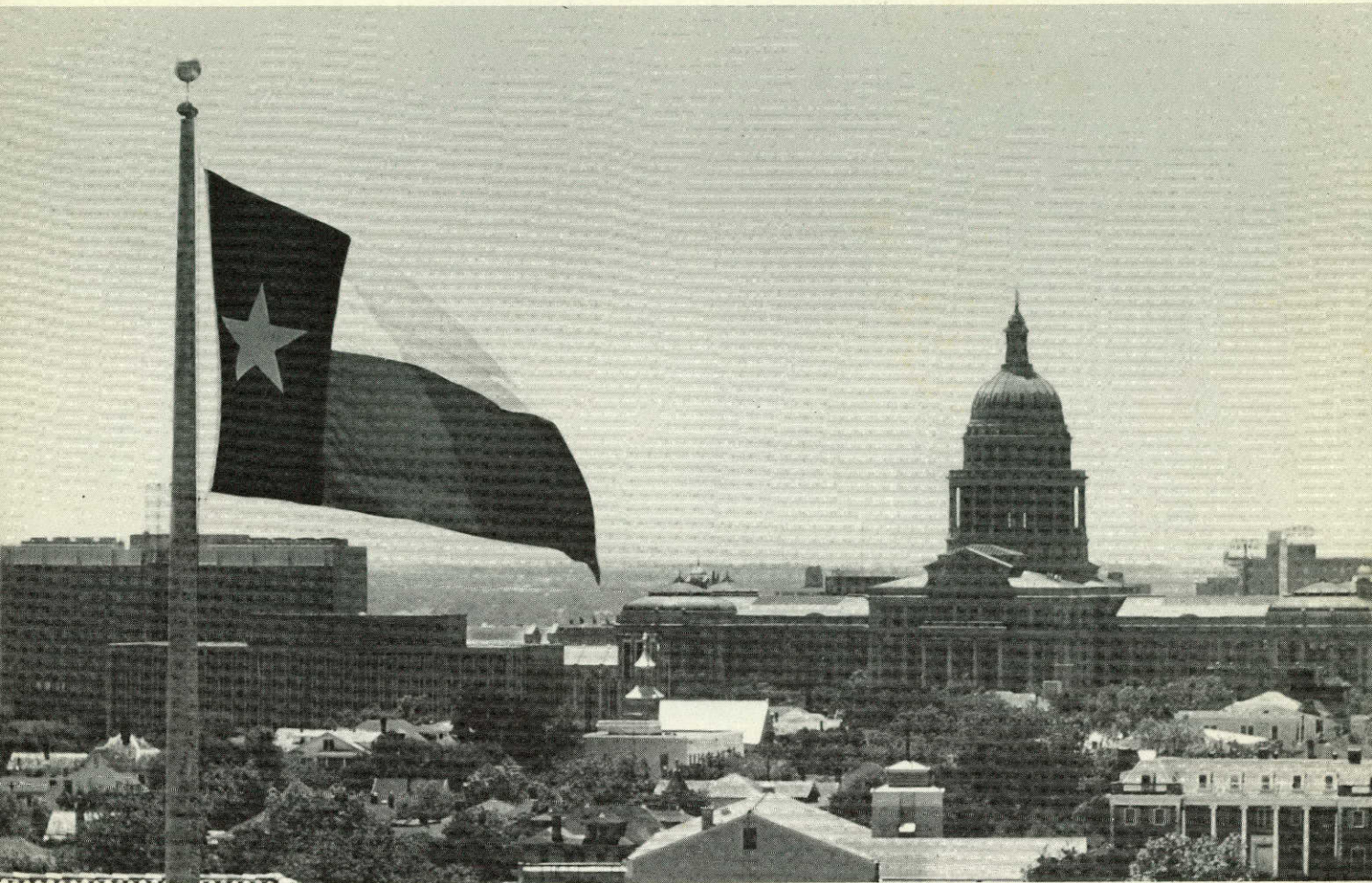
The Louisiana Purchase of 1803, extending United States soil to the very edge of the Texas border, fired American interest in the region. Privately financed military detachments kept crossing from the Louisiana Territory into Texas. Some came to establish an independent republic, others to expand United States sovereignty or aid Mexico in its revolt against Spain, but almost all were seeking adventure and wealth. One of the more notable expeditions, Gutierrez's and Magee's, invaded Texas in 1812 and held San Antonio for several months.

This was a period when Texas' boundaries were in dispute, when Mexico was agitating for

independence, when privateers ravaged the gulf coast and mercenaries and fugitives roamed the hinterlands—all occurring against the backdrop of Spanish tyranny. But eventually the Texas border dispute was settled; Mexico—including Texas—won its independence; and the era of filibustering came to a close.

In 1821 Stephen Austin was granted permission by the newly established Mexican Government to found a colony in Texas. The colonists were required to accept Mexican citizenship and adopt Mexican law, which they did. Other Americans came to Texas, new colonies sprang up, and before long the Territory's population became overwhelmingly American. This—plus increasing Texan complaints over violations of





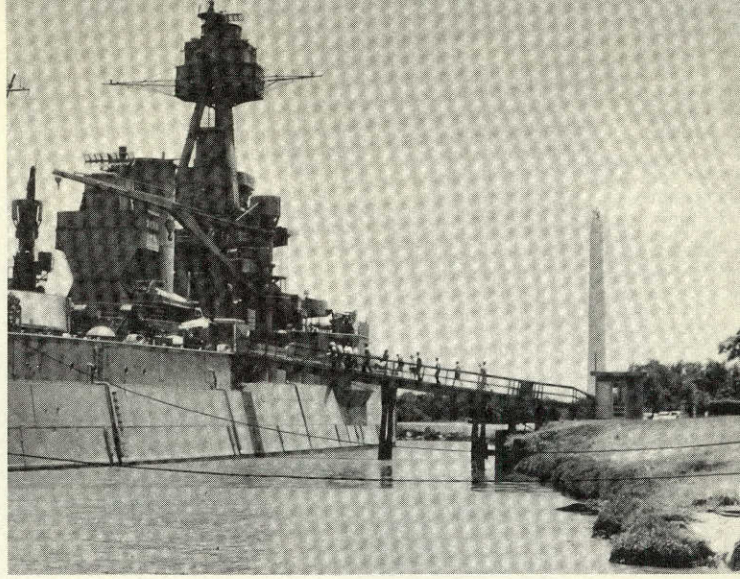
their liberties, a growing anti-Mexican sentiment accompanied by talk of independence or United States annexation, and the abortive Edwards rebellion of 1826—made the Mexican authorities suspicious and hostile. An 1830 decree choked off further American immigration, and several contingents of Mexican troops were ordered to the Territory. Ill feeling increased, and by 1835 Texas and Mexico were at war.

The early months of the war proved disastrous to the Mexicans; first Goliad and then San Antonio fell before the Texan onslaught, and the war seemed over before it began. The Texan army disbanded, leaving only a small garrison to hold San Antonio. But it was then that the Mexican President decided to march

his whole force to San Antonio's gates. A determined group of men, including Jim Bowie and Davy Crockett, barricaded themselves in the old Mission Alamo. After all hope of outside aid had been abandoned, legend has it that Bill Travis, the Texan commander, drew a line with his sword and asked all who would stay and die with him to cross it. And the 187 Alamo defenders stepped across the line, into the pages of Texas history.

Shortly after his Alamo exploit, Santa Anna captured a 300-man detachment and ordered the whole group executed in what came to be known as the Massacre of Goliad. "Remember the Alamo! Remember Goliad!" were on the lips of Sam Houston's army during the Battle of





(Above) Many years of Texas' impressive past are spanned by the San Jacinto Monument and the Battleship "Texas," anchored nearby.

(Left) The Alabamas and Coushattas, Texas' two remaining Indian tribes, live on a small reservation in the Big Thicket region.

(Right) The skyline of Dallas spreads above an ever-increasing industrial city. Dallas is a major inland spot cotton market and one of the Southwest's important oil capitals.



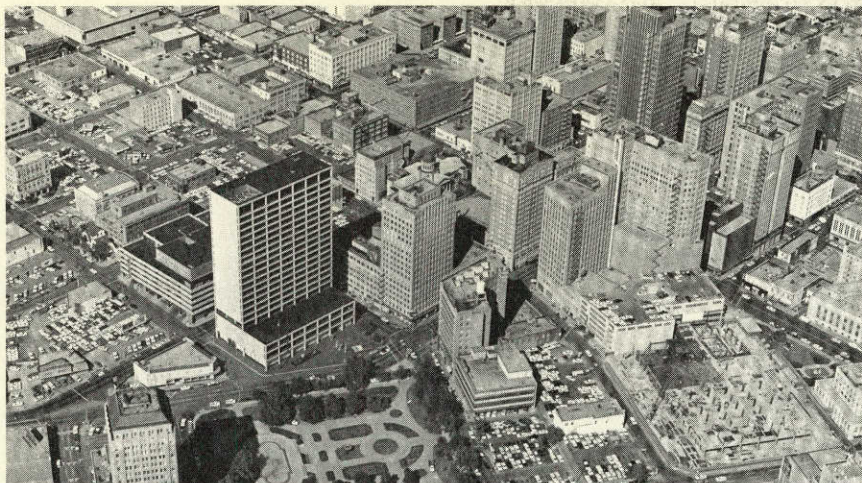
San Jacinto when it stormed through the Mexican lines to decisively defeat Santa Anna. So Texas finally won its independence, and in September 1836, Sam Houston became the Lone Star State's first President.

The era of the Republic marked a general decline in Indian strength. In 1839 the Cherokees were driven out of the State. The once powerful Caddoes of east Texas—including the Wichitas and Hasinai—were gradually decimated by war and pestilence. The coastal Karankawas and Lower Rio Grande Coahuiltecah tribes retreated into Mexico along with the Lipan Apaches. In a few years the Tonkawas of central Texas would be consigned to out-of-State reservations and the Alabamas and Coushattas would settle on a small reservation in the Big Thicket region where, today, most

of their few remaining Texas descendants live.

The worst menace came from the Comanches. For decades, violent Comanche raids had terrorized the settlers, and "Comanche" had become a byword for cruelty on the Texas frontier. The famous Texas Rangers had been organized to fight these Indians, and Comanche fighting was long a recognized profession in the Lone Star State. In 1840 a group of Comanche chiefs gathered for a peace conference with the whites was attacked by the Texas militia. This so-called Council House Fight resulted in a terrifying Comanche vengeance raid, and a thousand murderous warriors swept down into the valley of Guadalupe. When the Indians finally retreated, a volunteer Texan army pursued and defeated them in the Battle of Plum Creek. Although Comanche raids still continued





(Left) Situated on the Trinity River, Fort Worth is the center of the cattle and meatpacking industry.

(Below) Houston, a port city and the largest in Texas, is the home of NASA's Manned Spacecraft Center.



throughout the Civil War and Reconstruction, they were very much on the decline.

An increasing sentiment among both Texans and Americans for annexation resulted in Texas' becoming the 28th State in 1845. Annexation precipitated the Mexican War, and after Mexico's defeat, the Lone Star State's right to be in the Union seemed unquestionable. Yet 26 years later, Texas' tie to the Union was not only questioned but severed. Overwhelmingly a slave State, Texas deposed its unionist Governor, Sam Houston, and seceded in 1861. After the War, like most of the South, Texas suffered the harshness of "radical reconstruction" and carpetbagger rule, but the election of Richard Coke as Governor in 1873 marked a return to normalcy.

Most of the Indians had been placed on res-

ervations by the 1870's, and incidental raids all but ceased when General Mackenzie rounded up the Indians who had escaped these reservations. With the ravages of Civil War and the depredations of Indian warfare things of the past, Texas was ready for the booming epoch that was to follow. This was a time marked by railroad building and railroad scandals, the introduction of barbed wire and the start of fence-cutting wars, the disappearance of the free range and the coming of the homesteader.

And then came the 20th century—the years of expansion and growth. Texas no longer signified the legendary site of the Seven Cities of Cibola. For legend had become fact, and the Cities were all but visible in the great metropolises, universities, and industries of Lone Star Texas. . . . A legend had finally grown up.









## Shape of the Land

For a century the largest State in the Union, Texas now is second only to Alaska. Its more than a quarter million square miles—equalling the combined areas of all New England, New York, New Jersey, Pennsylvania, Ohio, and Illinois—constitutes one-twelfth the continental land mass of the United States. Midway between the Atlantic and Pacific and almost equidistant from the Equator and Arctic Circle, Texas is bordered by four States—Louisiana and Arkansas on the east, Oklahoma on the north-east, and New Mexico on the west. Mexico and the Gulf of Mexico form its southern border.

The State's boundaries stretch from the semi-tropical regions of the Lower Rio Grande Valley past the wind-swept Llano Estacado to the broad, treeless plains in the north. Tall pine forests and black-water bayous lie to the east, while Big Bend's purple canyons and the semi-arid Trans-Pecos plains are in the southwest.

The mighty Rio Grande flows along the 800 mile border between Texas and Mexico. Between the Sabine River on the east—which separates Texas from Louisiana—and the Rio Grande, seven rivers run southeasterly to the gulf. Important among these are the Trinity, the Brazos, and the Colorado. The Red River, which crosses the Panhandle and forms over 400 miles of the Texas-Oklahoma boundary, is another major river.

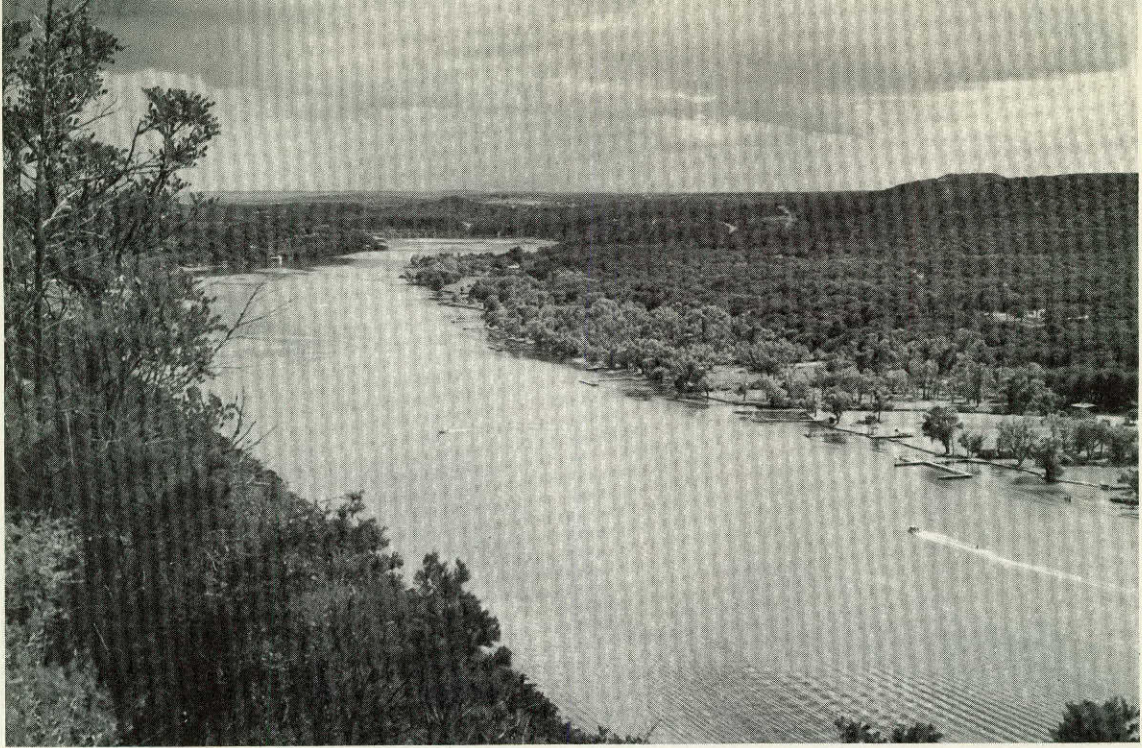
### *Geologic History*

A pebble rolling down El Capitan Peak—how acutely it portends the slow crumbling of a mountain, the gradual transformation of our planet's surface. Texas provides excellent ex-

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The Palo Duro Canyons, part of Palo Duro State Park, are famous for their spectacular color and height.





The Edwards Plateau and Coastal Plain border the Colorado River where it crosses the Balcones Escarpment.

amples of the great changes that characterize geologic history. During the Paleozoic era (600 to 225 million years ago), the hills and mountains of eastern Texas eroded away, their sediment forming the rock layers of the plains in northern and western Texas. Mountains that existed where Amarillo and Lubbock now stand were buried under this sediment. The pebbles and sand that eroded from these latter mountains are now the reservoir rocks of the extensive Panhandle gasfield.

At times during the Mesozoic era (225 to 70 million years ago) all of Texas was covered by sea and, during such periods, great quantities of chemical sediment were precipitated. These eventually formed the masses of limestone that make up the Edwards Plateau. Some of the seas were so shallow that dinosaurs could stride across the partly submerged flats and giant tracks were left in the soft lime mud. Many are excellently preserved today at Glen Rose and near Uvalde.

The locale of erosion and sediment production shifted during the Mesozoic era (225 to 70 million years ago). The plains area was uplifted and tilted eastward along the Balcones Escarpment. According to some geologists, it was early in the Mesozoic era that the Gulf of

Mexico was born and that great beds of salt were deposited in the sea that then covered eastern Texas. Thousands of feet of sediment carried from the plains area were laid upon these salt beds. In many places the salt ballooned upwards and fractured the sedimentary rocks, forming domes shaped like upside-down saucers. These domes served as traps that collected much of the oil and gas now found in the Coastal Plain.

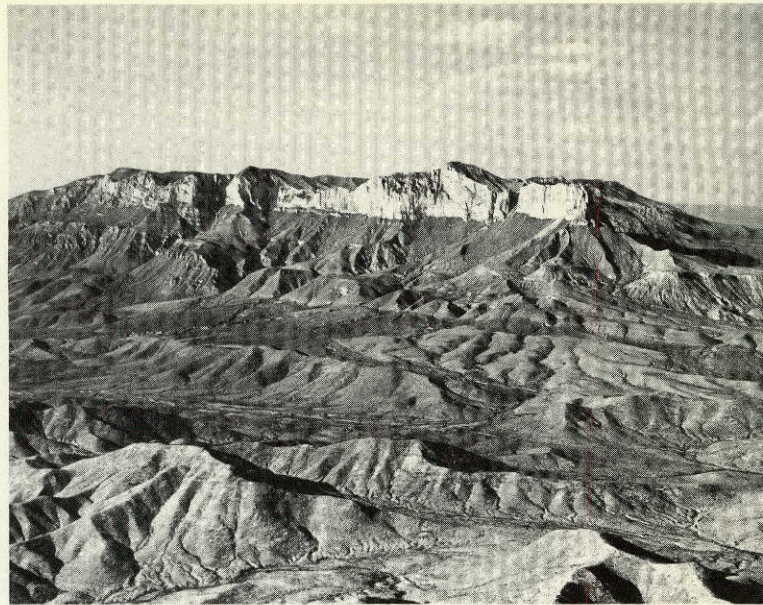
In the Cenozoic era—to which the most recent forms of life belong—the coastline of Texas slowly receded southeastward. Although some areas along the gulf shore sank at times, causing the sea to transgress, the predominant pattern was a slow uplift in the interior. This uplift resulted in increased sedimentation along the flat gulf shore, and consequently the shoreline moved steadily seaward.

Sometime during the Cenozoic era, western Texas and adjoining Mexico underwent intense volcanic activity. Lava poured out over large areas and built up volcanic mountains like those of the Davis Range. Clouds of volcanic ash showered the regions to the east and, picked up by streams, added to the sediment already being deposited along the gulf coast. The younger





The Rio Grande provides water vitally needed for irrigation as it winds through the groves of citrus and palm trees in the fertile Lower Rio Grande Valley.



The Guadalupe Mountains, characterized by a rough, corrugated terrain, present a dramatic change from the low plains which dominate Texas landscape.

sediments of the Coastal Plain contain a high percentage of volcanic ash and clays derived from it.

### *Geography*

The Texas of today may be divided into five physiographic regions: the Coastal Plain, the North Texas Plains, the Edwards Plateau area, the High Plains or Llano Estacado, and the Trans-Pecos. The State's surface—low near the coast but sloping gradually upward to the Central Plains—rises dramatically along the Edwards Plateau, where hills range from 900 to 2,500 feet above sea level and finally attains elevations of 3,000 to 4,500 feet in the High Plains to the north. The highest areas, however, are found in the Trans-Pecos region of the southwest. Here plateaus and canyon walls rise 5,000 feet above sea level and mountain peaks jut up another 3,000 feet.

The Coastal Plain stretches from the Gulf of Mexico to the Balcones Escarpment, which extends across the eastern third of the State between Mexico and Oklahoma. Along the southern part of the escarpment are a series of eastward-facing hills which, when viewed from the Coastal Plain below, resemble balconies,

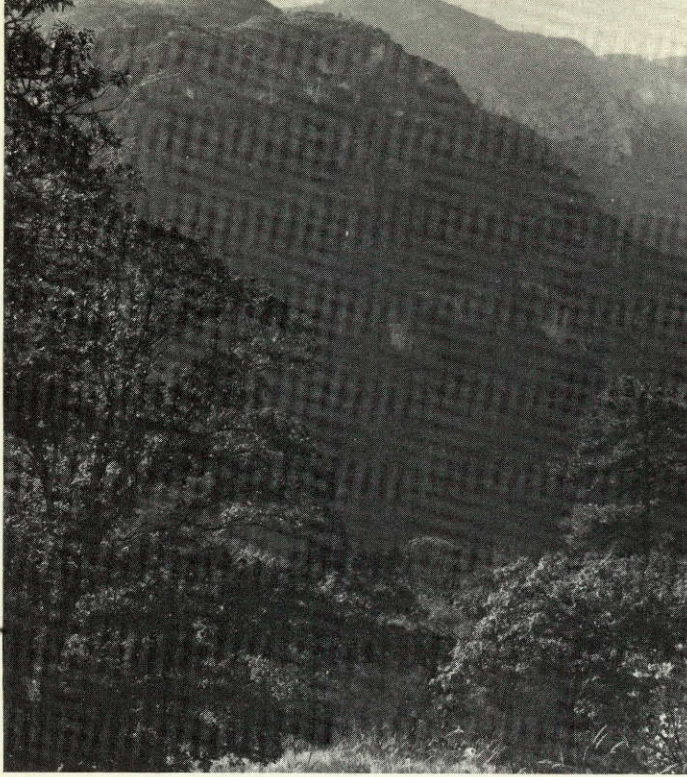
thus accounting for the Spanish name, balcones.

The southern part of the Coastal Plain, below San Antonio, is called the Rio Grande Plain. Although partly grassland, much of the plain is covered with a dense growth of prickly pear, cactus, mesquite, and other wild shrubs. Further north along the coast, reaching about 50 miles inland, is the flat, grass-covered coastal prairie. The east Texas timberlands, which contain most of the State's prime commercial forest, lie to the northeast.

The Blackland Belt—a narrow prairie wedged between the east Texas timberlands and the Balcones Escarpment—stretches the length of the State from the Red River to the Rio Grande Plain. Its unusually fertile soil once made it Texas' chief cotton-producing area. Because of this early growth, it is today the most thickly populated region in the State.

The North Texas Plains are west of the Blacklands Belt, falling between the High Plains of the Panhandle, the Trans-Pecos region in the extreme west, and the Edwards Plateau to the south. Near their eastern edge is the Grand Prairie, which is underlain by limestone and marl. The prairie is generally treeless and has rolling to hilly terrain. The rest of the North Texas Plains, underlain by red





(Left) Behind Guadalupe Peak at the southern end of the Guadalupe Mountains is forested McKittrick Canyon.

(Right) Lake Lavon is a popular recreation area and its mirrorlike surface is often interrupted by swimmers and boaters.

shale and sandstone, is largely an undulating prairie interspersed with scrub oak and mesquite. Though this area contains some farmland, cattle grazing is widespread and large ranches of many tens of thousands of acres are common. Many oilfields are also located in the region.

The caprock escarpment, at places rising abruptly 200 to 1,000 feet above its base, marks the western border of the North Texas Plains. Further west and extending over most of the Panhandle are the High Plains, or Llano Estacado (Staked Plains) as their Texas extension is called. Historians differ as to the origin of this name; some think it refers to the palisaded appearance of the caprock, while others think that it derives from the fact that the Coronado Expedition, crossing the waist-high grass of northern Texas, hammered stakes along its route as a guide for the return trip.

The Staked Plains form a great level tableland a few thousand feet above sea level. Along the caprock escarpment the plains have been deeply trenched by canyons such as the spectacular Palo Duro Canyons which were carved by tributaries of the Red River. The area is noted primarily for its wheat and livestock, although mineral products, especially natural gas, are also important.

The Edwards Plateau, blending imperceptibly

into the Staked Plains along its northwest border and sloping downward toward the Balcones Escarpment to the south and east, occupies the south central portion of Texas. This is a region of flat-topped limestone hills crisscrossed by innumerable streams and picturesque canyons. The plateau is covered with mesquite, cedar, small oak, and short grasses excellent for sheep and goat raising. In the eastern part, which is the geographic center of the State, lies the area popularly known as the Hill Country.

The triangular region west of the Pecos River is called the Trans-Pecos. Nearly flat plains extend along the Pecos River, but barren gypsum plains and badlands lie farther west. Rising above these plains are high plateaus and a southern extension of the Rocky Mountains. Highest of these Trans-Pecos mountains is the Guadalupe Range, with Guadalupe Peak—most elevated point in the State—soaring 8,751 feet above sea level. El Capitan is slightly lower but, oddly enough, appears higher to an observer on the plains below. The Sierra Diablo Plateau—dotted by numerous salt lakes—and the forested, grass-covered Davis Mountains, actually an immense pile of volcanic rock, add diversity to the terrain; while the Big Bend region—with its craggy mountains, sharp canyons, and cactus-strewn plains and badlands—





offers some of the most varied and colorful scenery in the country. In the far west are the Hueco Mountains and rugged Franklin Mountains, at the foot of which lies El Paso, gateway to Mexico.

### *Climate*

Texas has a diverse climate varying from hot and subhumid in the Lower Rio Grande Valley—ideal for citrus fruits and winter vegetables—to cold and semiarid on the northern Panhandle Plains. It ranges from warm and humid on the Louisiana border—where annual rainfall exceeds 55 inches—to arid in the Trans-Pecos, which receives barely 10 inches of rain a year.

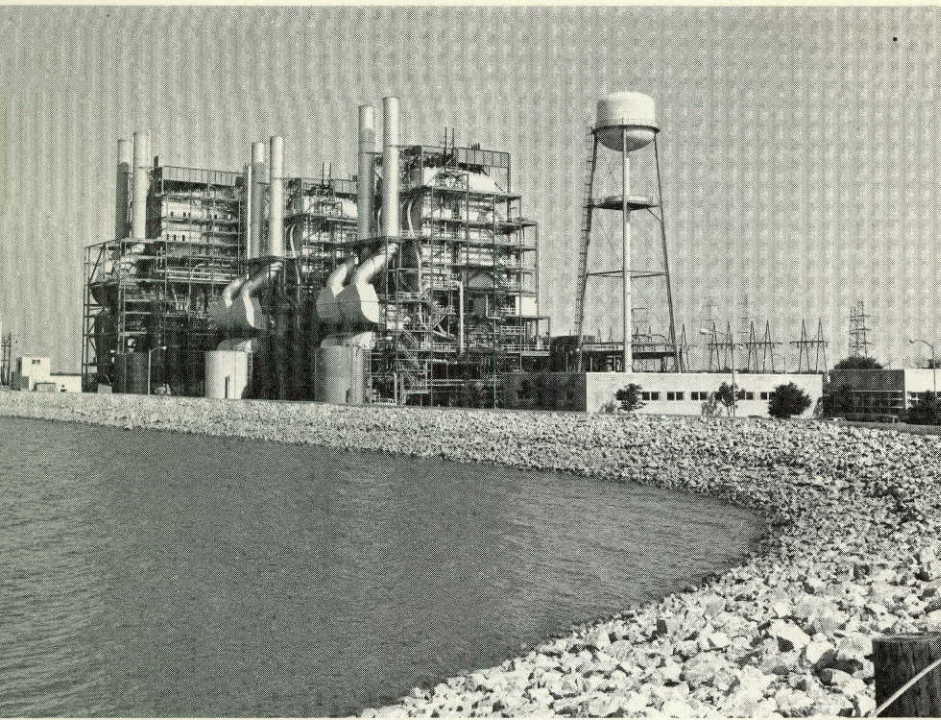
Rapid temperature changes and large temperature ranges both daily and annually characterize most of the State. The most marked extremes occur from early fall to late spring, when polar air masses called “northers” sweep in from the northwest. In the northern parts of the State, the mercury may fall 40 degrees in 12 hours. On the other hand, warm winds from the west sometimes cause marked temperature rises in both the north and south High Plains. In summer, temperature contrasts from north to south are less extreme, with daily highs in the 90's common all over the State.

A modified maritime climate prevails along the coast. Temperatures are relatively uniform in all seasons and have only minor daily ranges. Summers are warm and humid, but the gulf breeze cools off the nights. Winters are mild, the thermometer seldom falling below 50°, although northern winds sometimes bring freezing weather. Mountain climate is confined to a relatively small area of western Texas—the Trans-Pecos—and is cooler throughout the year than that of the adjacent plains.

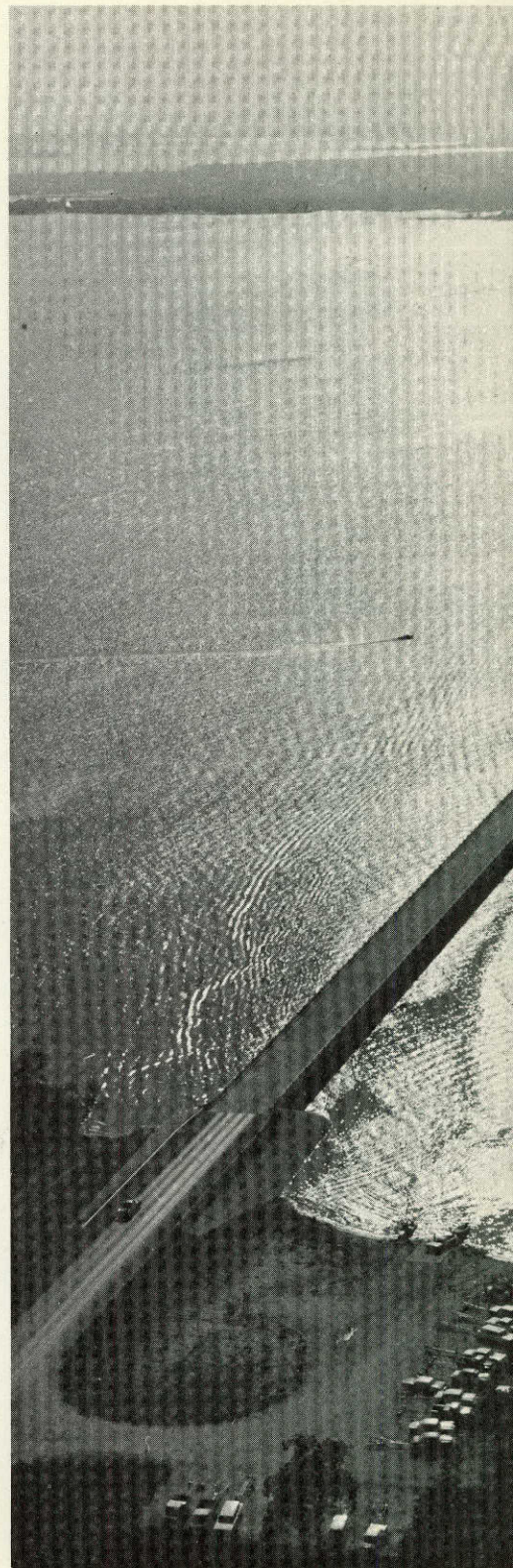
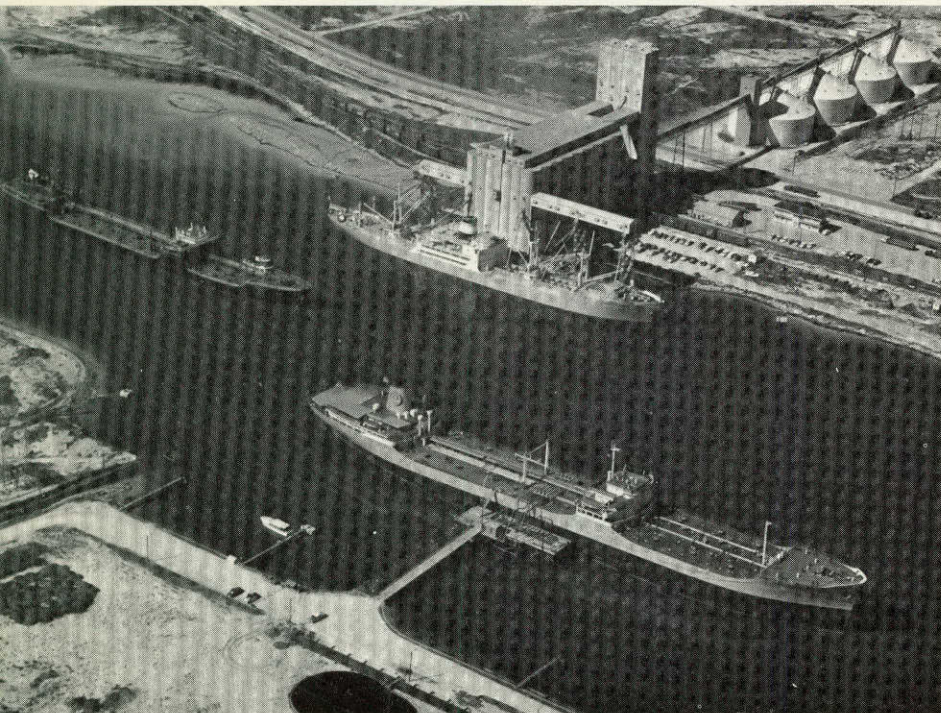
Rainfall, generally decreasing across the State from east to west, averages about 30 inches a year. Much of Texas' annual rainfall occurs within short periods, causing excessive runoff and erosion. On some Texas streams, floods occur nearly every year, although dams and floodways now considerably reduce the overflows.

Because of its location, Texas is often menaced by violent storms. Tropical cyclones threaten the gulf coast in summer and autumn. Since the flat coastal plain is particularly susceptible to the accompanying high tides and large waves, seawalls and breakwaters have been constructed for the protection of property. In late spring and early summer, the State is frequently struck by tornadoes. Texas is second only to Kansas in total number of tornadoes.

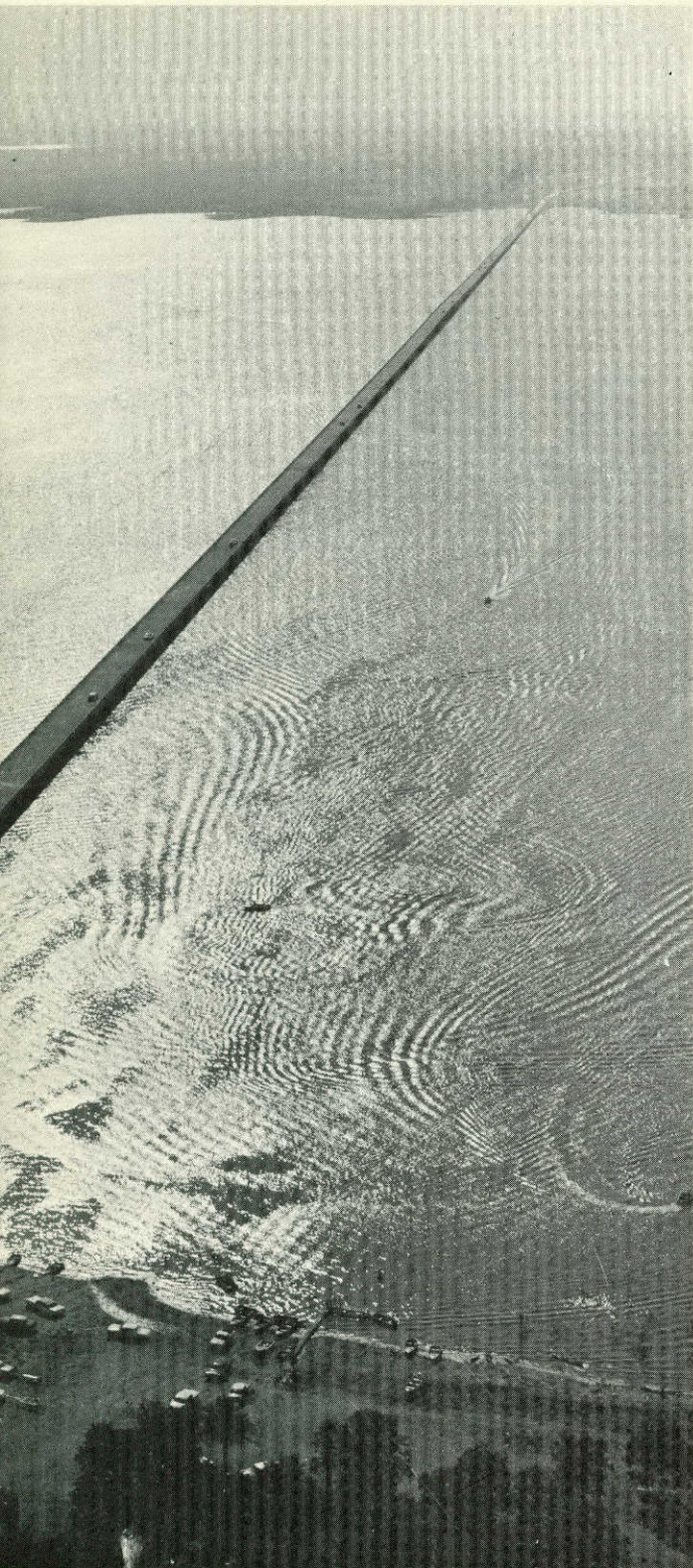




Water plays an important role in Texas' economics; its ports provide outlets for Texas products, its rivers furnish power for industry, and its lakes and shores are a source of fun and recreation for many Texans and their guests.







## Water and Power

Precipitation—the ultimate source of both surface and ground water—probably holds the key to an understanding of Texas' water resources. Varying widely from day to day and place to place, Texas' rainfall is often described as being "either too little or too much, rarely just enough." This variability in precipitation is reflected most directly in the State's streams, whose flows may change from a trickle to a major torrent often in a matter of days and sometimes in only a few hours. As a result, the water supply obtainable from streams is not very dependable, and it is not unheard of for a flood to be followed by a drought.

Over five times as much water is used in Texas today as 20 years ago. Increases in population, irrigation, and industrial growth—especially in the petrochemical industries—have considerably expanded the State's water requirements, transforming what once was a sufficiency of water resources into a potential scarcity.

In addition, each of these developments have contributed to the pollution of Texas' water. Mineralization, dating back millions of years to when briny seas covered the land surface, and widespread oil and gas operations are two other sources of pollution. Although efforts are being made to improve the quality of Texas' water resources, much still remains to be done.

Within Texas' boundaries lies more than enough water to satisfy present and future needs. But this water is not always available when and where it is needed, and when it is available, it is not always of a usable quality. Nature has supplied the resource; it is for man to develop and make optimum use of it.

### *Ground and Surface Water*

Texas obtains a little more than one-third of its annual water supply from underground sources, and among the States only California uses more "ground water." Within the past





Irrigation and improved farming techniques help to insure Texas' high rank on the scales of agricultural production.

few years, over three-fourths of the State's incorporated towns and about 80 percent of its nearly 6 million acres of irrigated farmlands have drawn most of their water from beneath the earth. Ground-water supplies are relatively dependable and do not show the short-term variation exhibited by rainfall or streamflow, but they are not inexhaustible. Constant large-scale demands, far exceeding the rate of possible replenishment, are seriously depleting these subterranean reserves. Unless other water supplies are rapidly developed, Texas' irrigated acreage—to give only one example—will be reduced by almost two-thirds.

More and more, Texas is turning to surface water to satisfy its expanding needs. Approximately 3,700 streams, whose combined length approaches 80,000 miles, are found in the State. Entirely within Texas' borders are such important rivers as the Neches, San Jacinto, Trinity, Colorado, Guadalupe, San Antonio, and Nueces, while rivers like the Rio Grande, Red Sabine, Brazos, Canadian, and Pecos pass through the State.

In 1958 Congress created a U.S. Study Commission—made up of Federal, State, and local representatives—to examine the Texas water situation. The construction of dams, water conveyance works, and other projects recom-

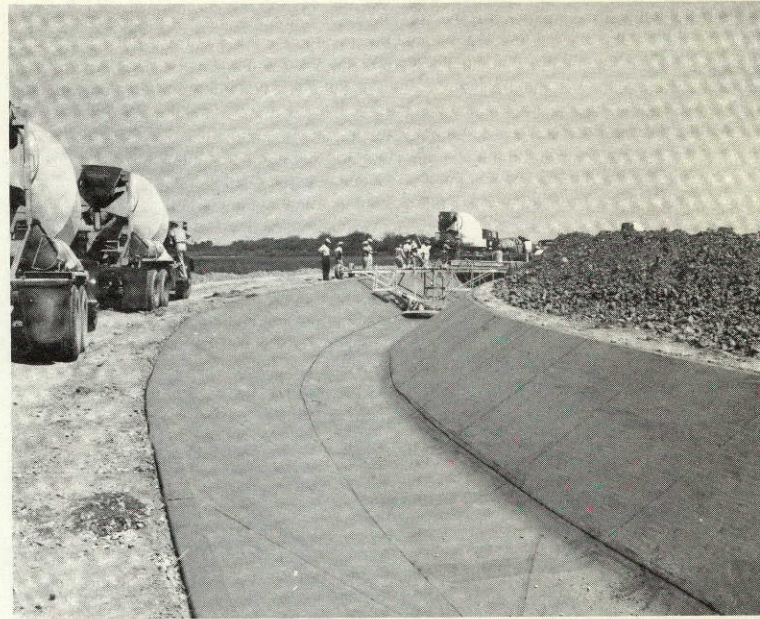
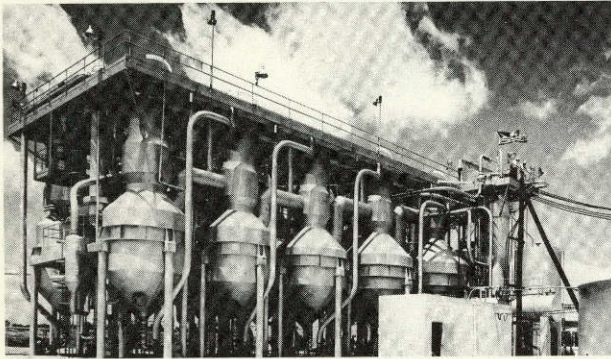
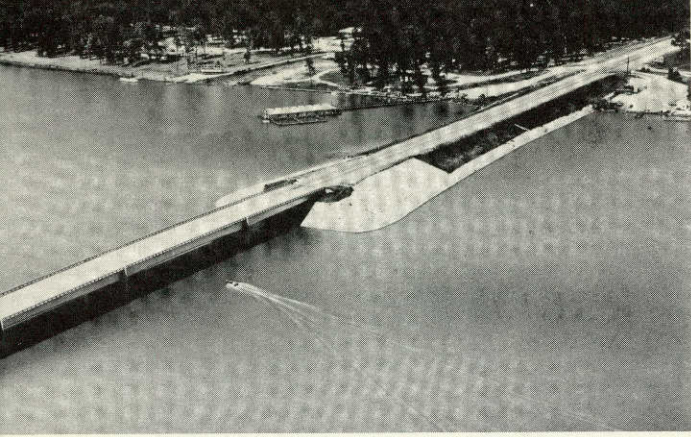
mended by the Commission should, if carried out, significantly increase the benefits obtainable from the State's surface water. The Bureau of Reclamation's proposed Texas Basins Project and the concomitant State projects should also prove greatly useful.

Many Federal and State projects have already been completed and others are underway. Using irrigation as the example again, Falcon Dam has been built on the Rio Grande and Amistad Dam is under construction. Soon the irrigation potential of this important river will be fully developed for Texas, and over a million acres of farmland will be supplied with badly needed water. With this new interest in developing Texas' vital surface water, the future is taking on an encouraging aspect.

Another encouraging possibility is the potential wide-scale use of sea water. The Office of Saline Water's million-gallon-per-day Demonstration Plant is now supplying desalinated water to the gulf coast city of Freeport and one of its industries. It is not inconceivable that plants of this type might some day provide an incremental source of fresh water to the whole Texas coast. And new ways of converting brackish ground water to fresh water may eventually benefit the inland regions.

Texas' coastal waters are also quite important,





especially for navigation. Extending along the entire Texas coastline is one of the Nation's finest shallow-draft channels—the Gulf Intra-coastal Waterway—which is given major credit for the area's post-war industrial boom. And although the gradient of the continental shelf is too low for Texas to have any natural harbors, dredging is not difficult. The coastal plain is very low and flat for many miles inland, so it is possible to construct ports not only along the 367-mile coastline but also many miles inland. Often a major industry will choose a site for its operations and then create a port to serve it. Houston—Texas' largest port and third largest in the Nation—is 50 miles inland, and a common yet startling sight along the Houston ship channel is the funnel of a 30,000-ton ship as it appears to float, disembodied, through the tree-tops of an inland forest.

### *Power for a Growing State*

The same flat terrain is responsible for Texas' relatively low hydroelectric potential. Unlike the more mountainous Western States, Texas is generally low, and most of its rivers lack sufficient fall to generate much hydropower. The States's largest hydroelectric powerplant, with a capacity of over 71,000 kilowatts, is at Deni-

(Top left) The resources of such reservoirs as Lake Houston serve the community twofold: they provide water for recreation as well as consumption.

Producing fresh water from the sea has long been a dream of man. The Freeport plant, pictured bottom left, is making that dream a reality.

(Above) Much of Texas' land has been heretofore arid and of little use. Now much of this unusable land is being reclaimed for farming and industrial uses.

son Dam on the Red River. Marshall Ford Dam and Powerplant on the Colorado River has a capacity of 67,500 kilowatts.

There are some smaller hydroelectric plants on the Colorado, Brazos, Red, Sabine, and Rio Grande Rivers, but Texas' total hydroelectric power capacity as of 1963 was about 390,000 kilowatts. By way of contrast, Grand Coulee Dam in Washington alone has a capacity of more than 2 million kilowatts. And even if all the hydroelectric potential from Texas' rivers were fully developed, the State's hydropower capacity would only double.

But Texas is fortunate in containing abundant supplies of natural gas and oil. Almost all electric power in the State is generated at steam plants, most of which use natural gas for fuel. Recent figures cite the total capacity of Texas' steam plants at over 12.5 million kilowatts.



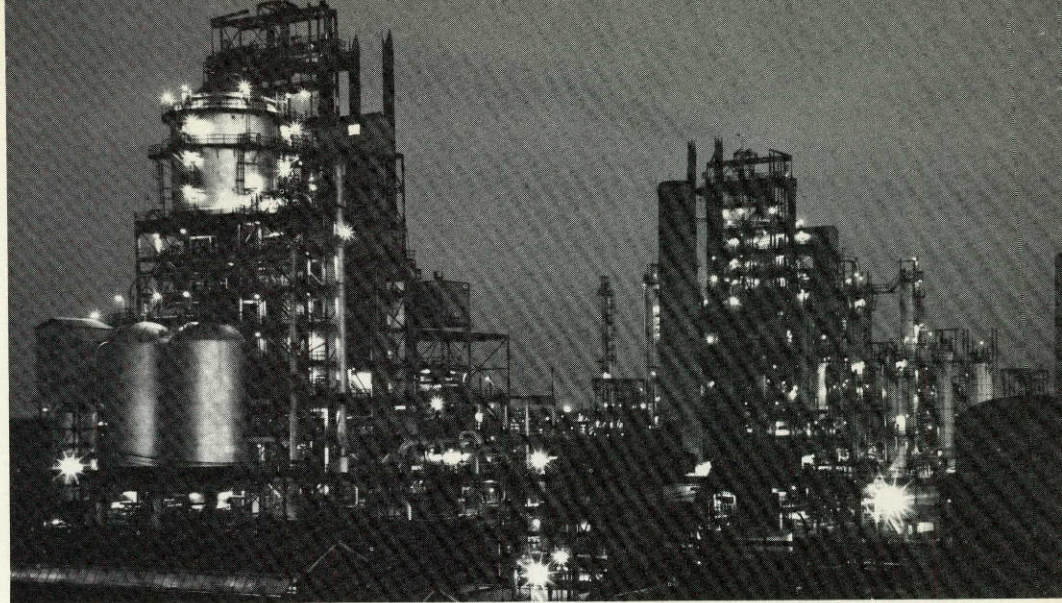
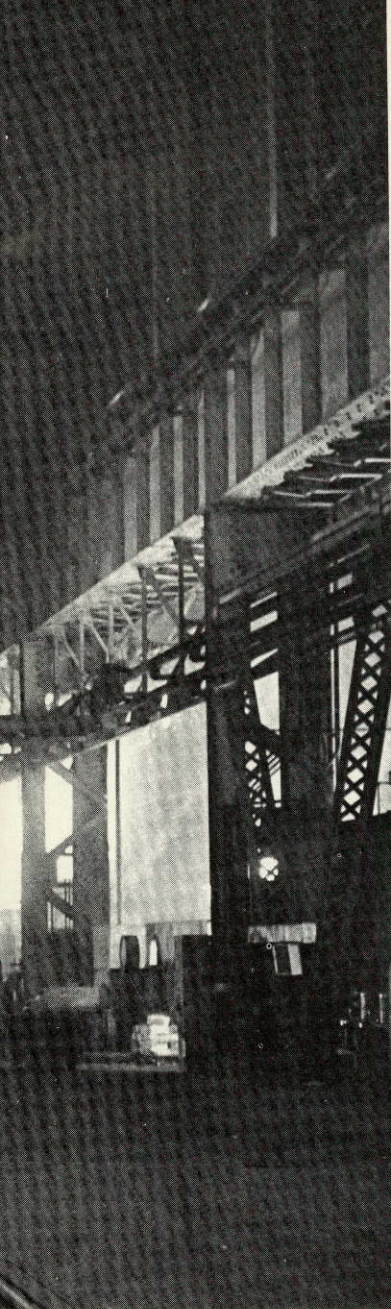


## Mineral Wealth

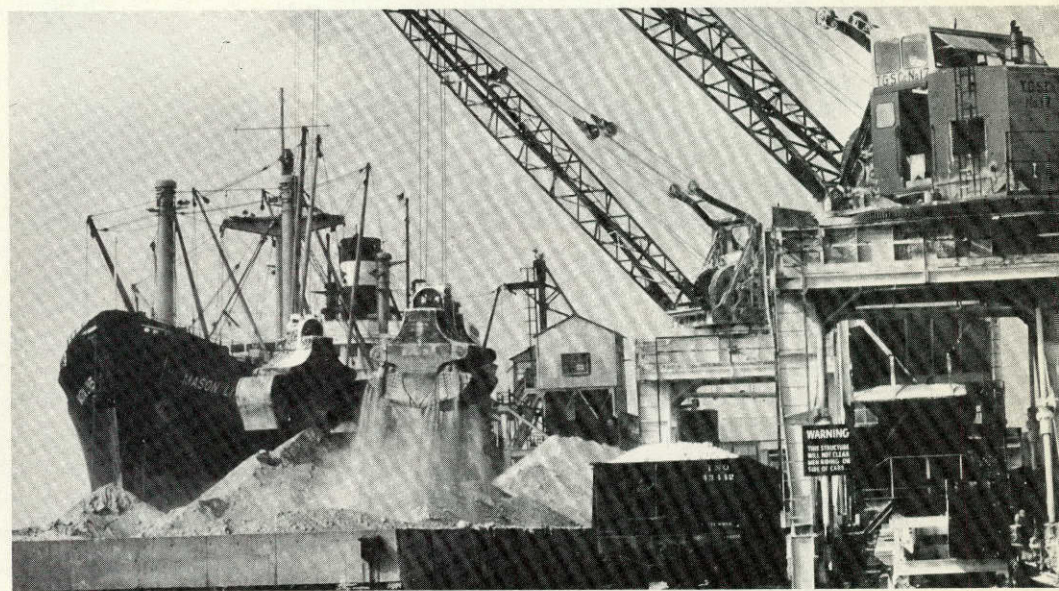
Texas is famous for superlatives, so it is not surprising that in minerals—as in other things—the Lone Star State is “number one.” For years Texas has led all other States in value of mineral output, sometimes producing as much as 25 percent of the the national total.

Texas’ petroleum and natural gas production in one recent year was alone worth over \$4 billion. Its more than 200,000 oil and gas wells account for about a third of the Nation’s annual output. Over two-thirds of the sulphur, half the carbon black, and almost a fifth of the salt produced in the United States come from





Texas not only has vast mineral resources, but the means to refine them as these photographs of an open hearth furnace (left), an oil refinery (top), and a sulphur plant (below) clearly show.



Texas. The State ranks first in magnesium output and third in stone production. It is also an important source of bromine, sand and gravel, cement, clay, gypsum, lime, and helium; and its untapped deposits of nonmetallic minerals offer the promise of new economic horizons for the future.

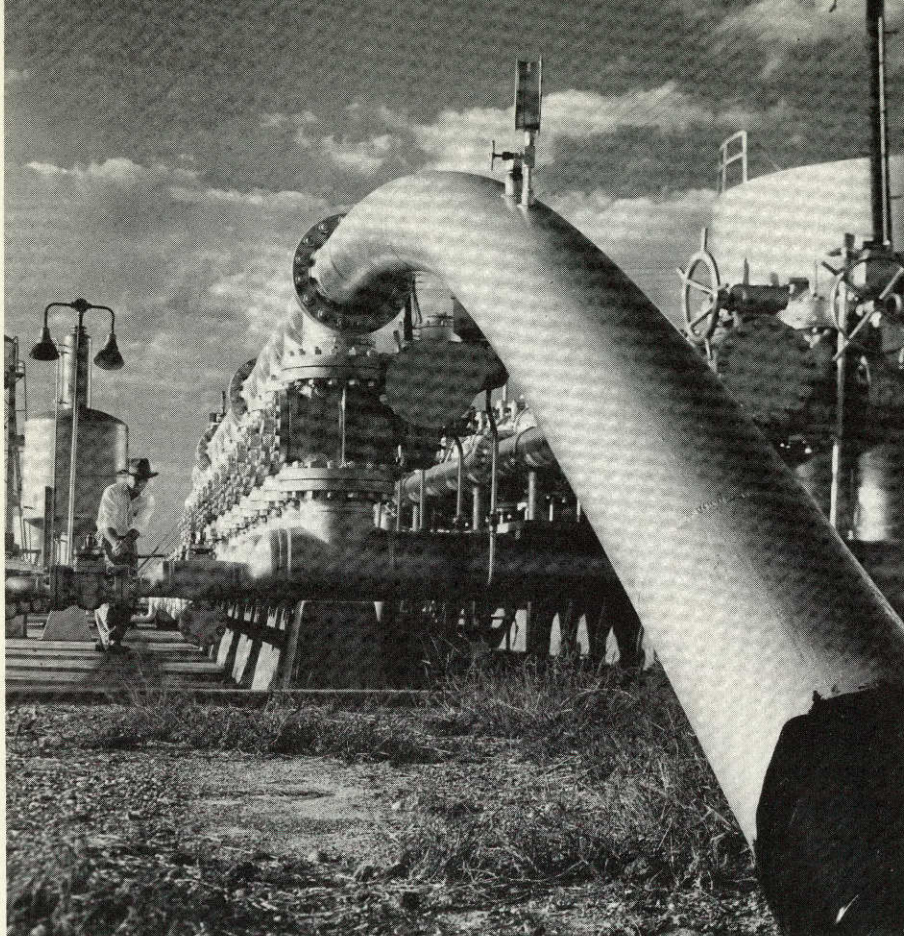
The State's mineral resources are as widely distributed as they are abundant. At one time or another almost all of Texas' 254 counties have reported mineral output, and in recent years only a handful have failed to do so. Petroleum production is especially widespread,

and drilling rigs are even springing up off the Texas coast in the Gulf of Mexico.

### *Petroleum and Natural Gas*

Barely a half century after the New World was discovered, and in the same accidental fashion, oil was "discovered" in Texas. Survivors of the De Soto expedition, touching on the Texas gulf coast in 1543, encountered a pitchlike substance floating on the water, which they used to calk their ships. Oil springs are found in the area even today, near Sabine Pass,





Vast systems of pipelines, creating fantastic new shapes and forms, carry the products of Texas' famed oil and gas fields to all parts of the Nation.

and oil can still occasionally be seen floating on the water.

As early explorers and the settlers who followed them gained a wider knowledge of the vast Texas territory, many such oil seepages became known and valued. Indians taught the white men to use petroleum as a salve and healing agent, and the settlers themselves discovered its utility as a lubricant for their wagons.

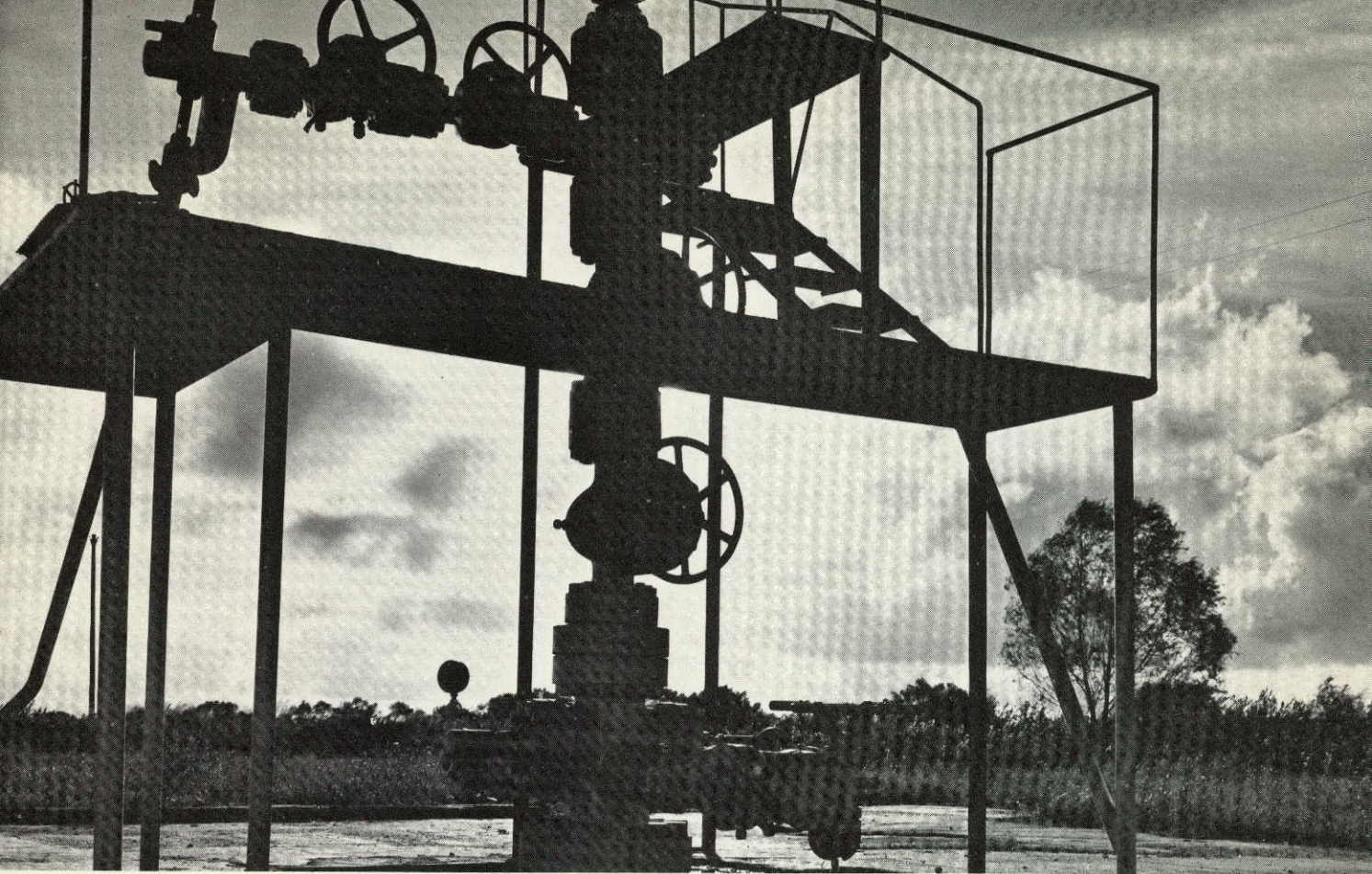
With petroleum becoming increasingly valued as a fuel and illuminant, the first Texas oil well was drilled in 1866. Interest in exploration began to spread, and by 1889 Texas was producing 48 barrels of oil a year, while its annual natural gas output was worth about \$1,700. Five years later, when the city of Corsicana was drilling for water, the first real Texas oilfield was discovered. A large refinery was constructed, and in 1899 the Texas Legislature passed the State's first oil and gas conservation laws.

Then, in mid-morning of a January day, 1901, the Texas oil industry skyrocketed into world-wide prominence on the crest of the famous Spin-

dletop gusher—the largest ever seen. Around the world, incredulous oilmen talked of this new Texas well producing 75,000 to 100,000 barrels of oil a day, and the city of Beaumont, near the field, became an international boomtown. Over the next few years one oil boom followed another, and when the East Texas field—until recently the largest in the Western Hemisphere—was fully opened in the 1920's, Texas became the unrivaled leader in American oil production. The State today pumps out well over 900 million barrels of oil a year. In addition to its immediate value, this oil forms the basis for two of Texas' large manufacturing industries—petroleum refining and the production of petrochemicals.

Texas also supplies about 6 trillion cubic feet of natural gas, or around 40 percent of the Nation's output. Many of the State's natural gases contain naturally formed gasoline, butane, and propane. An interesting conservation practice known as "cycling" involves the initial extraction of these useful hydrocarbon products followed by the return of the "dry" gas under pressure to natural reservoirs, where it provides





the energy needed to force out additional gas. Texas annually produces well over 265 million barrels of natural gas liquids, and its reserves are estimated at over 4 billion barrels. Such boundless reservoirs of natural gas are responsible for the rise in Texas of many industries requiring great amounts of inexpensive heat and power. The State also has almost 7½ billion tons of recoverable coal, including lignite, beneath its soil, which should also prove of benefit to these industries.

A large consumer of Texas natural gas is the carbon black industry. Natural gas, when burned with insufficient oxygen, forms a black deposit that can be used commercially. Texas produces more than half the domestic output of carbon black—over a billion pounds a year. The substance is used in the manufacture of rubber, ink, and paint.

In the geologic formations beneath Texas' surface and its offshore waters, there are an estimated 14.5 billion barrels of crude oil and 118 trillion cubic feet of gas. The State contains close to half the known domestic petroleum and natural gas reserves, so it seems that Texas'

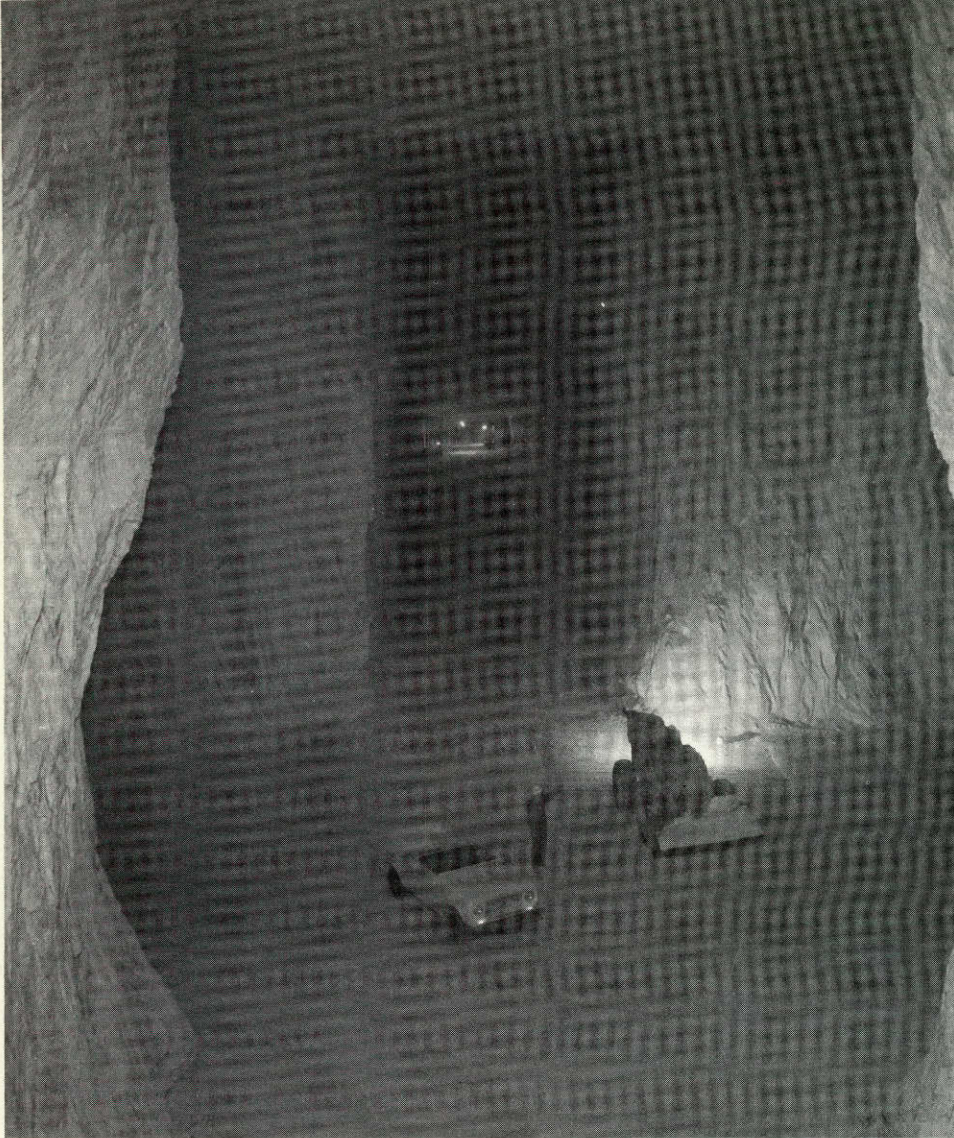
tremendous oil and gas production will be sustained for many years to come.

### *Helium: The Wonder Gas*

Certain natural gases found in the Texas Panhandle constitute one of the Free World's major sources of helium. A lightweight gas whose unusual properties make it indispensable to modern technology, helium is used—among other things—in making nuclear energy equipment, quality control devices, and sensitive electronic gear, and in spacecraft research.

Significant helium production in this country began in Texas in 1918 as part of the war effort. By 1922 helium was being used in all American blimps and dirigibles. During World War II, output had to be greatly expanded to supply Navy blimps making antisubmarine patrols. After the War, as the use of lighter-than-air craft declined, the demand for helium was sustained by the new uses that had been found for it in industry and scientific research. Helium consumption has now become so great that the





The earth supplies Texas with much of its wealth. Pictured is a salt mine at Grand Saline.

Federal Government has enlisted private industry in a 22-year conservation effort.

Centered in Amarillo—"helium's hometown"—Texas' helium operations supply about one billion cubic feet of helium a year, an output exceeded only in Kansas. Texas is itself a major helium consumer, recently using about 38.5 million cubic feet of the gas in one year. Much of this goes to military installations, such as the Dyess Air Force Base where, under high pressure, it is used to force liquid fuels into the engines of Atlas missiles.

#### *Nonmetallic and Metallic Minerals*

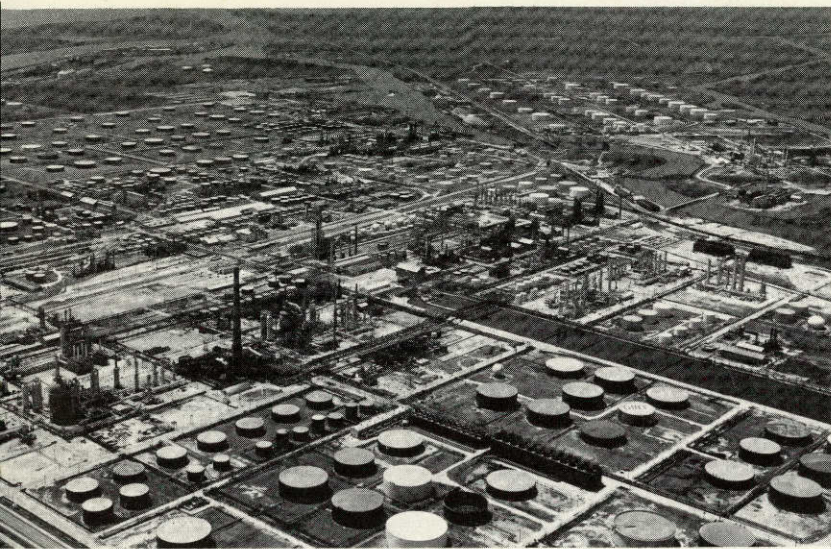
Perhaps the most important nonmetallic mineral in Texas is sulfur, which is extracted

from "sour" natural gas or, more commonly, brought up through wells by the Frasch process. This ingenious system uses superheated steam, pumped into underground sulfur deposits, to melt the element and force it to the surface in a very pure form. Texas is the world's leading producer of sulfur, and among its nonpetroleum minerals, only cement brings in more revenue.

Annual output of cement, worth more than \$83 million, has already exceeded 26 million barrels, and it shows a steadily rising trend. Limestone and shales—used in making cement—are found throughout the State, and oyster shell, also used for this purpose, is available on the gulf coast.

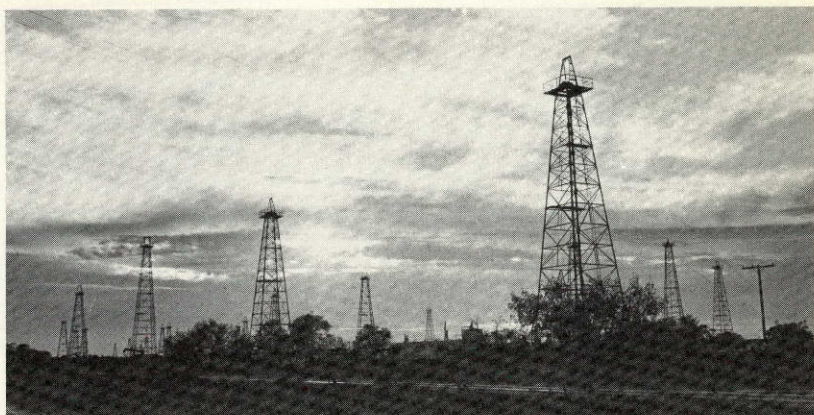
Valuable deposits of basalt, granite, marble,





(Left) At this vast complex at Port Arthur, crude oil is refined from an unseemingly black liquid to usable fuels and lubricants.

(Right) After 45 years, this field is still in production in Brazoria County, having yielded over 90 million barrels of oil.



limestone, and sandstone result in an annual stone output of approximately 38 million tons, which ranks Texas third in the Nation. Roughly two-thirds of this stone consists of crushed limestone, which is used for roadbuilding and similar purposes. The geologic processes which gave Texas such ample resources of stone also left considerable deposits of sand and gravel. Each year the State produces about 30 million tons, valued at over \$33 million.

Clay is found over much of the State. Varieties range from such special-use clays as bentonite, used as drilling mud in the oil industry, to common shale clay needed in the cement industry. Certain Texas fire clays make building bricks that are especially amenable to decorative coloring with additives.

Metals contribute less to the Texas economy than fuels or nonmetals. Nevertheless, the State is the Nation's principal producer of the extremely important industrial metal, magnesium. At Freeport and Valasco on the gulf coast, magnesium is "mined" from sea water by chemical processes worked out during World War II. Iron and uranium are two other metals mined in the State.

There are many plants in Texas that process metal ores mined elsewhere. Products from these installations, many of which treat both domestic and foreign ores, include aluminum, antimony, manganese, cadmium, copper, lead, silver, zinc, and tin. America's only tin smelter is in Texas.









## Fish and Wildlife

Terrain ranging from flat to mountainous, plantlife including jungles of mesquite and cactus as well as marshlands, climatic conditions encompassing the almost totally arid and the semitropical—this is Texas, habitat for an untold variety of fish and wildlife.

The east Texas timber belt, especially in the National Forests, is known for its deer and bobcat. On the Edwards Plateau—where the country is broken, well-watered, and sparsely inhabited—deer are very plentiful and wild turkeys and small animal life abound. The sheltered bays and inlets of the coastal region provide natural wildfowl preserves, while in the Trans-Pecos region are mountain lions, various kinds of deer, bighorn sheep, and elk. Inland lakes are famous for their black bass, and catfish and crappie are found in the State's numerous streams. In addition, the thousands of miles of surf-whipped coast along the Gulf of Mexico yield tarpon, redfish, and many other species.

### *Variety of Animal Life*

For the hunter, Texas has the largest deer herd in the country, more javelina than the rest of the States combined, wonderful quail shooting, numerous wild turkeys with generous bag limits, and open seasons on pronghorns in the western part of the State and in the east on squirrels. State and private interests have introduced blackbuck, Barbary sheep, mouflon sheep, and nilgai antelope of Asia to increase the State's already splendid hunting opportunities. Texas ranchers who lease hunting privileges on their lands receive incomes that supplement and sometimes even exceed their livestock profits. And in a recent year, over a half million hunting licenses brought the State well over \$1.5 million.

Many of the wild animals of early times have vanished or become extinct. Texas' great bison herds, once estimated in the millions have diminished markedly and today are found only





Muleshoe Wildlife Refuge is a popular stopping point for ducks and geese en route between summer and winter areas.

on a few ranches and in zoos. A small number of bighorn sheep remain, and these are concentrated on the Diablo Mountain ranges of the Trans-Pecos. The pronghorn antelope, which once ranged the open prairies of west Texas in great numbers, would have all but disappeared had recent conservation practices not assured its survival.

But many animals which the pioneers hunted are still plentiful. White-tailed deer, by far Texas' most important game animal, number about two million and are found over most of the south and central portions of the State. Mule or black-tailed deer inhabit the Big Bend and Pecos River areas, while the small Sonora deer is a wanderer in the Chisos Mountains.

A threat to livestock, mountain lions or cougars—sometimes measuring 7 or 8 feet—are found in the western mountains and hills. The jaguarundi, a cat with a long tail and body but

short legs, is present in small numbers, and the ocelot, or tiger-cat, prowls the underbrush of the Rio Grande.

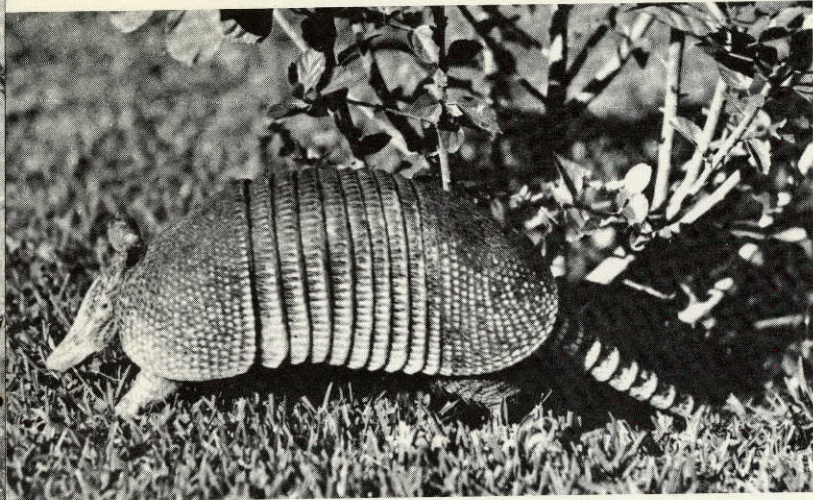
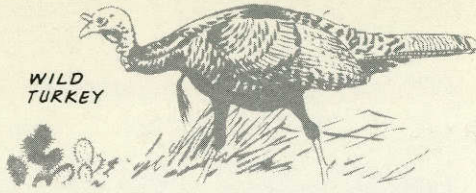
The muskhog (peccary), a wild hog locally called the javelina, roams the southwest border country. A scrappy fighter, it is a popular game animal and the subject of many tall tales. The red fox is also hunted, especially in east Texas.

One of the curious native animals found especially in the hilly regions is the armadillo, an odd shell-covered creature that escapes attackers by curling into its armored casing. Another unusual animal is the east Texas flying squirrel, which can spread the winglike folds of skin that extend from its forelegs to its hind-legs and glide from tree to tree.

Texas has all four of the poisonous snakes found in the United States—rattlesnakes, copperheads, water moccasins, and coral snakes. The



WILD  
TURKEY



The prairie dog (right) with its burrow is a curious little animal. Also native to Texas is the armadillo, whose shell is often used in the manufacture of curios.



PRONGHORN  
ANTELOPE

best-known Texas lizard is the horned toad, which is often mounted and sold to tourists. Alligators, frequently quite large, are found in the swamps and rivers of east Texas. Alligators are increasing in numbers due to the strict protective measures of the Texas Parks and Wildlife Department.

#### *Waterfowl and Upland Birds*

In addition to Texas' numerous resident birds, large numbers of migrants cross the State along the western Gulf Flyway. Texas is in the migratory path of practically all species of wild ducks except those that summer in Labrador. Large numbers of geese and brant also pass through the State. So it is little wonder that Texas is renowned for its duck and goose hunting.

Many waterfowl that summer farther north

use the Texas coast as their wintering grounds. Six species of geese, 28 of duck—including red-heads, mallards, and pintails—and even the whistling swan seek out the great marshes and ricefields of eastern Texas. More than 540 different bird species have been recorded in the State—closer to 800 if subspecies are included—and Texas' bird population is the most varied in the country.

Nearly half of the wild turkeys in the United States are found in Texas, and fossil evidence suggests that the turkey is one of the State's oldest inhabitants. Most prized of Texas' upland game birds, wild turkeys live principally in the Edwards Plateau region, although some inhabit the brushlands of south Texas and the hill country farther north. The State is presently stocking the Piney Woods country of east Texas to increase future hunting opportunities.

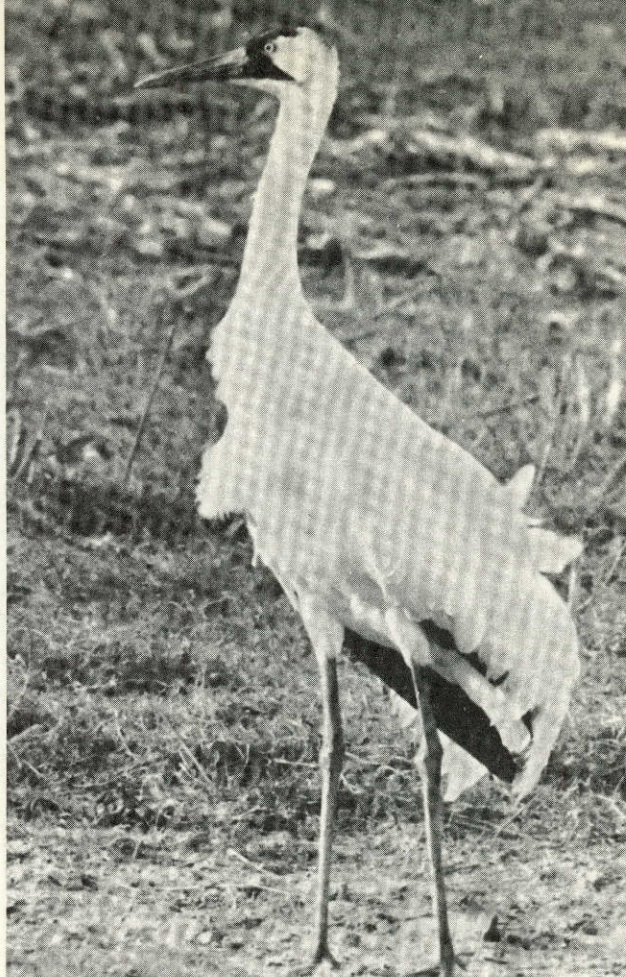
The bobwhite quail inhabits the open brush-







The javelina, a particularly vicious type of wild hog, is hunted for sport in the border country of southwest Texas. Whooping cranes, almost extinct, winter in Aransas Wildlife Refuge.



CHAPARRAL

lands of east Texas; it is also found in the Texas Panhandle and the Lower Rio Grande Valley. The scaled quail, preferring the more arid ranges in the west, and the Gambel's quail, also common to certain isolated areas in the western part of the State, are both popular game birds. The bobwhite quail, mourning dove, and white-winged dove are hunted in Texas too.

At a game farm near Tyler, the State raises exotic game birds for stocking areas that lack sufficient native game birds. Six hundred gray francolin—a West Pakistani bird adapted to arid climates—and over 800 red-legged partridges from France have recently been released by the State. Bobwhite quail, already found in Texas, are also bred on this farm.

Best known and loved of all Texas birds is the State bird—the mockingbird. Protected by both Federal and State laws, it may not be captured or killed. The golden eagle inhabits the Trans-Pecos region, and a few bald eagles are found on the Coastal Plains. The unusually photogenic lesser sandhill crane makes his winter home in the Muleshoe National Wildlife Refuge

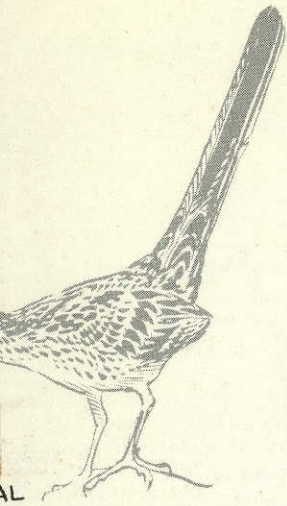
of western Texas, and the world's remaining whooping crane population of 30 or so birds winters at Aransas National Wildlife Refuge in the Trans-Pecos.

One of the State's most interesting birds is the chaparral or road runner. With its plumage comically ruffled, the large long-legged creature runs swiftly along the ground, often attempting to race ahead of automobiles. A figure in many tall tales, the road runner has recently "Beep-Beeped" his way to fame as one of Hollywood's cartoon favorites.

#### *Fish for Sport and Livelihood*

Nearly three-quarters of a million sportsmen take about 20 million pounds of finfish annually from Texas' coastal and inland waters. Black bass await the angler in hundreds of inland lakes, such as Caddo, Buchanan, Travis, Falcon, and famous Texoma. Crappie and catfish populate the numerous streams, and there is trout fishing in the upper Rio Grande region of west Texas.





This picturesque fleet of commercial shrimp boats is located in Galveston, nucleus of the vast gulf coast seafood industry. Sports fishermen also troll these waters for red snapper and mackerel.

In central Texas, some of the best fishing spots are found below dams that impound the highland lakes. White bass are most frequently landed, although crappie, catfish, and black bass are also caught. Requiring little fishing equipment and usually within easy access, reservoir fishing is popular all year.

Texas maintains 13 pondfish hatcheries which each year add approximately 15 to 20 million warm-water fish to public fishing waters. The Department of the Interior's Bureau of Sport Fisheries and Wildlife also restocks State streams, and Federal-State cooperation is quite extensive. So it is not likely that Texas' inland fisheries will ever be depleted.

For the surf caster, the Texas coastline offers the popular tarpon, spotted sea trout, redfish, snook, jack cravelle, and many other species. An old and favorite sport is flounder fishing at night, walking along the beaches with lights and barbless spears. Offshore, fishermen in small outboards troll the gulf for king and Spanish mackerel, while large party boats seek pompano, sailfish, red snapper, grouper,

flounder, and black and red drum.

In addition to their recreational value, Texas' fishery resources are important commercially. Fourth among the States in revenue from commercial fisheries, Texas markets a fresh and salt water catch worth between \$25 and \$34 million a year. Annual accountings show that nearly 200 million pounds of fish and shellfish are landed at gulf ports, while inland fresh-water fisheries account for another half-million pound catch.

Texas' shrimp harvest is the largest and most stable in the country. An average of 60 to 80 million pounds of shrimp, valued at around \$25 million are taken each year from the State's gulf waters. Menhaden is also caught on a large commercial scale and, together with shrimp, makes up over 90 percent of the landings in Texas ports. Blue crab, drum, sea trout, red snapper, and oyster are also harvested. A State program to restore oysterbeds to barren sections of the Texas coast has been quite successful. Texas also has small fresh-water fisheries for buffalofish, carp, and catfish.



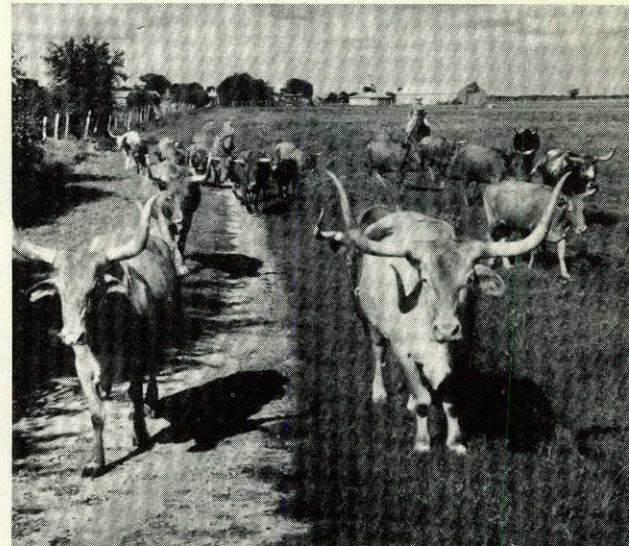
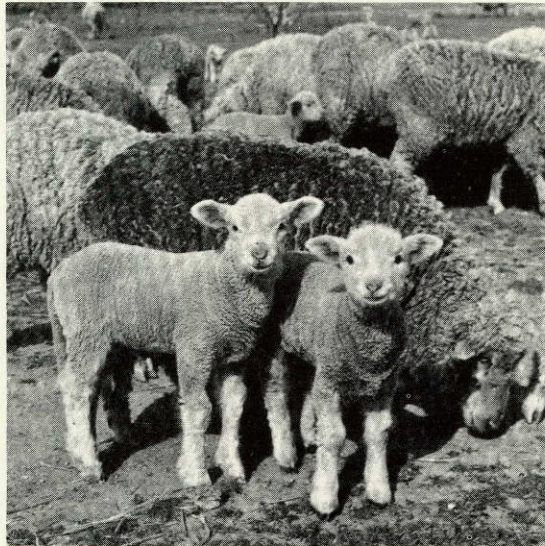
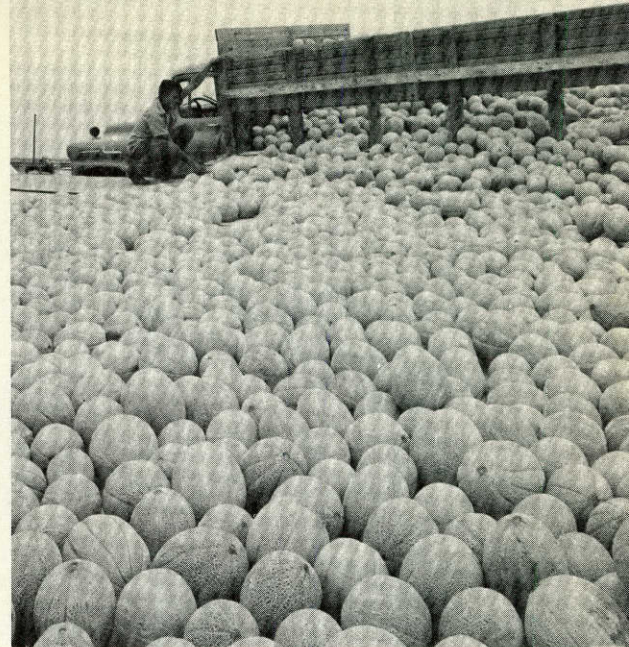


## Land and Forests

Throughout its history, Texas has been described as an "empire" and indeed, its very mention inspires visions of vast tracts of land. Texas' land area—171 million acres—is larger than that of any European nation except the U.S.S.R. How this huge land resource is utilized, then, is important not only to Texas but to the whole Nation.

Because Texas was an independent republic before its annexation, there was originally no public or federally owned territory within the State. The Federal Government later acquired small amounts of land and presently owns about





Texas, land of the "wide open spaces," is ideally suited for crop farming and livestock production. More than \$2 billion is derived from these enormous and widely diversified industries yearly.

1.6 percent of the State's total area, approximately 2.7 million acres.

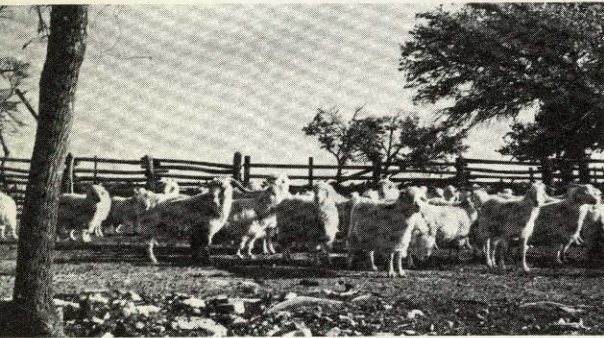
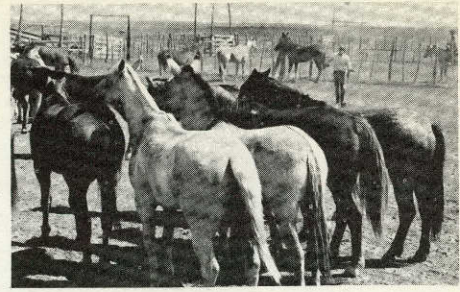
A land as large as Texas enjoys a great diversity of natural conditions. Soils range from the loose, deep sands generally found in the western part of the State to the heavy dark clays common along the gulf coast. Almost every variety of plant native to temperate and subtropical zones, whether it be salt cedar on the coast or the ocotilla and sotol of the lonely desert regions, can also be found in Texas.

From March until October (with the possible exception of July), the State is a virtual botanical

garden of wild flowers, with more than 4,000 different colorful species adorning the landscape. Foremost among these is the bluebonnet, the State flower. Wild-flower zones could once be demarcated according to soil and rainfall patterns, but today, as a result of extensive irrigation, many plants are found outside their natural ranges. Flowers raised in the State are sold commercially, as at Tyler, an important rose-growing center.

Most of Texas' land—approximately 143 million acres—is used for farming and ranching. Second only to California in size and variety





of agricultural output, Texas has more farms than any other State and alternates with Iowa as second or third in yearly agricultural income. About evenly divided between crops and livestock and their products, this agricultural revenue averages over \$2 billion a year.

A recent survey placed Texas first in cotton, cotton seed, grain sorghum, and rice production. In terms of acreage planted, sorghums are the most extensively raised crop, but cotton brings in more revenue. The State is also a principal producer of wheat, corn, oats, and vegetables. Citrus fruits—especially grapefruit and oranges from the lower Rio Grande Valley—are also quite important.

Although most of Texas' 22 million acres of cropland is cultivated by dry-land farming, more than half the State's crop revenue comes from produce grown on irrigated land. Nearly 6 million acres of Texas farmland are now irrigated, and among the States only California has more irrigated land for agricultural use.

#### *Range and Livestock*

About half of the approximately 1,200 grasses found in the United States grow in Texas.

Although of little commercial value, these grasses provide a basis for the State's enormous cattle and sheep industry. Texas has more cattle, sheep, goats, and horses than any other State in the Union and is the country's leading producer of wool and mohair. It is also the second most important turkey-raising State.

Perhaps more than any other symbol, the longhorn steer represents Texas. Now replaced by other improved breeds, the longhorn provided the start for the cattle industry which played so important a role in the State's development. Large cattle operations today are concentrated mainly on ranches in the southern and western parts of the State. Noteworthy among these is the famous King Ranch, covering nearly a million acres, which was only one of the vast properties acquired by the 19th-century steamboat captain, Richard King.

Improved railroad facilities have eliminated the need for the great cattle drives to markets. As a result, better meats and hides can be purchased at lower prices. Although completely modernized, the cattle industry still retains much of the color and excitement associated with the "Old West."





Two rural industries dominate agrarian life: crop farming or a combination of crop farming and stock raising, and ranching. But the sharp distinctions which formerly separated the farmer and rancher have diminished over the years, and the historic antagonism between sheep men and cattlemen and between cattlemen and farmers has mellowed. Open and unfenced ranges are for the most part gone, replaced by better ranges, more intensely developed water resources, and other features that mutually benefit both ranchers and farmers.

#### *Valuable Commercial Forests*

Trees are a renewable resource, and some of the best managed forests and tree farms in the country are found in Texas. Texas has more than 225 species of trees, and in almost every county there are wooded areas that may be classified as forests. But except in the eastern counties—where southern yellow pines and red gums predominate—Texas' forests are of limited commercial value. They are still important, however, in controlling soil erosion and providing habitat for wildlife. And for many

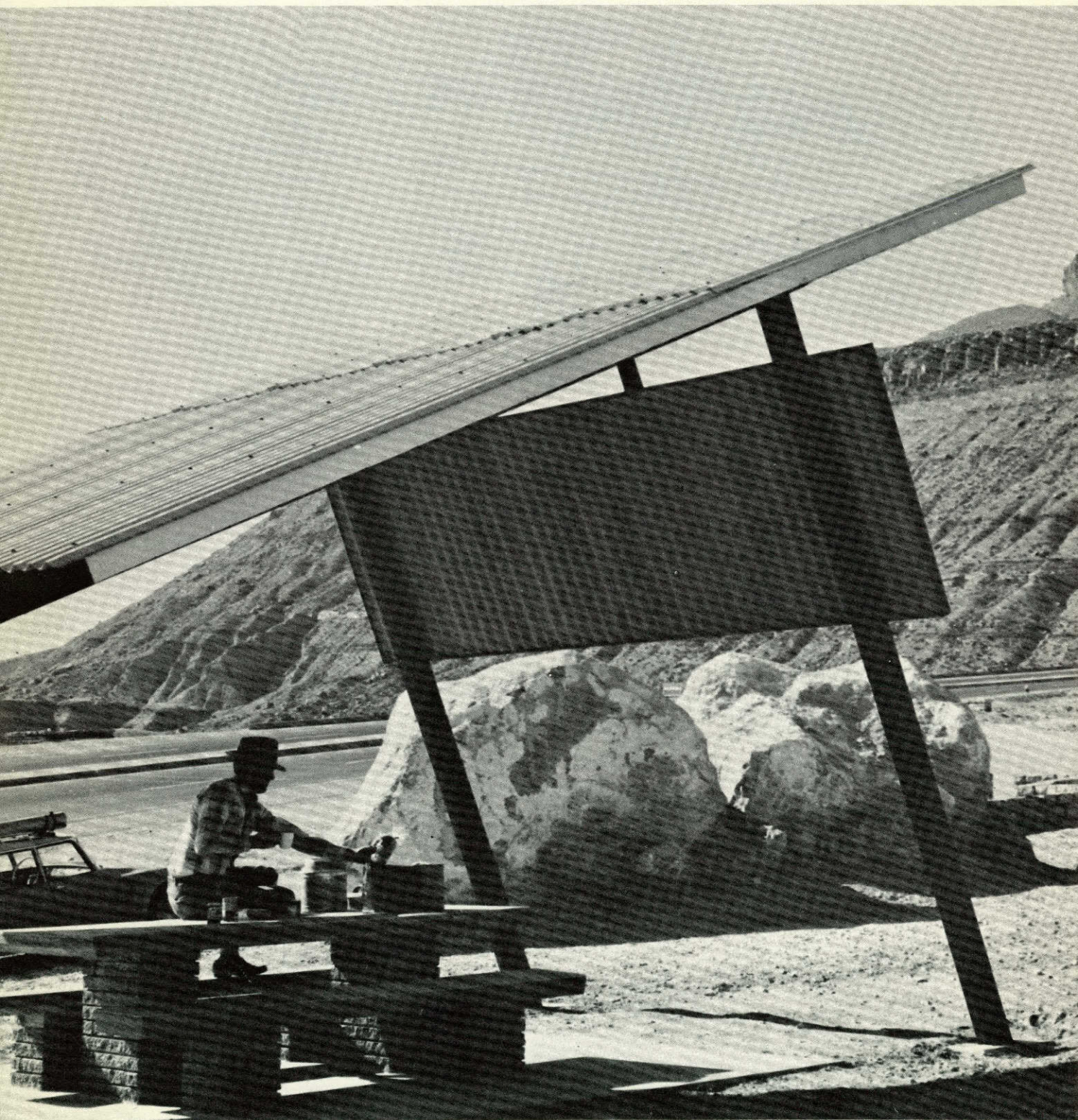
Measured in either land area or number of farms involved, the production of livestock, poultry, and their products is the largest agricultural enterprise in the State.

Texas is one of the leading lumber-producing States. These logs are ready to be taken to the mill at Lufkin.

areas of the State they offer the only shade as well as the only source of fuel.

The State's commercial forests, located mainly in east Texas, have important economic significance. Ever since the turn of the century Texas has been a leading lumber-producing State, and well over a billion board-feet of timber are cut each year. Texas timber supports more than a thousand mills and factories, while forest product and related industries provide full-time jobs for approximately 43,000 people and thousands of part-time positions. These industries produce a variety of wood and wood products ranging from toys, furniture, paper, and lumber to venetian blinds and cedar oil. Research sponsored by the forest and chemical industries is finding new uses for wood and is thus adding even greater value to Texas forests.







## Outdoor Recreation

During a recent year, it is estimated that more than eleven and a half million tourists spent over a half billion dollars in Texas. For like few other places in the country, Texas is a veritable outdoor wonderland.

A sightseer can travel from spacious Panhandle plains to the wooded slopes and bald granite crags beyond the Pecos River. He can stop at one of the 1,000 roadside parks maintained by the Texas Highway Department and have a picnic or cookout. Perhaps he will visit Sandhills State Park near Monahans and see sand dunes like the Sahara's or peer down the precipitous 1,000-foot walls of Palo Duro Canyon. If he's a rockhound, he'll find in Texas the Nation's richest agate deposits as well as fire opal, smoky quartz, and amethyst. If he's a horseman, he can ride a spirited Texas stallion or a gentle dude ranch pony. And, of course, there are numerous rodeos to give him a taste of the old West.

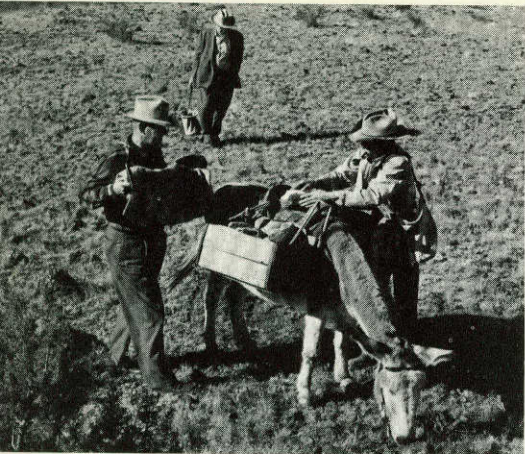
The spelunker may wander to his heart's content in the many caves found along the Edwards Plateau. The mountain climber will find a challenge in the rugged Trans-Pecos mountains, and the woodsman can go to any of a number of secluded forests and camping retreats. Hunters choose from a great variety of big game and game birds. Also, wolf hunts are held in many parts of the State, and fox hunting is popular in parts of east Texas. The fisherman, too, can choose from diversity ranging from the sluggish mud catfish to the fighting tarpon. And for the lover of solitude . . . the untrammelled Trans-Pecos, the eastern pines, the vast lonely prairie are unsurpassable.

The ocean lover will discover the ideal combination of a warm gulf current and lazy sun-



El Capitan, Guadalupe's twin peak, has been carved to a height of 8,078 feet by centuries of wind and water.





(Top left) Rockhounds collect red plume agate on this ranch near Alpine.

(Top right) Corpus Christi is a maritime resort and one of Texas' four major ports.

(Left) Galveston's smooth, 30-mile beach includes fishing, surfing, and boating.

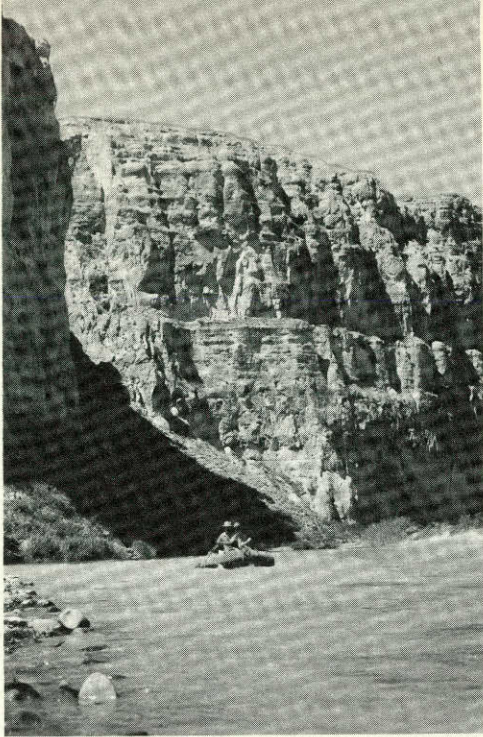
drenched beaches. Texas has over 600 miles of coastline, so it is little wonder that swimmers, sunbathers, surf casters, deep-sea fishermen, and yachtsmen find many attractions in the Lone Star State. Lying just offshore are numerous islands, such as the 113 mile-long Padre Island. An uninhabited 80-mile strip of beach was recently set aside on it as a National Seashore. When developed, the seashore will offer swimming, fishing, boating, hiking, and camping. A seasonal sanctuary for offshore and wading birds, the area should also appeal to the bird watcher.

Inland water sportsmen can find canoeing, boating, water skiing, swimming, and fishing in the State's streams, lakes, and reservoirs. The U.S. Army Corps of Engineers supervises 12 reservoirs in Texas, among them the popular Lake Texoma. Lakes are also found in each of the four National Forests and in many of the State parks. Numerous streams—many with excellent fishing—wind through the eastern forests, delighting the camper and nature

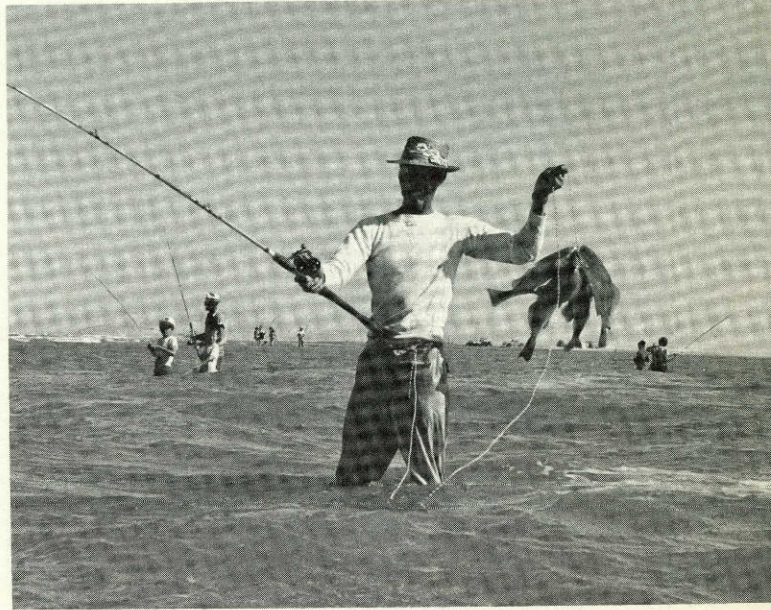
enthusiast. Second only to Alaska in square miles of inland water, Texas is truly a water-lover's State.

Forests of pine and hardwood lie in the eastern part of the State. Here the U.S. Department of Agriculture's Forest Service manages four National Forests where vacationers can hike, camp, hunt, swim, fish, picnic, and sightsee. Angelina National Forest is noted for the beautiful longleaf pines that line the banks of the Angelina River. Davy Crockett and Sabine Forests both offer excellent hunting and fishing. Sabine Forest also contains an unusual sampling of both virgin shortleaf pine and huge cypress. Sam Houston—known for the Big Thicket region, with American beech, shrub holly, rare ferns, and beautiful flowers, and the Shepard Creek area, crisscrossed by winding streams and covered with shortleaf-loblolly pine—is largest of the Texas National Forests. In addition to these National Forests, there are more than 60 State parks, all supervised by the Texas Parks and Wildlife Commission. Camping, picnicking, and fish-





(Top) A trip down the sometimes gentle, sometimes raging Rio Grande is an experience limited to few.



(Right) The shallow waters of the Laguna Madre attract anglers from many parts of the country.

ing facilities are available at many of them.

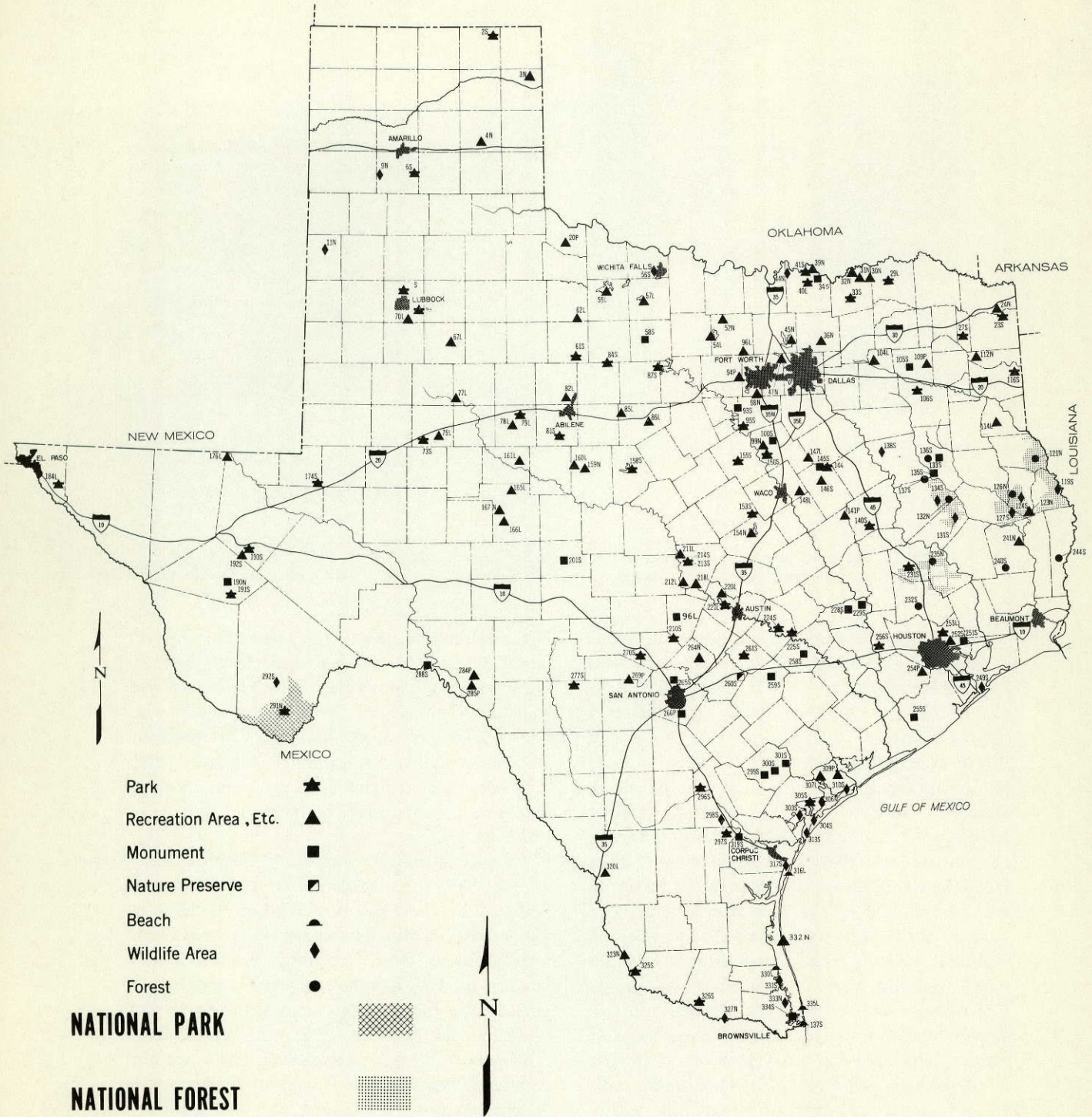
In the Trans-Pecos region, where the Rio Grande describes a great horseshoe bend, is famous Big Bend National Park. Administered by the National Park Service, this more than 700,000-acre park has some of the most unusual geological formations, flora, and wildlife in the country. Here stand the towering Chisos Mountains, their eroded peaks resembling ancient forts and castles. Legend has it that from their southern rim a man can look across into Mexico and see the "day after tomorrow." Perhaps this is why the mountains were named "Chisos," which comes either from an Indian word meaning spirit or the Castilian word, "hechizos," which means enchantment. Sheer canyon walls—notably those of Boquillas and Santa Elena—offering marvelous vistas of the Rio Grande far below, are also found in the park, and these form a strange contrast with the nearby desert regions. The visitor can enjoy horseback riding, hiking, camping, picnicking, and sightseeing.

For the historically minded, Texas has two

national historic sites. The one at Fort Davis, administered by the National Park Service, once played a major role in the history of the southwestern frontier. Troops stationed at the Fort guarded travelers along the San Antonio-El Paso road from marauding Comanches and Apaches. The remains of Fort Davis are more extensive and impressive than those of any other southwestern fort.

Another nationally significant place in Texas is the San Jose Mission at San Antonio. Founded by the Franciscan Fathers in 1720 as part of the Spanish missionary effort, it is often referred to as the "Queen of the Missions." It's not hard to imagine a brown-robed Father tending the little garden or meditating in the beautiful old cloisters. The architecture and ornamentation are outstanding, and certain structures—such as the flying stone buttresses of the granary—are unique in this country. The San Jose Mission is owned and administered as a National Historic Site by the Roman Catholic Church and the State of Texas in cooperation with the National Park Service.



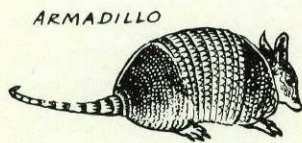




# Texas Outdoor Recreation Guide

## How To Use This Guide

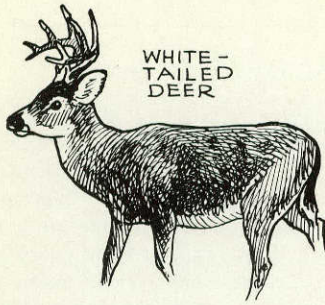
Information on major areas offering recreation in Texas is given in the listings on the following pages. Each area can be located on the map at left by matching its number (as 24 N) with the corresponding number on the map. Symbols on the map represent types of areas. Letters after the numbers refer to Federal (N), State (S), local (L), and quasi-public and private (P). Only major interstate highways and major cities are shown on the map. A road map will provide exact routes to those areas you may wish to visit.



	Number on map	Acreage		Type of use				Activities								
		Total land and water within area	Water surface (?)	Day and weekend	Vacation	Out-of-State target	Tourist en route	Picnicking	Hiking and riding	Camping	Boating	Swimming	Fishing	Hunting	Nature study	Winter sports
<b>FEDERAL</b>																
Park: Big Bend National Park . . . . .	291N	708, 221			x	x	x	x	x						x	
Monument: Historic: Fort Davis National Historic Site . . . . .	190N	460		x												
Seashore: Padre Island . . . . .	332N	328, 000	119, 904	x	x	x	x	x	x	x	x	x	x	x	x	x
Recreation areas:																
Lake Marvin, Boggy Creek Land Utilization Area . . . . .	3N	512	51	x			x	x	x	x	x	x	x	x	x	
McClellan Creek Land Utilization Area . . . . .	4N	1, 449	376	x			x	x	x	x	x	x	x	x	x	
Texarkana Reservoir . . . . .	24N	525	20, 300	x	x		x	x		x	x	x		x		
Lake Davy Crockett . . . . .	30N	(7)	588	x			x	x	x			x	x	x		
Coffee Mill Lake . . . . .	31N	(7)	704	x			x	x	x			x	x	x		
Lake Fannin . . . . .	32N	(7)	35	x			x	x				x	x	x		
Lavon Reservoir . . . . .	36N	25, 745	11, 080	x	x		x	x		x	x	x	x		x	
Lake Texoma . . . . .	39N	194, 775	93, 000	x	x	x	x	x	x	x	x	x	x		x	
Garza-Little Elm Reservoir . . . . .	45N	49, 339	23, 470	x	x		x	x		x	x	x	x		x	
Grapevine Reservoir . . . . .	47N	17, 512	7, 380	x	x		x	x		x	x	x		x		
Cross Timbers Land Utilization Area (not grassland) . . . . .	52N	20, 033		x			x	x	x					x	x	
Benbrook Reservoir . . . . .	98N	11, 247	3, 770	x	x		x	x	x	x	x	x		x		
Whitney Reservoir . . . . .	99N	48, 483	15, 800	x	x		x	x		x	x	x		x		
Ferrell's Bridge . . . . .	112N		18, 700	x	x		x			x	x	x		x		

See footnotes at end of table.

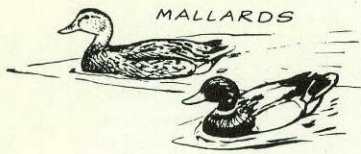




	Number on map	Acreage		Type of use				Activities									
		Total land and water within area	Water surface (?)	Day and weekend	Vacation	Out-of-State target	Tourist en route	Picnicking	Hiking and riding	Camping	Boating	Swimming	Fishing	Hunting	Nature study	Winter sports	Wilderness experience
FEDERAL —Continued																	
Recreation areas—Continued																	
Sam Rayburn Lake .....	123N	135,000	114,500	x	x	..	x	x	..	..	x	x	x	..	x	..	..
Belton Dam .....	154N	27,001	7,400	x	x	..	x	x	..	x	x	x	x	..	x	..	..
Hords Creek Reservoir .....	159N	3,027	510	x	..	..	x	x	..	x	x	x	x	x	x	..	..
San Angelo Reservoir .....	167N	18,016	5,440	x	x	..	x	x	..	x	x	x	x	..	x	..	..
Dam "B" (Town Bluff) .....	241N	21,751	13,700	x	..	..	x	x	..	x	x	x	x	..	x	..	..
Canyon Reservoir .....	264N	11,774	8,240	x	..	..	x	x	..	x	x	x	x	..	x	..	..
Falcon Dam .....	323N	..	98,805	x	x	..	x	x	..	x	x	x	x	..	x	..	..
Forests:																	
Sabine National Forest .....	121N	183,844	24	x	x	..	x	x	x	x	x	x	x	x	x	x	..
Angelina National Forest .....	126N	154,392	30	x	x	..	x	x	x	x	x	x	x	x	x	x	..
Davy Crockett National Forest .....	132N	161,563	78	x	x	..	x	x	x	x	x	x	x	x	x	x	..
Sam Houston National Forest .....	235N	158,205	31	x	x	..	x	x	x	x	x	x	x	x	x	x	..
Wildlife areas:																	
Buffalo Lakes .....	9N	7,664	1,900	x	x	..	x	x	x	x	x	x	x	x	x	x	..
Muleshoe .....	11N	5,809	500	x	x	..	x	x	x	x	..	x	..	..	..	..	..
Hagerman .....	44N	11,319	2,500	x	x	x	x	x	x	x	x	x	x	..	x	..	..
Aransas .....	306N	47,261	..	x	x	x	..	..	..	..	..	..	..	..	..	..	..
Santa Ana .....	327N	1,980	500	x	..	..	x	x	..	..	..	..	..	..	x	..	..
Laguna Atascosa .....	333N	41,767	3,200	x	x	..	x	x	x	x	..	x	..	x	..	..	..
STATE																	
Parks:																	
Perryton .....	2S	..	..	x	..	..	x	x	x	x	..	..	..	..	x	..	..
Palo Duro Canyon State Park .....	6S	15,104	..	x	x	..	x	x	x	x	..	..	..	..	x	..	..
Atlanta State Park .....	23S	1,475	20,300	x	x	..	x	x	x	x	x	x	x	..	x	..	..
Daingerfield State Park .....	27S	550	30	x	x	..	x	x	x	x	x	x	x	..	x	..	..
Bonham State Park .....	33S	555	65	x	..	..	x	x	x	x	x	x	x	..	x	..	..
Eisenhower State Park .....	41S	416	93,000	x	x	x	x	x	x	x	x	x	x	..	x	..	..
Lake Stamford State Park .....	61S	208	5,125	x	..	..	x	x	x	x	x	x	x	..	x	..	..
Mackenzie State Park .....	71S	549	..	x	..	..	x	x	..	..	..	x	..	..	x	..	..
Big Spring State Park .....	73S	344	..	x	..	..	x	x	..	x	..	..	..	..	x	..	..
Abilene State Park .....	81S	507	S	x	..	..	x	x	..	x	..	x	..	..	x	..	..
Fort Griffin State Park .....	84S	503	..	x	..	..	x	x	x	x	..	..	..	..	x	..	..
Possom Kingdom State Park .....	87S	2,621	19,800	x	x	..	x	x	x	x	x	x	x	..	x	..	..
Cleburne State Park .....	95S	498	116	x	..	..	x	x	x	x	x	x	x	..	x	..	..
Tyler State Park .....	106S	994	2,450	x	x	..	x	x	x	x	x	x	x	..	x	..	..
Caddo Lake State Park .....	116S	485	35,000	x	x	..	x	x	x	x	..	x	..	..	x	..	..
Normangee .....	140S	504	53	x	..	..	x	x	x	x	..	x	..	..	x	..	..
Fort Parker State Park .....	144S	1,485	750	x	x	..	x	x	x	x	x	x	x	..	x	..	..
Lake Whitney State Park .....	150S	1,315	15,800	x	x	..	x	x	x	x	x	x	x	..	x	..	..
Mother Neff State Park .....	153S	259	..	x	..	..	x	x	x	x	..	x	..	..	x	..	..
Meridian State Park .....	155S	462	73	x	..	..	x	x	x	x	x	x	x	..	x	..	..
Lake Brownwood State Park .....	158S	538	8,900	x	x	..	x	x	x	x	x	x	x	..	x	..	..
Monahans Sandhills State Park .....	174S	3,840	..	..	x	..	x	x	x	..	..	..	..	..	x	..	..

See footnotes at end of table.





	Number on map	Acreage		Type of use			Activities										
		Total land and water within area	Water surface (?)	Day and weekend	Vacation	Out-of-State target	Tourist en route	Picnicking	Hiking and riding	Camping	Boating	Swimming	Fishing	Hunting	Nature study	Winter sports	Wilderness experience
STATE—Continued																	
Parks—Continued																	
Davis Mountains State Park	191S	1,815		x	x		x	x	x	x		x			x		
Balmorea State Park	193S	48	6	x			x	x	x	x		x	x				
Blanco State Park	210S	110		x			x	x	x	x		x	x				
Longhorn Caverns State Park	213S	708		x			x	x	x	x					x		
Inks Lake State Park	214S	1,201	900	x	x		x	x	x	x	x	x	x		x		
Bastrop State Park	224S	2,100	S	x			x	x	x	x		x			x		
Buescher State Park	225S	1,720	40	x			x	x	x	x					x		
Huntsville State Park	231S	2,122	S	x	x		x	x	x	x	x	x	x		x		
Stephen F. Austin State Park	256S	664		x			x	x	x	x					x		
Lockhart State Park	261S	257		x			x	x	x	x		x			x		
Kerrville State Park	270S	500		x	x		x	x	x	x	x	x	x		x		
Garner State Park	277S	640	2	x	x		x	x	x	x	x	x	x		x		
Tips State Park	296S	31		x			x	x	x	x		x			x		
Lake Corpus Christi State Park	297S	483	22,050	x			x	x	x	x	x	x	x		x		
Goose Island State Park	305S	307		x	x		x	x	x	x	x	x	x		x		
Falcon State Park	325S	563	98,805	x	x		x	x	x	x	x	x	x		x		
Bentsen-Rio Grande State Park	326S	587		x			x	x	x	x		x			x		
Recreation areas:																	
Springfield Lake	146S		S	x			x	x		x	x	x	x		x		
Lower Parks Reservoir-Lake Balmorea	192S		560	x			x	x		x	x	x			x		
Sheldon Reservoir	252S		S	x			x	x		x	x	x			x		
Monuments: Historic:																	
Eisenhower Birthplace State Park	34S	3		x			x										
Fort Belknap	58S	5		x			x								x		
Action State Park	93S			x			x										
Jeff Davis State Park	100S	38		x			x	x									
Gov. J. S. Hogg Memorial Shrine State Park	105S	19		x			x	x									
Jim Hogg State Park	133S	177		x			x										
Mission San Francisco de Las Tejas State Park	135S	118		x			x	x	x						x		
Old Fort Parker State Park	145S	11		x			x	x									
Independence State Park	228S	7		x			x	x									
Washington State Park	229S	71		x			x	x	x		x						
San Sabs Mission and Presidio	201S	150		x	x	x	x	x	x	x	x						
San Jacinto Battlefield State Park	251S	352		x			x				x						
Varner-Hogg State Park	255S	53		x			x	x									
Monument Hill State Park	258S	4		x			x	x									
Gonzales	259S	100		x			x										
The Alamo	265S	2		x			x										
Court of Judge Roy Bean	288S			x			x	x							x		
Goliad State Park	299S	209		x			x	x	x		x				x		
Zaragoza Birthplace State Park	300S	2		x			x										
Fannin Battlefield State Park	301S	2		x			x	x									
Lipantitland	319S	5		x			x	x									
Port Isabel Lighthouse State Park	334S	3		x			x										

See footnotes at end of table.





	Number on map	Acreage		Type of use				Activities								
		Total land and water within area	Water surface (1)	Day and weekend Vacation	Out-of-State target	Tourist en route	Picnicking	Hiking and riding	Camping	Boating	Swimming	Fishing	Hunting	Nature study	Winter sports	Wilderness experience
STATE—Continued																
Nature preserve: Palmetto State Park	260S	198		x		x	x	x				x		x		
Beach: Brazos Island	337S	217		x	x	x	x	x			x	x		x		
Wildlife areas:																
Wichita County Wildlife Refuge	56S			x		x	x							x		
Moore Plantation Area	119S			x		x	x							x		
Bannister Lake	124S		S	x		x	x	x					x	x		
Boykin-McGee Bend Area	127S	21,000	114,500	x		x	x	x	x			x	x	x		
Alabama Creek	131S		M	x		x	x	x	x			x	x	x		
White Rock Creek Game Preserve	134S		1,210	x		x	x							x		
Gus Engeling Wildlife Area	138S			x		x	x							x		
Vingt et Un Islands	249S			x		x	x							x		
Black Gap Wildlife Migratory Area	292S				x	x	x	x	x				x	x		
Lake Corpus Christi Sanctuary	298S		22,050	x		x	x							x		
Swan Island	303S			x		x	x							x		
Rockport Wildlife Sanctuary	304S			x		x	x							x		
Second Chain of Islands	310S			x		x	x							x		
Lydia Ann Island	313S			x		x	x							x		
South Bird Island in Laguna Madre	317S			x		x	x							x		
Green Island in Laguna Madre	331S			x		x	x							x		
Forests:																
I. D. Fairchild	136S	2,275				x								x		
Mission	137S	117				x								x		
W. Goodrich Jones	232S	1,709		x		x								x		
John Henry Kirby	240S	600		x		x								x		
E. O. Siecke	244S	1,722		x		x								x		
MAJOR LOCAL																
Parks:																
Lake Crook	29L		1,226	x		x	x	x	x	x	x	x		x		
Loy	40L		350	x		x	x	x	x	x	x	x		x		
Slaton Park	69L			x		x								x		
Lake Sweetwater	79L	950	750	x		x	x	x	x	x		x	x	x		
Fabens	184L			x		x	x							x		
City of Austin Metro	221L	1,142	1,830	x		x	x	x	x	x	x	x		x		
Harris County	253L	15		x		x	x							x		
Recreation areas:																
Bridgeport Lake	54L		9,000	x		x	x	x				x	x	x		
Lake Kickapoo	57L		6,200	x		x	x		x	x		x	x	x		
Lake Kemp	59L	38,460	17,835	x	x	x	x	x	x	x		x	x	x		
Lake on Payne Creek	62L		150	x		x	x			x		x	x	x		
Lake on Coon Creek	67L		526	x		x	x			x		x	x	x		
Lake in Yellow House Canyon	70L		S	x		x	x			x		x	x	x		
Moss Creek Lake	75L		125	x		x	x		x	x	x	x	x	x		
Lake J. B. Thomas	77L		7,820	x	x	x	x		x	x	x	x	x	x		

See footnotes at end of table.





	Number on map	Acreage		Type of use				Activities								
		Total land and water within area	Water surface (7)	Day and weekend Vacation	Out-of-State target	Tourist en route	Picnicking	Hiking and riding	Camping	Boating	Swimming	Fishing	Hunting	Nature study	Winter sports	Wilderness experience
<b>MAJOR LOCAL—Continued</b>																
<b>Recreation areas—Continued</b>																
Lake Trammell .....	78L	100	100	x	x		x	x		x	x	x	x	x	x	
Lake Fort Phantom Hill .....	82L		4,246	x			x	x		x		x	x	x	x	
Lake Cisco .....	85L		477	x			x	x		x		x	x	x	x	
Lake Leon .....	86L		1,590	x			x	x		x		x	x	x	x	
Eagle Mountain Lake .....	96L		8,502	x			x	x		x	x	x	x	x	x	
Iron Bridge Dam and Reservoir .....	104L		36,700	x			x	x		x		x	x	x	x	
Lake Murvaul (Panola) .....	114L		3,820	x			x	x		x		x	x	x	x	
Lake on East Cottonwood Creek .....	147L		614	x			x	x		x		x	x	x	x	
Battle Lake .....	148L		860	x			x	x		x	x	x	x	x	x	
Coleman Lake .....	160L		1,260	x			x	x		x	x	x	x	x	x	
Oak Creek Lake .....	161L		3,800	x			x	x		x	x	x	x	x	x	
Lake on North Concho River .....	165L		150	x			x	x		x		x	x	x	x	
Lake Nasworthy .....	166L		1,326	x	x		x	x		x	x	x	x	x	x	
Red Bluff Lake .....	176L		11,700	x	x		x	x	x	x	x	x	x	x	x	
Buchanan Lake .....	211L		23,040	x	x		x	x	x	x	x	x	x	x	x	
Lake Lyndon B. Johnson .....	212L		6,400	x	x		x	x	x	x	x	x	x	x	x	
Marble Falls Lake .....	218L		580	x	x		x	x	x	x	x	x	x	x	x	
Lake Travis .....	220L		18,955	x			x	x	x	x	x	x	x	x	x	
Green Lake .....	307L		304	x			x	x		x		x	x	x	x	
Lake Casa Blanca .....	320L		1,950	x			x	x		x		x	x	x	x	
<b>Beaches:</b>																
Nueces County Parks .....	316L	200		x			x	x	x		x	x	x	x	x	
Port Mansfield .....	330L			x			x	x	x		x	x	x	x	x	
Cameron County Parks 1, 2, and 3 .....	335L	189		x			x	x	x		x	x	x	x	x	
<b>MAJOR QUASI-PUBLIC AND PRIVATE</b>																
Monument: Historic: San Jose Mission .....	266P	14		x			x	x	x							
Boyhood home of the 36th U.S. President, Lyndon Baines Johnson .....	96L	2					x									
<b>Recreation areas:</b>																
Lake Pauline .....	20P		1,000	x			x				x		x	x		
Lake on Turkey Creek .....	94P		1,030	x			x				x		x	x		
Gunstream Lake .....	109P		M	x			x				x		x	x		
Camp Creek Lake .....	141P		750	x			x				x		x	x		
Lake on Oyster Creek .....	254P		1,600	x			x				x		x	x		
Lake Medina Area .....	269P		5,575	x	x		x				x	x	x	x	x	
Devil's Lake (Lake Hamilton) .....	284P		M	x			x	x	x		x	x	x	x	x	
Lake Walk .....	285P		380	x			x	x	x		x	x	x	x	x	
Magnolia Beach Lake .....	309P		200	x			x				x		x			

(7) Where acreage not shown:  
 "S" indicates water surface under 500 acres.  
 "M" indicates water surface of 500 to 10,000 acres.  
 "L" indicates water surface over 10,000 acres.

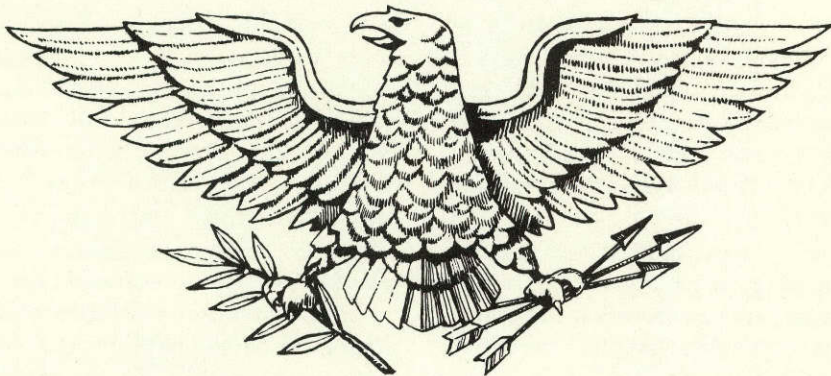




The wide beaches of Padre Island stretch for miles along the gulf coast, a haven for bathers and beachcombers.



# Programs of Federal Natural Resource Agencies



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The natural resource functions of the Federal agencies represented in this booklet are extensive and detailed and are only briefly described. Additional information can be obtained by contacting the offices noted in the following programs section.

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## Geological Survey

The Department of the Interior's Geological Survey conducts various geologic and geophysical studies, topographic mapping projects, and water-resource investigations in Texas. Also, on federally owned land it supervises about 200 oil and gas leases which together have an annual output worth over \$1.8 million.

Geological and geophysical studies make important contributions to our knowledge of the earth's composition, structure, mineral resources, and history. Regional investigations—supplemented by chemical, physical, and paleontological research both in the laboratory and the field—enable scientists to determine what kinds of rock make up the earth and how they were formed. Based on their field studies, geologists draw up geologic maps which show the type, structure, age, and location of various rocks. Regional geologic studies currently underway involve the Del Rio-Indian Wells area, the Sierra Diablo and Sierra Blanca areas, the Permian rocks of northern Texas, and fusuline fossils of north-central Texas.

In addition to conducting these kinds of geological and geophysical studies, scientists of the Geological Survey investigate areas which are likely to have valuable mineral and mineral fuel deposits. Geologic mapping plays an important role here, helping to determine such things as the location, depth, and dimensions of mineral deposits or sub-surface oil-bearing beds. Present studies of the uranium deposits in the south Texas Coastal Plain and the oil-bearing Jurassic rocks of northeast Texas and adjoining States exemplify Geological Survey work in economic geology. Scientists are constantly working to develop new tools and methods of geologic exploration and as these materialize, economic geology will become even more important than it is now.

The Geological Survey provides information for engineering as well as mineral projects. An

area's suitability for urban development or highway construction, for example, is affected by the likelihood of its being a potential site of earthquakes, subsidence, or landslides. An engineering geologic study of the San Antonio region was begun just recently.

Perhaps better known than its work in geologic mapping is Geological Survey's work in topographic mapping. Some of the earliest Texas maps were made by ranchers as they sought the shortest and most accessible routes for their cattle drives. In the latter part of the 19th century, crude maps showing trails, waterholes, river crossings, and grazing areas became increasingly important, and in the early 1880's the Geological Survey made the first topographic maps of central Texas.

For many years now the State of Texas and the Geological Survey have engaged in cooperative mapping programs. At the present time, approximately 141,000 square miles, or about 54 percent of the State is covered by detailed maps scaled to 1 inch equals 2,000 feet or 1 inch equals 4,000 feet. Maps at a scale of one inch equalling about 4 miles are available for 97 percent of the State. New mapping and map revisions, using the most modern techniques of our aerospace age, are constantly underway.

No less important than geologic and topographic investigations are the studies being made of Texas water resources. Ground and surface water is studied under both natural and manmade conditions to obtain the facts needed to solve various water problems, such as those of distribution, supply, quality, variability, and floods.

Geological Survey collects basic facts on Texas streamflow at approximately 350 different locations. About 67 water-sampling stations are maintained to monitor the chemical and physical quality of water along streams, and the stage and content of 45 reservoirs are measured



regularly. The Geological Survey also measures ground-water levels at 1,100 wells throughout the State, with the Texas Water Commission measuring water in an additional 3,500 wells.

Appraisals of ground water are presently being carried out in 30 counties. Also under study are the water resources along the important Balcones fault zone, flood plain and urban runoff, low flow in streams and interchange of surface and ground water, hydrologic effects of small reservoirs, and factors relating to the discharge of brine in the Upper Brazos River Basin. Much of this water resource investi-

gation is carried out by the Geological Survey in cooperation with the Texas Water Commission and other Federal and local agencies.

Information on Geological Survey's water resource activities is available from the Chairman, Water Resources Division Council, U.S. Geological Survey, 807 Brazos Street, Austin, Tex., 78701. Information on other Geological Survey activities can be obtained from the Public Inquiries Office, U.S. Geological Survey, 602 Thomas Building, 1314 Wood Street, Dallas, Tex., 75202.

When completed in 1967, this 322-mile pipeline will carry Canadian River water to 11 of Texas' high plains cities and towns. This section of the pipeline is being installed near Amarillo.



## Bureau of Reclamation

Irrigation works along the Rio Grande were among the earliest Reclamation projects. The Rio Grande Project, which stretches from Texas over into New Mexico, was authorized in 1905. Operated and maintained by the Bureau, it today supplies water to nearly 180,000 acres of land. Reclamation is also helping to rehabilitate some old, privately constructed irrigation and drainage systems in the Lower Rio Grande Valley. It is constructing a new and modern system for the Mercedes and La Feria Districts, and it has loaned \$8.6 million to the Harlingen

and Donna Districts so they can do their own rehabilitation.

Begun in 1937, Marshall Ford Dam—known locally as Mansfield Dam—was another early Reclamation project. Located on the Colorado River about 12 miles from Austin, it was one of the first large dams built in the State. The project, which is operated by the Lower Colorado River Authority, provides hydroelectric power, flood control, and irrigation water.

After World War II—when ground water could no longer meet Texas' expanding needs—the Bureau of Reclamation, like other Federal



and State agencies, intensified its activities in Texas. Reclamation's general plan, called the Texas Basins Project, involves development and control of the waters of the Rio Grande and of the Sabine, Neches, Trinity, San Jacinto, Brazos, Colorado, San Antonio, Guadalupe, and Nueces Rivers basins. Coordinated with plans of the U.S. Study Commission and other Federal and State agencies, the Texas Basins Project is actually about one-third of a statewide water plan. Generally, the Reclamation plan proposes using the flows of Texas Gulf streams for municipal and industrial water supply, irrigation, flood control, fish and wildlife, and recreation.

Principal feature of the Texas Basins Project is a proposed coastal canal which would convey excess water from eastern streams to water-deficient areas in the west. Because of the urgent need for water in Texas, several projects—actually just units of the larger project—are being studied in an effort to obtain Congressional authorization for early construction.

Construction of Sanford Dam, a part of the Canadian River Project, was begun by Reclamation in the fall of 1962. This project will develop the last major surface water supply of the Panhandle to provide water for Amarillo and ten other cities. When completed, the project will ease the demands on the depleting Ogallala ground-water reservoir which now supports over 4.5 million acres of irrigated farmland. Flood control, fish and wildlife use, and recreational opportunities are other benefits expected.

The Bureau has also helped the International Boundary and Water Commission design Falcon Dam and Powerplant, which was constructed jointly by the United States and Mexico. The Bureau of Reclamation was delegated authority to market the United States' share of electric power generated at the dam.

Further information on the Bureau of Reclamation's activities in Texas is available from the Regional Director, Bureau of Reclamation, Region 5, Box 1609, Amarillo, Tex., 79105.



## Office of Saline Water

Responsible for sponsoring and coordinating many of the Nation's programs which search for more economical means of desalting sea water is the Department of the Interior's Office of Saline Water. Texas has become the scene of considerable activity as this search continues to expand.

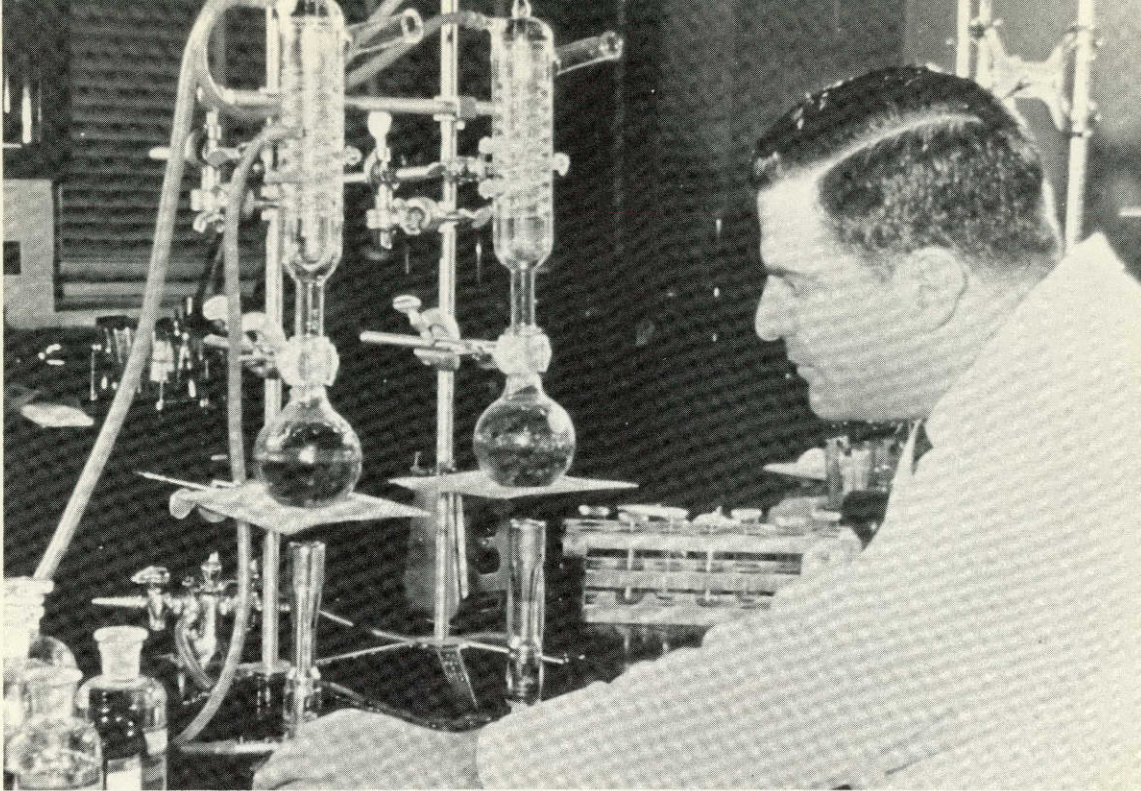
In 1961, the Office of Saline Water Demonstration Plant at Freeport began producing fresh water from the Gulf of Mexico. Capable of producing one million gallons of fresh water daily, the plant marks a technological milestone in the progress of the country's desalinization program. Part of the fresh water the plant produces is used in Freeport's municipal water system; the remainder goes to a nearby chemical firm for industrial use.

Grants from the Office of Saline Water enable Texas educational institutions to do research in saline-water conversion. The Texas A. & M. Research Foundation at College Station is working on the development of a new kind of extraction process. And at Austin, spectroscopic studies of hydrogen bonding are being made by the University of Texas.

Research grants are also given to private firms. In San Antonio, for example, a private company has been contracted to study the costs of conventional water supplies.

Further information on the Saline Water Conversion program can be obtained from the Director, Office of Saline Water, U.S. Department of the Interior, Washington, D.C., 20240.





A new field laboratory in Oklahoma will aid Texas and other Southwestern States in the control of water pollution.



## Public Health Service

Federal responsibility for the control of water pollution rests in the Department of Health, Education, and Welfare. The Public Health Service administers a broad program involving research, enforcement, comprehensive river-basin planning, and technical and financial assistance to the States. In Texas, the Public Health Service works closely with the Texas Water Pollution Control Board and cooperates with the Texas Water Commission, the Parks and Wildlife Commission, and the Railroad Commission.

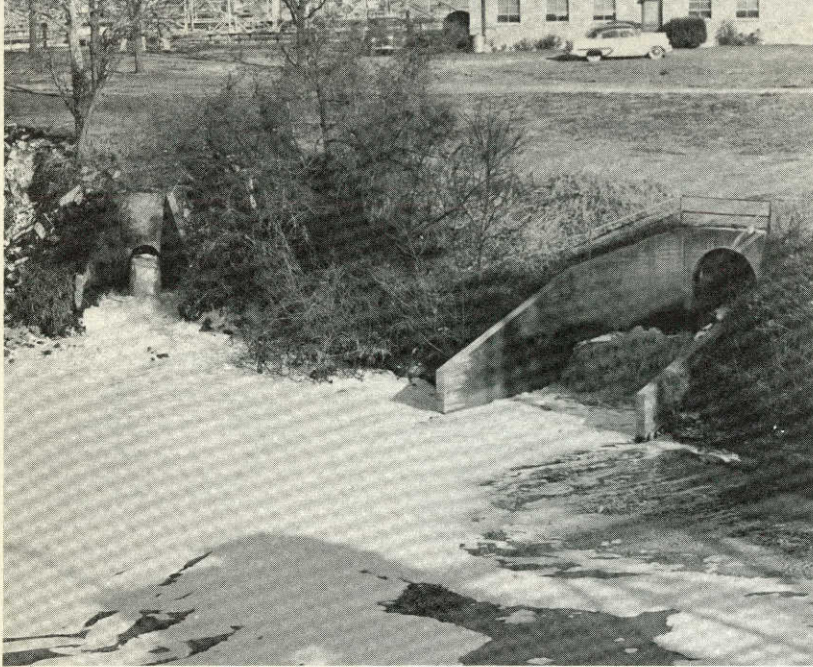
Even if all wastes were given the best possible treatment before discharge to streams, water pollution would still be a problem in many waterways. To assure clean water for downstream users, water can be stored in reservoirs and released later on to dilute wastes during periods of low flow. The Public Health Service prepares reports used by the U.S. Army Corps of Engineers and the Bureau of Reclamation in planning for such water storage in Federal

reservoir projects. Such streamflow regulation for water quality control will henceforth be an integral part of all comprehensive river-basin plans.

Under the Water Pollution Control Act, the Public Health Service in conjunction with other Federal and State agencies seeks to protect waters for public supply, propagation of fish and wildlife, recreation, agriculture, and industry. The Service bases its recommendations for long-term maintenance of suitable water quality upon comprehensive river-basin studies of water usage, waste disposal, and future water needs. These studies are made in cooperation with other Federal and State agencies. Partially as a result of such a study of the Arkansas-Red Basin in northern Texas, a plan for better disposal of brine from natural sources and the area's oil and gas operations was completed.

In cooperation with other Federal and State agencies, the Public Health Service maintains





Government and industry have coordinated their research programs seeking new ways to rid streams of troublesome chemicals, such as those found in detergent suds.

a Water Pollution Surveillance System which gathers data on the quality of the Nation's interstate waters. Five of the System's sampling stations are in Texas. Also, the Public Health Service periodically publishes reports on fish being killed by pollution and descriptions of public water supply and waste treatment facilities and needs.

Research plays an important role in the Public Health Service program. Studies of such matters as the effects of agricultural pesticides in streams, the use of reclaimed sewage waters for recreation purposes, and the control of pollution from boats has greatly benefited Texas. Texan engineers, chemists, and biologists often take specialized training courses at out-of-State Service research centers.

The Public Health Service also carries out programs of financial assistance. It distributes Federal grants which have helped Texas communities build or enlarge more than 260 sewage treatment works. Through a system of grants to colleges, universities, and other institutions, it also supports research and training in water supply and pollution control. Finally, it administers Federal grants to the State which enables it to maintain an adequate water-quality management program.

Further information on the Public Health Service's activities in Texas is available from the U.S. Public Health Service, Region VII, Water Supply and Pollution Control, 1114 Commerce Street, Dallas, Tex., 75202.



## U.S. Army Corps of Engineers

At the request of local citizens and with the authorization of Congress, the U.S. Army Corps of Engineers is responsible for the construction and operation of various water projects in Texas. These projects generally have to do with navigational improvement, flood control, water conservation, recreation, and re-

lated water functions. The Corps often serves as a disaster-relief agency also.

By improving and interconnecting the many natural coastal waterways along the gulf, the Corps of Engineers constructed an inland channel over 1,100 miles long which stretches from Texas' Lower Rio Grande Valley all the way



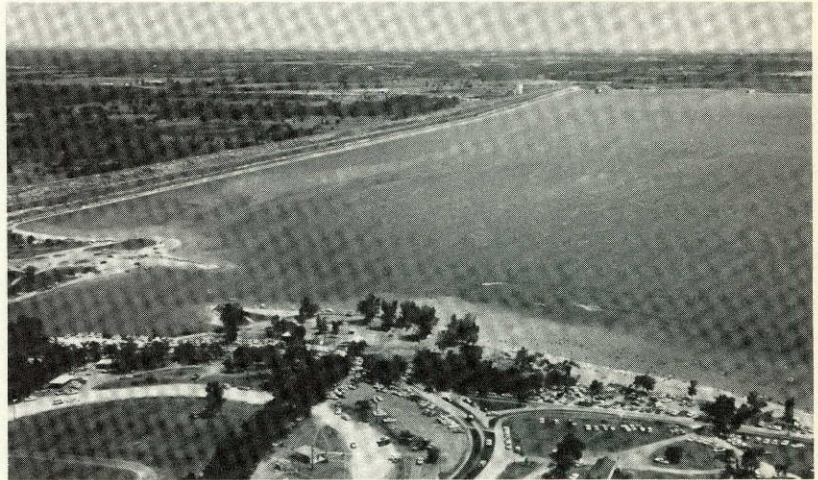
to Florida. This Gulf Intracoastal Waterway is only one of the many important navigation projects completed by the Corps. Numerous other light-draft channels with a total length of over 700 miles, as well as eight deep-draft channels, have also been built. Various deep and light draft channels are currently under construction. In addition, the Corps is engaged in a continuous program to improve and maintain ports and previously constructed channels.

Building flood-control works is another important activity of the Corps of Engineers. A comprehensive program for the development of the water resources of the Brazos River Basin has already resulted in the completion of the Whitney and Belton Dams; and eight more dams are underway. The Buffalo Bayou and

and from six to seven million people visit the area each year. Eleven other reservoirs, supervised by the Corps, are also popular with vacationers.

Altogether, the Corps of Engineers has completed 16 reservoir projects and a number of flood-control systems which have prevented about \$250 million in flood damage to date. In addition, more than 25 Texas communities are being supplied with municipal and industrial water from Corps reservoirs. This number should increase as newly authorized reservoirs and those currently under construction become operational. The Corps also has six important river-basin planning studies in process. A large-scale project for developing the waters of the Trinity River for navigation, flood control,

Lake Texoma, on the Texas-Oklahoma border, is among the 10 largest manmade reservoirs in the United States. It is also the most popular recreational area supervised by the Corps, with over 6 million visitors a year.



Tributaries Flood Control Project, partially completed, should save the city of Houston an average estimated \$4.5 million a year flood damage. Other flood-control projects have been constructed on the Colorado River Basin, the Neches-Angelina Rivers Basin, and the Trinity River Basin.

Another Corps of Engineers project, Denison Dam, was built on the Red River basin to provide flood protection, runoff control, power, and recreation. Lake Texoma, the accompanying reservoir, is the largest manmade lake in Texas, and the tenth largest reservoir in the United States. The Army engineers have developed the recreational potential of the lake,

water supply, and other purposes is under consideration also.

The U.S. Corps of Army Engineers tries to assure that the basinwide projects it constructs take into account a variety of needs. Flood control, irrigation, water conservation, water-quality control, fish and wildlife, and recreation must all be considered. In formulating plans, the Corps cooperates with various other Federal and State agencies.

Further information on Corps of Engineers projects in Texas may be obtained from the U.S. Army Engineer Division (Southwestern), 1114 Commerce Street, Dallas, Tex. 75202.



This helium plant, in Moore County near Dumas, can process 130 million cubic feet of gas a day, making it the largest of the Bureau's five helium plants.



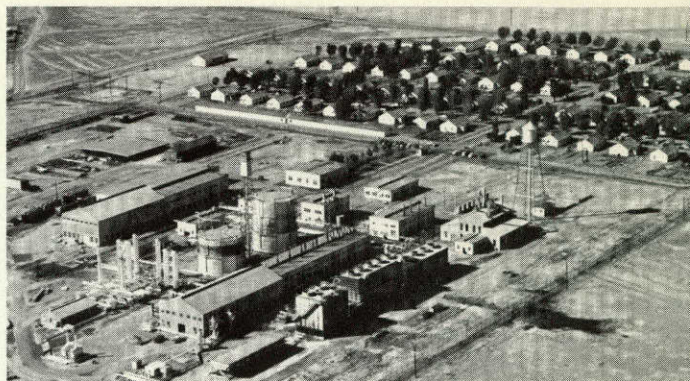
## Bureau of Mines

The Department of the Interior's Bureau of Mines conducts a variety of programs in Texas to foster conservation of the State's diverse mineral resources—particularly its valuable reserves of mineral fuels and helium—and to promote safe, healthful working conditions and practices in the mineral industries. In carrying out its programs, the Bureau works closely with the mineral and allied industries and with State and local agencies.

By far the largest Bureau of Mines activity in Texas involves helium. As early as World War I, Bureau scientists began developing methods for extracting helium from its only commercial source—natural gas. Their accomplishments over the years have provided the Nation with badly needed supplies of a substance vital for defense and essential to scientific and technological progress.

Today, Bureau of Mines helium operations are centered at Amarillo, helium capital of the world. Amarillo is headquarters for Bureau helium research and for operations at five Federal helium plants—two in Texas and one each in Kansas, New Mexico, and Oklahoma—which have contributed millions to the economy of Texas and other Southwestern States. Moreover, it is the focal point for a national helium conservation program in which Government and industry have joined forces to minimize waste and protect future supplies of this limited natural resource.

Under this helium conservation program, private companies have built plants in Texas and Kansas to extract from natural gases the relatively small percentages of helium that



formerly went directly to fuel markets. Instead of being wasted to the atmosphere as it used to be when the gases containing it were burned for fuel, the helium is now being extracted and sold to the Government on a long-term contract. A 425-mile pipeline system constructed and operated by the Bureau of Mines delivers the helium to the Government-owned Cliffside gasfield near Amarillo. Here it is stored underground, in a partly depleted natural-gas reservoir, to be used whenever needed. Should a large surge in demand suddenly occur, the crude helium in the reservoir could be diverted to one of the Bureau's plants for purification and immediate shipment.

As stipulated by Congress in 1960, some of the funds obtained from the sale of helium are used to finance a comprehensive research program. Where earlier Bureau studies sought mainly to improve the methods of extracting and purifying helium, this new program emphasizes the need for a fundamental understanding of the properties, behavior, and potential uses of the element.

Oil and gas, which represent over 90 percent of the total value of Texas' mineral output, are also objects of intensive Bureau research. Engineering studies, conducted out of field offices at Dallas and Wichita Falls, seek to improve recovery of these fuels. The studies are complemented by laboratory investigations performed at Bureau petroleum research centers outside the State. This approach, which aims at improving applied technology while at the same time works to increase basic knowledge, has greatly benefited the Texas oil and gas indus-



try. It has led to increased efficiency in methods of recovering and producing oil and storing gas. In addition, Bureau research on the fundamental characteristics of so-called "gas-condensate" fields in the gulf coast area is contributing to an advanced production technology which should substantially increase the State's recoverable reserves.

Other Bureau investigations designed to promote wise and efficient development of the State's minerals have led to an increased utilization of important Texas resources. For example, Texas lignite—now regularly upgraded by a Bureau drying process—is used to generate electric power at a Rockdale aluminum plant. Bureau studies of brown iron ores in Cass, Cherokee, and Morris Counties helped pave the way for their use in Texas steel and cement plants, and Bureau evaluations of the possible applications for Texas clays promise to expand their markets also.

Bureau of Mines health and safety engineers, headquartered at Dallas, investigate explosions and fatal accidents at mines, quarries, mineral-processing plants, and similar operations. They also conduct classes in first aid, mine rescue, and accident prevention for mineral-industry workers and supervisors. Their lectures and demonstrations on the safe handling of toxic and flammable gases, vapors, and dusts every year help thousands of Texans cope with these industrial hazards.

The Bureau also collects and disseminates statistical information on each of Texas' varied mineral commodities, providing both Government and industry with the data needed for planning resource conservation and development. In addition, Bureau experts perform detailed economic studies—evaluating the potential of such resources as clay and sulfur—not only in Texas but throughout the south-central United States. Samples of Texas crude oil and natural gas are analyzed to help industry develop new and better ways of processing and utilizing them, and evaluations of mineral deposits at proposed reservoir sites permit the formulation of balanced programs for maximum resource development.

General information on Bureau of Mines programs in Texas can be obtained from the Area Director, Area IV Mineral Resource Office, Bureau of Mines, 206 Federal Office Building, Bartlesville, Okla., 74004.

Inquiries concerning the Bureau's helium program should be addressed to the Office of the General Manager, Helium Operations, Bureau of Mines Helium Activity, 1747 Avondale, Box 10085, Amarillo, Tex., 79106.

Information about Bureau safety education and inspection activities in Texas is available from the District Supervisor, Health and Safety District G, Bureau of Mines, 1114 Commerce Street, Dallas, Tex., 75202.



## Office of Minerals Exploration

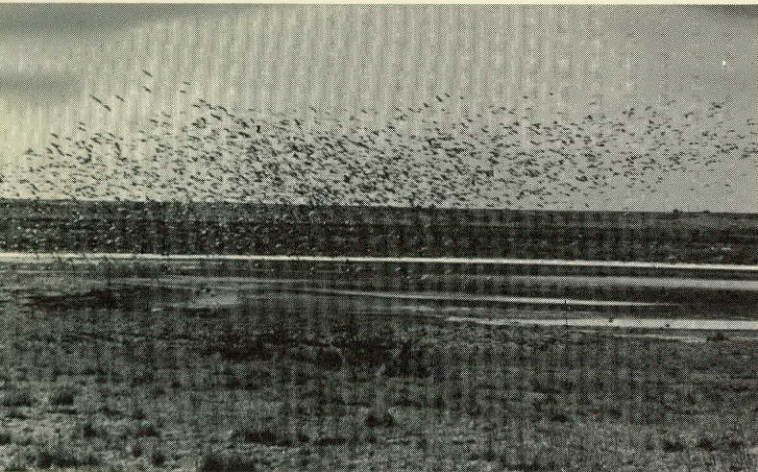
The minerals exploration assistance program, introduced in 1951 under the Defense Minerals Administration, has been administered by the Department of the Interior's Office of Minerals Exploration since 1958. Under this program, the Federal Government assists private industry in domestic minerals exploration by paying 75 percent of the cost of exploration for silver and 50 percent of the cost of exploration for various other minerals.

During the first seven years of this program,

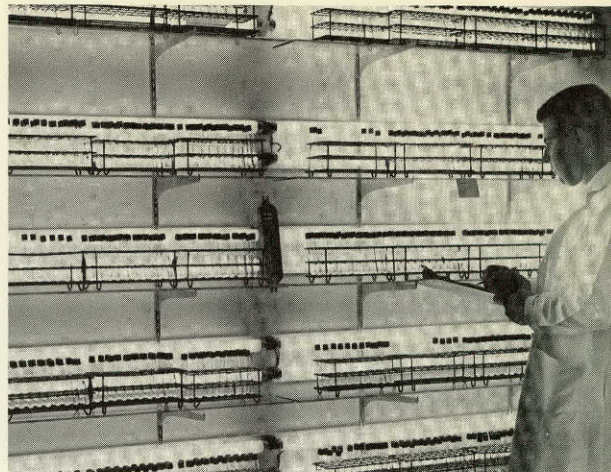
exploration work was authorized on 10 Texas projects. A discovery was certified on one of these. Since 1958, however, there have been no contracts in Texas.

Information about this program can be obtained by writing to the Field Officer, OME, Region III, Denver Federal Center, Denver, Colo., 80225, or to the Director, Office of Minerals Exploration, Department of the Interior, Washington, D.C., 20240.





One of the largest concentrations of sandhill cranes may be found on Muleshoe Refuge during the winter months.



Research, an important function of the Fish and Wildlife Service, includes the study of marine organisms.



## Fish and Wildlife Service



When the early pioneers first came to Texas they were astounded by the abundance of native wildlife. Astonishment gave way to recklessness, and hordes of birds and animals were heedlessly slaughtered for food and sport. The extermination of millions of passenger pigeons and bison during the latter half of the 19th century was merely the denouement to this centuries-old national tragedy. It was only during the last 50 years that America became conservation conscious and began taking steps to save its wildlife. The Department of the Interior's Fish and Wildlife Service—composed of the Bureau of Sport Fisheries and Wildlife and the Bureau of Commercial Fisheries—represents a major governmental effort along these lines.

### *Bureau of Sport Fisheries and Wildlife*

The Bureau of Sport Fisheries and Wildlife administers seven national wildlife refuges in Texas. Newest of these is the Anahuac Refuge on the gulf coast, established in 1963 to preserve the coastal wetlands used by wintering Canada and snow geese. The Muleshoe Refuge in the high western plains—oldest of the State's national wildlife refuges—is noted for its winter population of lesser sandhill cranes. It has one

of the largest concentrations of these birds in the United States, sometimes as many as 50,000.

The Aransas Refuge is famous as the winter home of the world's last remaining flock of whooping cranes. Loss of their prairie grasslands to agriculture, drainage of prairie pot-holes, and overshooting along the extensive 2,500-mile flightline between wintering and nesting areas have threatened the whooping crane with extinction. Today there are hardly more than 30 of these birds in the wild, and the Aransas Refuge is probably responsible for even this number surviving.

Prime waterfowl habitat is found in the Laguna Atascosa National Wildlife Refuge along the lower southern Texas coast. Thousands of wintering redheads and pintails and myriad other waterfowl and shorebirds come here, moving between the refuge and the abundant food supplies of the Laguna Madre. Large numbers of wintering geese are attracted to the green fields of wheat and other grains planted especially for their benefit. Because of the refuge's strategic location, many birds migrating between North, Central, and South America pass through the area. More different kinds of birds have been seen on this refuge than on any other within the whole national refuge system. The



Buffalo Lake Refuge near Amarillo and the Hagerman Refuge in northwestern Texas also provide needed habitat and protection for waterfowl.

Santa Ana Refuge, sometimes called the "gem of the Federal refuge system" because of its unique plant and animal life, is a veritable ecological island. Here in the junglelike growth of elm, ebony, hackberry, ash, anaqua, tepeguaje, huisache, and mesquite are found such unusual nesters as the beautiful black-bellied treeduck, the strident-voiced chachalaca, the red-billed pigeon, and green jay. Despite its small size—Santa Ana Refuge covers less than 2,000 acres—some 255 different kinds of birds have been sighted there.

The Bureau of Sport Fisheries and Wildlife also operates five large warm-water fish hatcheries in Texas, which annually produce about 3½ million fish. Although most of these fish are used to stock farm ponds and reservoirs in Texas, a half million channel catfish and a million black bass were recently transported to out-of-State fisheries. As one official put it, "made in Texas" labels could well be placed on some of the sport fish now being caught in the upper and lower Colorado River.

Some of the other activities of the Bureau of Sport Fisheries and Wildlife include investigating problems of fish culture and fish handling, conducting studies associated with the proposed Texas Basins Project, enforcing game laws, making periodic population surveys of migratory game birds, and bird banding. The Bureau also works to control predatory animals, destructive rodents, and migratory birds that destroy agricultural crops, and cooperates with other Federal and State agencies in determining the effect of water development plans on the State's fish and wildlife.

### *Bureau of Commercial Fisheries*

The Bureau of Commercial Fisheries, like the Bureau of Sport Fisheries and Wildlife, is a branch of the Department of the Interior's Fish and Wildlife Service. One of its important activities is research. Studies of the distribution, abundance, and life histories of shrimp and commercial fishes provide data that is used

to predict the location and size of the fish and shrimp stocks—information valuable to the fishing industry. The Bureau also conducts estuarine research, examining the bays and estuaries along the Texas coast where important fish, shrimp, and other shellfish nursery grounds are found. This research aims at learning how man's activities affect the estuaries and their production of fish and shellfish and seeks to develop ways of reducing man's harmful effects on them.

Information on the daily landings of the valuable shrimp fishery—species, size, area where taken, and value—is collected by the Bureau, and the catch data is summarized in Market News reports for immediate release to the shrimp industry. A monthly report which contains detailed information on Texas landings of fish and shellfish is published jointly by the Texas Parks and Wildlife Commission and the Bureau of Commercial Fisheries. The Bureau also gathers information on cold storage freezings, holdings of fishery products, and other general facts relating to the fishing industry.

Other activities of the Bureau in Texas include lending money to commercial fishermen for repairing their vessels or financing fishing operations, assisting fishermen in constructing new vessels under an insurance program, conducting a statewide consumer-education program aimed at developing new or expanded markets, and providing in-plant inspection and certification services for those seafood processing firms desiring them.

Further information on the Texas activities of the Bureau of Sport Fisheries and Wildlife is available from the Regional Director, Bureau of Sport Fisheries and Wildlife, Federal Building, 517 Gold Avenue SW., Albuquerque, N. Mex., 87103. Information on the Bureau of Commercial Fisheries may be obtained from the Director, Bureau of Commercial Fisheries Biological Laboratory, Building 302, Fort Crockett, Galveston, Tex., 77552. Statistical data is available from Biological Laboratory A at the same address. A Fishery Statistical Office is also located in Room 14-C, Post Office and Custom Building, Port Arthur, Tex., 77640.





## Forest Service

The U.S. Department of Agriculture's Forest Service administers the National Forests and National Grasslands in Texas, cooperates with State and private agencies in forest protection and management, and conducts research on programs related to forestry, range, and wildlife management.

When some 658,000 acres of seriously depleted East Texas forest lands were established as National Forests in 1933, the Forest Service—aided by the Civilian Conservation Corps—supervised their rehabilitation. Today these National Forests are covered with the commercially valuable loblolly, shortleaf, and slash pine as well as several species of oak, ash, magnolia, sweet and black gum, and hackberry. Future Forest Service plans include continued reforestation, building roads and new recreation facilities, and reducing brushy undergrowth and thickets to prevent forest fires.

In the Texas Panhandle and parts of Oklahoma and New Mexico there are over 117,000 acres of former dustbowl land which have been irrigated, contoured, and reseeded. Today they form a cluster of five National Grasslands which provide habitat for wildlife and range for cattle and horses. Like the National Forests, these grasslands—scientifically managed by the Forest

Service—help prevent floods and erosion and contribute to maximum water seepage into underground storage.

The Forest Service cooperates with the State in encouraging fire control, wildlife management, tree planting, and insect control on private and commercial forest lands. The State Forest Director administers these programs and the Federal Government provides financial, technical, and advisory assistance.

Also involved in research, the Forest Service maintains two experimental forests for the study of pine hardwood stands. Studies of pine-hardwood silviculture and wildlife habitat in southern forests are in process. Other studies, such as those showing that tree farming could be profitable in East Texas, help landowners find new uses for their land. Wildlife research—aimed at developing scientific guidelines for combined timber and game management—is conducted in cooperation with the U.S. Bureau of Sport Fisheries and Wildlife, the Texas Parks and Wildlife Commission, and the Texas A. & M. University system.

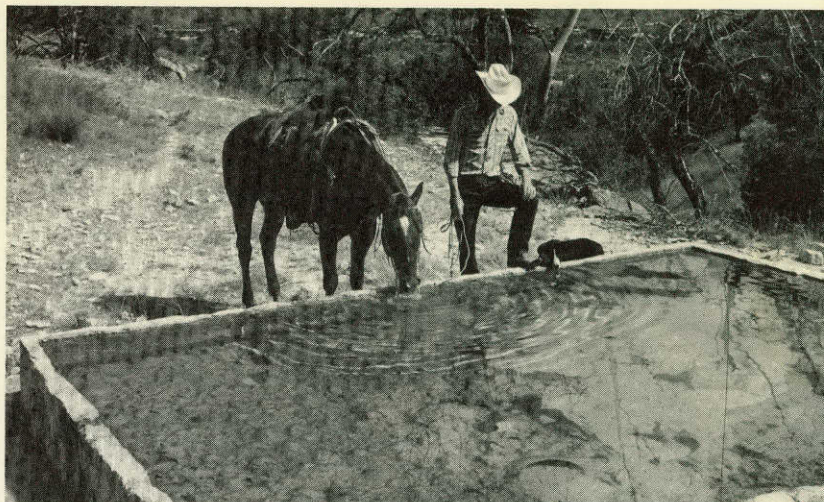
**Further information on Forest Service activities in Texas may be obtained from the Supervisor, Texas National Forests, U.S. Forest Service, Lufkin, Tex., 75901.**



(Far left) Virgin longleaf timber, found today near Sabine National Forest, once covered large sections of the eastern portion of Texas.

(Left) A Soil Conservation Service agronomist measures the growth of buffelgrass which will tell whether the crop has been managed well.

(Right) Farmers and ranchers are helped through local districts to develop stock watering systems.



## Soil Conservation Service

The Soil Conservation Service, an agency of the U.S. Department of Agriculture, provides land owners and operators with technical assistance in matters of soil and water conservation. In Texas as elsewhere, most of this aid is channeled through the soil conservation districts established by State law. These districts, which are legal subdivisions of the State, are governed by locally elected representatives.

To help plan and install conservation systems, the Soil Conservation Service assigns its conservationists to the districts. These conservationists make an acre-by-acre survey of the individual farm or ranch to determine the best uses for the land and try to develop an overall plan that will conserve cropland, pasture, range, and woodland. Such plans often call for construction of drainage and irrigation systems, farm ponds, terrace systems, diversions, waterways, and recreation facilities.

Under the Watershed Protection and Flood Prevention Act, the Soil Conservation Service gives technical and financial assistance for developing small watershed projects. Local citizens initiate, build, help pay for, operate, and maintain these projects and in turn own all the structures. The projects, constructed in upstream watersheds of not over 250,000 acres, are designed to halt destructive floods, soil erosion, and siltation. They also serve recreation, municipal, industrial, and irrigation needs. This program has found wide acceptance in

Texas, and more of these projects have been built here than in any other State.

As a result of the Flood Control Act of 1944, the Soil Conservation Service also does flood-prevention and water resource-development work on major watersheds. In Texas it is assisting in the development of the Trinity River, the Middle Colorado River, and that portion of the Washita River which flows through the State.

Texans living in any of 95 counties stretching from the Panhandle to the Rio Grande are eligible for further assistance from the Soil Conservation Service. The Great Plains Conservation Program provides that farmers and ranchers living in areas of severe climatic hazards may receive technical and cost-sharing aid in establishing a more stable agriculture.

In cooperation with Texas A. & M. University, the Soil Conservation Service also conducts soil survey work in Texas. From the published soil surveys, estimates can be made of the yields of cultivated crops, grasses, and trees produced under certain systems of management. Soil surveys also help in making important soil and land use studies.

Additional information on resource development on private land can be obtained from local soil conservation districts or from the State Office of the Soil Conservation Service, First National Bank Building, Temple, Tex., 76501.





Padre Island has one of the country's few remaining shorelines that has not been altered by commercial development.



## National Park Service

The Department of the Interior's National Park Service administers Big Bend National Park, Padre Island National Seashore, and Fort Davis National Historic Site in Texas. It also cooperates with the Roman Catholic Church and the State of Texas in administering the San Jose Mission National Historic Site.

Long range plans for developing Big Bend National Park as both a summer-use and winter-use recreation area include the construction of new roads, visitor centers, outdoor theaters and exhibits, and improved recreation facilities. In addition, efforts to preserve the park's natural beauty are now being accelerated.

For Padre Island National Seashore there will be a headquarters area, including a visitor center and adjacent camping and restroom sites and a seashore road leading to the area. Negotiations for the purchase of strategic properties within the area's boundaries are in the planning stage.

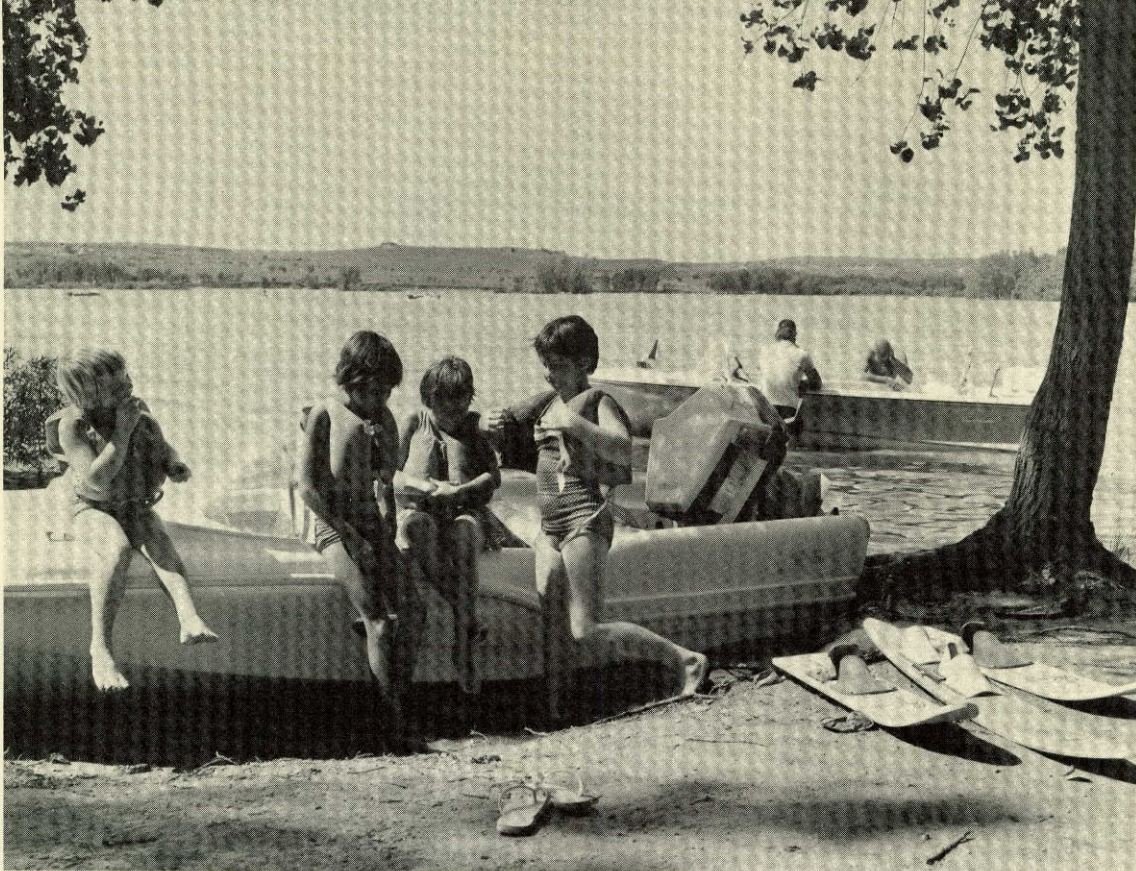
At Fort Davis National Historic Site, structures are being rehabilitated and stabilized and construction will eventually begin on a visitor

center and employee quarters. A tape recording of bugle calls which governed daily activity at old western army forts is also planned.

A bill providing for the establishment in Texas of Guadalupe Mountains National Park including North and South McKittrick Canyon was introduced in the 88th Congress. The proposed Chamizal National Memorial at El Paso, which would symbolize the peaceful and amicable relations between Mexico and the United States is another future possibility. If established, both areas would be administered by the National Park Service.

Additional information about areas in Texas administered by the National Park Service is available from the area superintendents at the following addresses: Big Bend National Park, Big Bend National Park, Tex., 79834; Fort Davis National Historic Site, Box 785, Fort Davis, Tex., 79734; and Padre Island National Seashore, Box 4012, Corpus Christi, Tex., 78408.





These four young ladies prepare for a day of fun on Lake McClellan in the McClellan National Grasslands.



## Bureau of Outdoor Recreation

The Bureau of Outdoor Recreation in the Department of the Interior administers a program of grants-in-aid available to all States for outdoor recreation planning, acquisition, and development. Authorized by the Land and Water Conservation Fund Act of 1965, the program provides Federal matching funds for State and local outdoor recreation projects. The Land and Water Conservation Fund derives moneys from "pay-as-you-go" user fees and entrance charges at Federal recreation areas, sale of surplus Federal property, Federal tax on motorboat fuels, and advance appropriations.

The Bureau of Outdoor Recreation provides technical assistance to Texas and other States in statewide planning necessary for State participation in the matching fund program. These plans will provide guidelines for future outdoor recreation developments by individuals, private organizations, cities, counties, and various units of the State government.

Chief duties of the Bureau of Outdoor Recreation are to cooperate with the States on outdoor recreation matters, promote coordination of Federal outdoor recreation programs, administer the grants-in-aid programs, and develop a long range, continuing nationwide outdoor recreation plan based on State, Federal, regional, local, and private plans. The Bureau manages no lands or recreation facilities.

The Governor of Texas has designated the Director of the Texas Parks and Wildlife Commission to serve as liaison officer for the State in working with the Bureau of Outdoor Recreation.

Further information can be obtained from the Regional Director, Bureau of Outdoor Recreation, Mid-Continent Region, Hartford Building, 7860 West 16th Avenue, Denver, Colo., 80215.



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U.S. Army Corps of Engineers, p. 17; U.S. Forest Service, Department of Agriculture, pp. 60 (left), 63; Public Health Service, U.S. Department of Health, Education and Welfare, p. 53; Soil Conservation Service, U.S. Department of Agriculture, pp. 60 (right), 61; Corpus Christi Chamber of Commerce, inside front cover, inside back cover, pp. 18 (bottom), 40 (top right); Dallas Chamber of Commerce, pp. 18 (top), 19; Galveston Chamber of Commerce, pp. 33, 40 (bottom); Greater Houston Convention and Visitors Council, p. 21 (top left); Gulf Oil Corp., p. 27 (left); The *Houston Chronicle*, p. 54; Lone Star Steel Co., p. 22; Morton Salt Co., p. 26; National Aeronautics and Space Administration, p. 11 (bottom right); National Geographic Society, pp. 6, 7, 9, 10 (top right), 11 (bottom left), 15 (left), 23 (bottom), 31 (left), 35 (bottom right, top left), 40 (top left); Texaco Inc. pp. 21 (right), 23 (top), 24, 25, 34; Texas Highway Department, back cover, pp. 2, 10 (left), 12, 14, 16, 35 (top right), 36 (top left, top right, bottom right), 37, 38, 48; Texas Memorial Museum, p. 8; Studer Photo Co., p. 36 (bottom left). All other photographs by the Department of the Interior.

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## Some Other Interior Department Publications of Special Interest

Natural Resource booklet series, states: Nevada, \$.45; Massachusetts, \$.45; Colorado, \$.50; Arizona, \$.45; Oregon, \$.50; Ohio, \$.45; Montana, \$.50; Washington, \$.50; New Mexico, \$.50; West Virginia, \$.45; Idaho, \$.50; Utah, \$.45. "The Race for Inner Space," \$.55; "Quest for Quality," (in full color) \$1.00; "Reclamation Era," (published quarterly) subscription rates, \$.50 a year. "Federal Assistance in Outdoor Recreation," \$.20; 1963 Minerals Yearbooks—Vol. 1, Metals and Minerals (Except Fuels), \$4.50; Vol. 2, Fuels, \$2.50; Vol. 3, Area Report: Domestic, \$4.25; U.S. Wall Map, \$2.00; "Our Public Lands," (quarterly magazine), \$.60 annually; "Wildlife on the Public Lands," (in full color) \$.35; Waterfowl Tomorrow, \$4.00; Attracting Birds, \$.15; Shrimp Tips, \$.25; Take a can of Salmon, \$.25; "Vacationing With Indians," \$.30; "American Indian Calendar," \$.20; "Indian Affairs—A Progress Report," \$.15; Answers to Questions about the American Indian, \$.20; Colonials and Patriots, \$2.75; Parks for America, \$5.25; Geology of Mt. Rainier National Park, \$1.75; A Primer on Water, \$.35; A Primer on Ground Water, \$.25 "Lake Powell, Jewel of the Colorado," (in full color) \$.75.

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## Conclusion

Texas is a huge land and a rich land. Beneath its soil lie some of the largest mineral deposits in the world—quantities of oil and gas that stagger the imagination. Texas is an industrialized land, a land of large modern cities, with manufacturing and shipping and industry. It is a land where wheatfields stretch to the horizon, where seemingly endless plains give pasture to sheep and cattle. It is a land of rugged natural beauty and startling scenic contrasts. Bountiful crop harvests, beautiful forests, diverse and abundant fish and wildlife—all these connote a land that is responsive to the efforts of its people.

Texas has come to symbolize the conquering of new frontiers through enterprise and determination. Blending the charm of the old South with the energy of the growing West, the State combines a special pride in the past with an unusual confidence in the future. Confidence in the future means confidence in the unspoken covenant between man and nature. Man, through wise and thoughtful conservation practices, sustains and protects the land, and the land in turn entrusts to man its bounty of natural resources. The Federal Government and the State of Texas work together to safeguard this trust.





Created in 1849, the Department of the Interior—a Department of Conservation—is concerned with the management, conservation, and development of the Nation's water, fish, wildlife, mineral, forest, and park and recreational resources. It also has major responsibilities for Indian and Territorial affairs.

As the Nation's principal conservation agency, the Department works to assure that nonrenewable resources are developed and used wisely, that park and recreational resources are conserved for the future, and that renewable resources make their full contribution to the progress, prosperity, and security of the United States—now and in the future.

