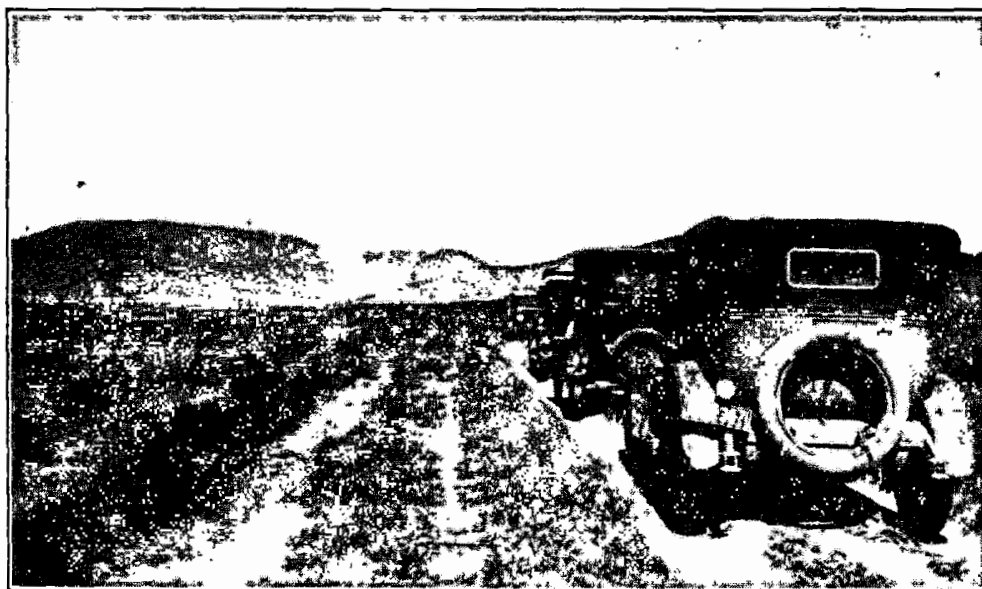


A LIST OF THE
COMMON MINERALS AND MINERAL PRODUCTS
OF TEXAS
WITH NOTES ON OCCURRENCE AND USE

by

THE BUREAU OF ECONOMIC GEOLOGY OF THE UNIVERSITY
OF TEXAS



GEOLOGISTS OF TEXAS IN FIELD CONFERENCE IN THE
GLASS MOUNTAINS, BREWSTER COUNTY

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INTRODUCTION

The following list of common minerals and mineral products has been prepared by the Bureau of Economic Geology of the University of Texas as a brief index to the mineral resources of Texas. Many minerals occur in the State in addition to those here listed, the less common being for the most part omitted. Of those listed only the more important localities are given, as it is impracticable to list all occurrences of the common minerals.

Of the minerals and mineral products enumerated about twenty are now being commercially utilized. The present annual production of these minerals is indicated in the following table, based on the returns for 1925, except petroleum which is for 1926. The returns are estimated for clay products, mineral water, and petroleum.

NAME	QUANTITY	VALUE
Asphalt, short tons.....	204,527	\$ 692,731
Cement, barrels.....	4,735,521	8,729,046
Clay, tons.....	4,821	20,247
Clay products, brick, M.....	200,000	5,500,000
Coal, tons.....	1,008,375	1,566,000
Fuller's earth, tons.....	30,462	310,145
Granite, tons.....	7,860	178,375
Gypsum, tons.....	588,132	3,721,954
Lime, tons.....	74,638	698,132
Limestone, tons.....	2,495,440	1,898,185
Mineral water, gals.....	350,000	50,000
Natural gas, cu. ft.....	127,995,594	6,659,915
Petroleum, bbls.....	162,191,024	309,195,365
Sand and gravel, tons.....	6,093,476	3,478,517
Sandstone and basalt, tons..	147,700	165,800
Graphite, quicksilver, salt, silver, and sulphur.....	7,102,311
		<hr/> \$350,036,589

With the exception of clay products and petroleum the statistics on which this table is based were collected jointly by the Bureau of Economic Geology and the United States Bureau of Mines. The statistics on clay products were collected in coöperation with the United States Bureau of Census.

E. H. SELLARDS, ASSOCIATE DIRECTOR,
BUREAU OF ECONOMIC GEOLOGY.

EXPLANATION OF MAP, FIGURE 1

Symbol	Mineral	Map Coördinate
A	Asphalt	8H.
B	Basalt or trap rock.....	7H, 11 G.
C	Bituminous coal.....	5D, 6D, 6E, 8I.
Cp	Brick, pottery, and fire clay.....	2D, 2E, 3D, 3E, 4G, 5D, 5E, 5G, 6H
Cr	Copper	7D, 12F, 13F.
F	Fuller's earth.....	3G, 4G, 6H.
Fl	Fluorspar	13F.
G	Granite	6G, 7G.
Go	Gold	11H.
Gr	Graphite	6G.
Gy	Gypsum	6J, 7C, 8E, 13F.
Ic	Iceland spar.....	7F.
Ir	Iron	2E, 3F.
L	Lignite	2F, 3D, 3E, 3F, 4F, 4G, 5F, 6H.
Lc	Cannel coal.....	7J.
Ld	Lead	12H, 13F.
Li	Limestone	3G, 4D, 4E, 4F, 5D, 5E, 5F, 5G, 6D, 6E, 6F, 6H, 7E, 9H, 14F.
Lim	Lime	5G, 6H, 14F.
M	Marble	5G, 6F, 11G.
Mi	Mica	12G.
P	Volcanic ash.....	4G.
PC	Portland cement.....	3H, 4E, 5E, 14F.
Q	Quicksilver	11H.
R	Rare earth minerals.....	6G.
S	Salt	3E, 3F, 8B, 8E, 10F, 10G.
Sil	Silver	12F, 12H.
SS	Sandstone	2F, 3G.
Su	Sulphur	3H, 3I, 5J, 11F, 12F.
T	Tin	14F.
Z	Zinc	13F.

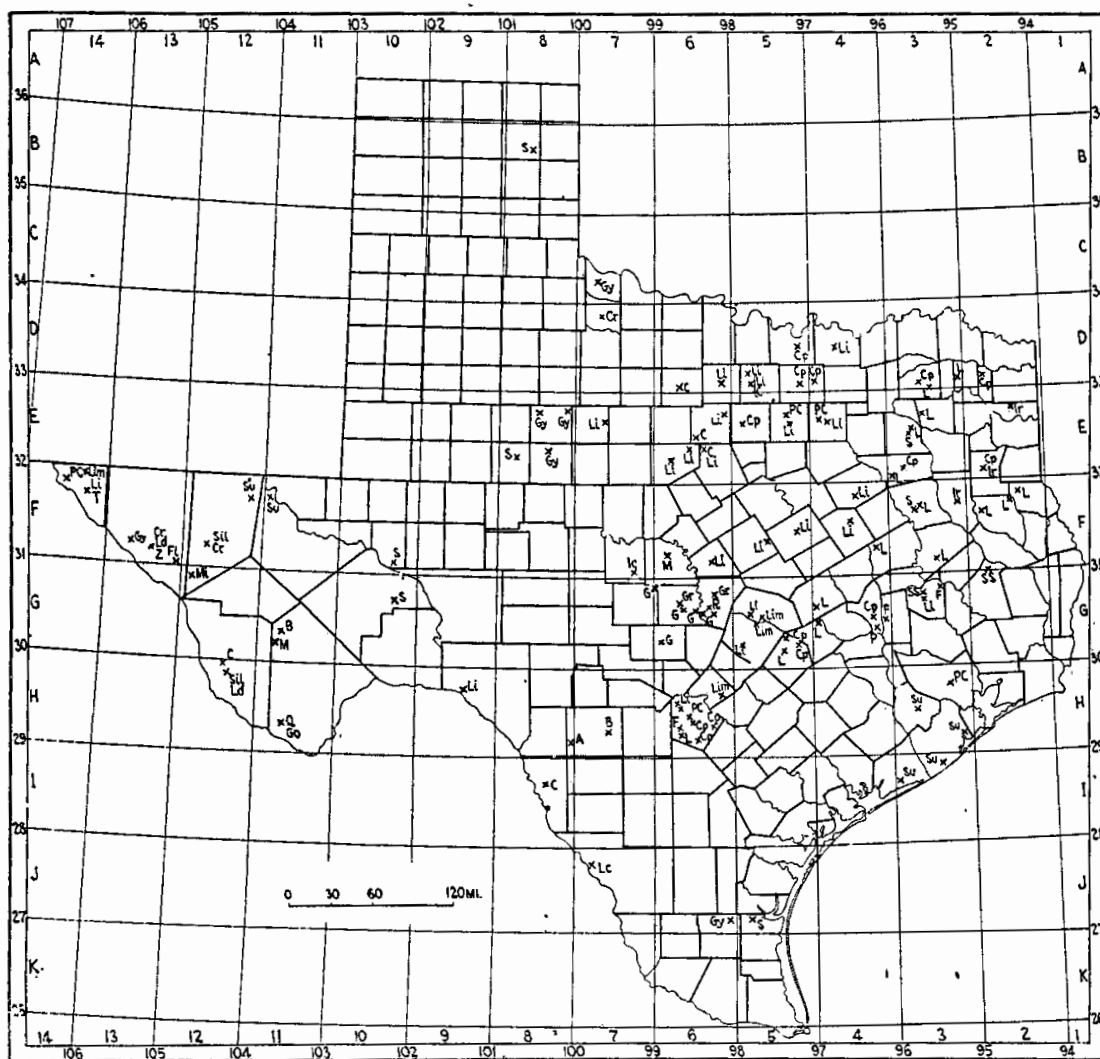


Fig. 1.—Index map to location of minerals and mineral products in Texas. The localities given are those from which production has been obtained, For oil, gas, sand and gravel, and for petroleum pipe lines, see map, page 28. For power lines in Texas, see map, page 29.

A LIST OF THE COMMON MINERALS AND MINERAL
PRODUCTS OF TEXAS WITH NOTES
ON OCCURRENCE AND USE

ABRASIVES

Composition.—Minerals or rocks of such hardness as to be used in grinding and polishing.

Occurrence.—Occur widely in the State.

Use.—As an abrasive.

ADOBE

Composition.—A calcareous clay or silt.

Occurrence.—Occurs widely particularly in stream valleys.

Use.—In making sun-dried brick. Adobe bricks are used to some extent in the southwestern part of Texas.

AGATE

Composition.—Silica, SiO_2 . Agate is a variety of quartz, not distinctly crystallized and often banded and of varied colors.

Occurrence.—Brewster County, near Alpine, and Presidio County, Bogel Ranch, twelve miles south of Marfa.

Uses.—As a gem, and ornamental stone, and in making mortars and pestles, dental tools, meter and balance bearings, and phonograph needles.

ALABASTER—See gypsum

ALLANITE—See rare earth minerals

ALUM

Composition.—The alums are double sulphates of potassium sodium, iron, ammonium, aluminum, and other elements.

Occurrence.—Native alum occurs in small quantities in Brewster County, near Ash Springs, western foothills of the Chisos Mountains, and near Alpine; also Fresno Canyon,

eighty miles south of Marfa in Presidio County; in Fayette and Wilson counties.

Uses.—Among the uses of alum are, dyeing, sizing paper, tanning skins, clarifying water, in medicine, baking powders, and for other purposes. The alum of commerce comes largely from the mineral bauxite, aluminite, and cryolite, and in relatively small amounts from natural alums.

ALUNITE, ALUM STONE

Composition.—A hydrated aluminum sulphate.

Occurrence.—Big Bend mine, Brewster County, and in Culberson County.

Use.—As a source of alum.

AMETHYST

Composition.—Silica, SiO_2 , a purple or violet quartz, the color being due probably to a small amount of manganese.

Occurrence.—Burnet, Hudspeth, and Llano counties.

Uses.—As a gem.

ANHYDRITE

Composition.—A calcium sulphate, CaSO_4 . Large deposits of anhydrite have been formed in the drying up of sea water.

Occurrence.—Occurs in great quantities underlying the salt basin of West Texas, and in the salt domes of the Gulf Coast. Near the surface it is altered more or less completely to the hydrated form, gypsum.

Uses.—May be added to cement to control the setting qualities.

ASBESTOS

Composition.—Properly a fibrous variety of amphibole, although applied in commerce also to a fibrous variety of serpentine (chrysotile). The fibers are flexible and in some varieties may be woven into cloth.

Occurrence.—Found in small quantities in El Paso, Gillespie, and Llano counties. Not commercially produced.

Uses.—Fireproofing, heat insulation; fireproof clothes, brake bands on motors; as non-conductors of electricity;

for shingles and asbestos lumber, and for other purposes. Asbestos comes largely from Canada and South Africa. It is found also extensively in Russia. The price of asbestos varies greatly, depending upon quality.

ASPHALT

Composition.—Solid or viscous hydrocarbons.

Occurrence.—Impregnating limestone in Uvalde, Kinney, and Medina counties; also in Kaufman, Kern, Williamson, Montague, Burnet, and Pecos counties. Found in sandstone at various localities; also obtained as a residue from the distillation of petroleum.

Uses.—The asphalt impregnated limestone of Uvalde and Kinney counties is extensively used for road paving. Asphalt is used as a bond for crushed rock in roads, as a protective covering for wood or iron, and in varnishes. Asphalt impregnated limestone is produced in Texas to the amount of about 200,000 tons per annum, valued at the mines at about \$680,000.

AZURITE

Composition.—Basic copper carbonate. A blue mineral often coating other copper minerals.

Occurrence.—In small quantities in Hudspeth and Llano counties.

Use.—An ore of copper.

BARITE, BARYTES OR HEAVY SPAR

Composition.—Barium sulphate, BaSO_4 . A light or dull colored heavy mineral, occurring in crystals or in masses.

Occurrence.—Llano County, also from Burkeville, Newton County, and southeast of Marathon in Brewster County.

Uses.—As a pigment in paints; in paper manufacture; in making barium nitrate, artificial ivory, insecticides, peroxide of hydrogen; in refining sugar, and for other purposes. In the United States Georgia is the leading producer of barite.

BASALT OR TRAP ROCK

Composition.—A dark colored dense basic igneous rock.

Occurrence.—Medina, Travis, Uvalde, and Kinney counties, and Trans-Pecos Texas.

Uses.—As crushed stone for ballast, and road material. Basalt is being quarried in Texas in Uvalde County.

BENTONITE

Composition.—A clay derived from the disintegration of volcanic ash. The chief mineral is the hydrated aluminum silicate, montmorillonite. Bentonite swells and defloculates when placed in water. It is closely related to fuller's earth.

Occurrence.—Bentonite occurs widely, usually in thin layers in the Cretaceous and Cenozoic formations of Texas. The production of bentonite is combined in the tabulated statement with that of fuller's earth.

Uses.—Some bentonite serves the purpose of a fuller's earth. It is used also as an adulterant in drugs and candy; for de-inking newspaper print, as a water softener, as a filler in rubber textiles; in the manufacture of paints, soap, and for other purposes. In view of the abundance of bentonite in Texas and its varied uses, a larger future production may be expected.

BAUXITE

Composition.—A hydrated aluminum oxide, $\text{Al}_2\text{O}_3 \cdot 2\text{H}_2\text{O}$.

Occurrence.—Reported to occur in Culberson County.

Uses.—A source of aluminum.

BORAX OR TINKAL

Composition.—Sodium tetraborate, $\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O}$. A white efflorescence on soils or on the margin of lakes, or in solution in lakes

Occurrence.—Reported in incrustations of shallow lakes in West Texas.

Uses.—Industrial, medicine, household, baking powder, flavoring extracts, soap, starch, glue, and for other purposes.

CALCITE

Composition.—Calcium carbonate, CaCO_3 . Calcite occurs usually as a colorless crystallized mineral often filling cavities or veins.

Occurrence.—Occurs widely, especially in the limestone regions of the State. In caves it is found as stalactites and stalagmites deposited from evaporating water. It is the chief mineral of limestones, caliche, and marble.

Uses.—Very pure calcite crystals, "Iceland Spar," are used in optical instruments. "Iceland Spar" occurs near Nalca in McCulloch County.

CALICHE

Composition.—Calcium carbonate, CaCO_3 . Caliche forms by precipitation upon the evaporation of the water from soils. It is light in color, usually soft, and finely divided, although also in the form of dense hard rock.

Occurrence.—Extensively through West and Southwest Texas.

Uses.—Road material, lime, and as a flux.

CASSITERITE

Composition.—Tin oxide, SnO_2 . A hard brown or black heavy mineral, crystalline or massive.

Occurrence.—In the Franklin Mountains, El Paso County, where it has been mined to some extent, although not being mined at present.

Uses.—The principal ore of tin.

CELESTITE

Composition.—Strontium sulphate, SrSO_4 .

Occurrence.—Burnet, Lampasas, Mason, San Saba, and Travis counties. Usually occurs in relatively small amounts in limestone.

Uses.—Medicine, sugar refining, signal lights, and fireworks.

CERARGYRITE—Horn silver

Composition.—Silver chloride, AgCl .

Occurrence.—Shafter Silver Mine. Presidio County.

Use.—An ore of silver.

CHALCOCITE—Copper glance

Composition.—A copper sulphide, Cu_2S .

Occurrence.—Hardeman, Archer, King, Knox, and Hudspeth counties.

Use.—An ore of copper.

CHALCOPYRITE

Composition.—Copper iron sulphide CuFeS_2 .

Occurrence.—Quitman Mountains, Hudspeth County.

Use.—An ore of copper.

CHRYSOTILE—A variety of serpentine

CINNABAR

Composition.—Sulphide of mercury, HgS . A vermillion or red heavy mineral occurring in masses or in crystals.

Occurrence.—Terlingua District, Brewster County, and smaller amounts in Presidio County. Produced in Brewster County.

Uses.—Ore of mercury.

CLAY

Composition.—Chiefly aluminum silicate, although extremely variable, often containing more or less sand.

Occurrence.—General throughout the State.

Uses.—For manufacture of brick, tile, stoneware, and as an ingredient in the manufacture of cement. The value of clay products in Texas is about \$5,000,000 per annum.

COAL—See also Lignite

Composition.—A carbonaceous substance derived from vegetation.

Occurrence.—Bituminous coal of the Pennsylvanian formations is found in Brown, Coleman, Comanche, Erath, Jack, McCulloch, Montague, Palo Pinto, Parker, Stephens, Wise, and Young counties, and of the Cretaceous Age in Maverick and Presidio counties.

Use.—Fuel, and for making ammonia gas, and coal tar products.

COPPER

Composition.—Native copper is a soft red malleable metal. It occurs usually in sheets, wires or irregular masses.

Occurrence.—Native copper occurs in small amounts in the Sierra Diablo, Hudspeth County.

Uses.—In making copper wire, coins, engraving, roofing; with tin to make bronze and with zinc to make brass. For copper ores see chalcocite, chalcopyrite, and malachite.

DIATOMACEOUS EARTH

Composition.—Silica, SiO_2 . Diatomaceous earth consists of the siliceous tests of diatoms.

Occurrence.—Found in small quantities under volcanic ash in Kent County.

Uses.—Insulation for heat and sound; as filtering medium and as fire resisting material; in making water glass and for other chemical applications.

DOLOMITE OR MAGNESIAN LIMESTONE

Composition. — A calcium magnesium limestone, $\text{CaCO}_3 \cdot \text{MgCO}_3$.

Occurrence.—Dolomite or dolomitic limestone is widely distributed over Texas, being found in the Ordovician Permian and Lower Cretaceous formations.

Uses.—Building stone and rock material; and as a source of magnesium and of carbonic acid gas.

EGLESTONITE

Composition.—Mercury oxychloride, $\text{Hg}_4\text{Cl}_2\text{O}$.

Occurrence.—At Terlingua, Brewster County.

Use.—A mercury ore.

FELDSPAR

Composition.—Aluminum silicate of potassium, calcium, sodium, or other bases. The feldspars include a large group of minerals which vary considerably in composition and properties.

Occurrence.—Generally present in the igneous rock of the Central Mineral region.

Uses.—In manufacturing pottery and glass.

FERGUSONITE—See rare earth minerals

FLINT

Composition.—Silica, SiO_2 .

Occurrence.—Widely distributed.

Use.—Road making and as an abrasive.

FLUORITE OR FLUORSPAR

Composition.—Calcium fluoride, CaF_2 , usually in cubical crystals, clear or delicately colored, sometimes fibrous.

Occurrence.—Brewster, Burnet, Gillespie, Hudspeth, and Llano counties.

Uses.—As a flux in the manufacture of glass, enamel ware, hydrofluoric acid, in making aluminum, high power lenses in optical instruments, and for many other purposes. A small amount of fluorite is produced in Hudspeth County.

FULLERS EARTH

Composition.—Clay. The fuller's earth clays are variable in color. As a rule they are very porous and are of light weight per cubic foot. Their usefulness is dependent upon their absorbent properties.

Occurrence.—Mined in Bexar, Fayette, Walker, and Grimes counties. Occurs in many other counties.

Uses.—Principal use for clarifying mineral and vegetable oils, fats, greases, and waxes. Annual production in Texas about 30,000 tons. The market for fuller's earth is chiefly in the large refinery centers.

GADOLINITE—See rare earth minerals

GALENA

Composition.—Lead sulphide, PbS , a lead gray heavy mineral showing cubical cleavage.

Occurrence.—In Bell, Brewster, Brown, Burnet, Cameron, Coleman, El Paso, Erath, Fannin, Garza, Grayson, Hudspeth, Irion, Knox, Presidio, and Red River counties. Small amounts of lead have been produced although no production at present.

Uses.—A lead ore.

GARNET

Composition.—The garnets are silicate minerals including several species.

Occurrence.—Found in the schists of the Central Mineral region and in Trans-Pecos Texas.

Uses.—As a gem and abrasive.

GAS

Composition.—Hydrocarbons.

Occurrence.—Occurs very widely in Texas. The recorded production for 1925 was 127,995,594 cubic feet. This amount includes that which passed through pipe lines for commercial use, and is exclusive of the very large amount that escapes or is used in connection with petroleum production.

Uses.—As a fuel and as a source of helium, of casinghead gasoline, and of carbon black.

GLASS SAND—See sand

GLAUCONITE—GREEN SAND

Composition.—A hydrous silicate of iron and potassium.

Occurrence.—On Leon Creek in Bexar County; in Llano and San Saba counties; and in numerous localities in the coastal plains.

Uses.—As a fertilizer, as a source of potash, and as water purifier.

GOLD

Composition.—Native gold is soft yellow heavy malleable metal.

Occurrence.—In small quantities in silver lead ores in West Texas; with mercury ores in Brewster County; and in quartz veins in Blanco, Burnet, Gillespie, Mason, El Paso, Guadalupe, Hudspeth, and Presidio counties.

Uses.—In coinage, for jewelry, dentistry, and for lettering. Small amounts of gold have been produced in Texas, although there is no production at present.

GRAHAMITE

Composition.—A hydrocarbon occurring as a jet black brittle substance.

Occurrence.—Two miles west of Muldoon in Fayette County.

Uses.—In paving, roofing, and in paint.

GRANITE

Composition.—A crystallized igneous rock composed of quartz, feldspar, and mica.

Occurrence.—Brewster, Burnet, Gillespie, Llano, and Mason counties.

Uses.—For construction purposes and for crushed stone. The production of granite in Texas chiefly for monumental purposes was 7,860 tons in 1925.

GRAPHITE OR BLACK LEAD

Composition.—Carbon. Graphite is a gray black soft mineral with greasy feel.

Occurrence.—Burnet and Llano counties.

Uses.—For making refractory crucibles, lubricants, pencils, paints, and for many other purposes. Graphite is mined in Burnet County.

GREEN SAND—See glauconite

GUANO

Composition.—Contains phosphoric acid, ammonia, and potash. Guano is the dried hardened often earthy excreta of birds and bats and is found in caves and under shelving rocks.

Occurrence.—Occurs widely in caves.

Use.—As a fertilizer.

GYPSUM AND GYPSITE

Composition.—Hydrous calcium sulphate, $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$.

Occurrence.—Occurs extensively in the Permian formations of West Texas, and is mined in Hardeman, Jones, and Fisher counties. Gypsite is a finely divided form of gypsum valuable in making mortar. Alabaster is a massive fine-grained variety of gypsum. Selenite is a variety occurring in tabular crystals.

Uses.—Plaster of Paris, wall plaster, Keene's cement; in

cement and as a fertilizer, and for many other purposes. The production of gypsum in Texas in 1925 was 558,132 tons. The market includes Texas and adjoining states, shipments going as far east as Florida.

HALITE—See salt

HELIUM

Composition.—The element helium exists as a gas.

Occurrence.—Helium occurs as a constituent of natural gas from which it is isolated.

Uses.—Chiefly as a gas for balloons, for which its light weight and non-inflammable nature makes it well suited.

HEMATITE

Composition.—Iron oxide, Fe_2O_3 . Hematite occurs as a red or black metallic mineral, crystallized or massive.

Occurrence.—Brown, Llano, and Mason counties. No hematite is being produced at present.

Use.—An iron ore.

ICELAND SPAR—See calcite

ILMENITE

Composition.—Iron-titanium oxide, FeTiO_3 . Ilmenite is a black hard mineral, crystallized or massive.

Occurrence.—Barringer Hill, Llano County, and at Fly Gap in Mason County.

Uses.—In cast iron steel for steel rails; rim and tread of wheels.

INFUSORIAL EARTH—See diatomaceous earth

IRON

See the iron minerals, Ilmenite, Hematite, Limonite, Magnetite, and Siderite.

JASPER

Composition.—A variety of quartz.

Occurrence.—Brewster, Presidio, Llano, Jeff Davis, and Uvalde counties.

Uses.—A gem and ornamental stone.

KAOLIN

Composition.—A clay, usually of light color.

Occurrence.—Real, Brazos, Caldwell, Burleson, Fayette, Lee, and Washington counties. No production at present.

Uses.—Manufacture of paper and pottery, paint, rubber filler.

KLEINITE

Composition.—Mercury ammonium chloride.

Occurrence.—Terlingua district, Brewster County.

Uses.—A source of mercury.

LEAD

See the lead mineral, Galena.

LIGNITE

Composition.—A brownish coal.

Occurrence.—The lignite belt of Texas extends entirely through the State from the Red River to the Rio Grande, being 650 miles long by 200 miles wide. Lignite veins vary in thickness from a few feet to fifteen or twenty feet.

Uses.—As a fuel, and as gas producer.

LIME

Composition.—Lime or quicklime, CaO , is made from limestone. The output of lime in Texas is about 75,000 tons per year.

Use.—Lime finds many uses, among which are building, chemical, and agricultural purposes.

LIMESTONE

Composition.—Calcium carbonate, CaCO_3 , often, varying to calcium magnesium carbonate.

Occurrence.—Limestone occurs extensively throughout the State.

Uses.—For manufacture of lime, cement, building materials, concrete, ballast, and road material, and as a flux.

LIMONITE, BOG ORE, BROWN HEMATITE

Composition.—Hydrous iron oxide. Limonite is usually of yellow color. It grades into bog iron ore and ochre.

Occurrence.—In the iron belt of Northeast Texas. Formerly worked but no production at present. There are about 1,200 square miles of limonite-bearing area in Northeast Texas.

Uses.—An iron ore.

MACKINTOSHITE—See rare earth minerals

MAGNETITE, LODESTONE, MAGNETIC IRON ORE

Composition.—Oxide of iron, Fe_3O_4 . Magnetite is a black hard mineral.

Occurrence.—Llano and Mason counties.

Uses.—An iron ore.

MALACHITE

Composition.—Hydrous copper carbonate, $2\text{CuO} \cdot \text{CO}_2 \cdot \text{H}_2\text{O}$. Malachite is a bright green mineral.

Occurrence.—In small quantity in the Permian formations of West Texas.

Uses.—A copper ore and as ornamental stone.

MANGANESE—See pyrolusite and psilomelane

MARBLE

Composition.—Crystalized limestone.

Occurrence.—Near San Saba is found marble of the Ellenburger formation; in the Central Mineral region marble is found in several counties. In Trans-Pecos, Texas marble is found near Alpine, at Marfa and in the Eagle Mountains.

Use.—A building stone.

MARL

Composition.—Chiefly calcium carbonate, but with more or less clay and sand.

Occurrence.—Occurs widely.

Use.—Road material, and as a source of lime.

MERCURY—See mercury minerals, cinnabar

Native mercury is a heavy opaque liquid.

Occurrence.—A small amount of native mercury is found in association with the mercury ores in the Terlingua region of Brewster County.

Uses.—In extracting gold from its ores and in the manufacture of explosives and in medicine.

METEORITE

Composition.—Chiefly iron and silicates.

Occurrence.—About thirty meteorites have been found in Texas.

MICA

Composition.—A hydrous silicate of aluminum.

Occurrence.—Mica is found in commercial quantity in Hudspeth County south of Dalberg. Mica is reported also from Mason, Burnet, Llano, and McMullen counties.

Uses.—As insulator in electric appliances; also in lubricants, paints, wall paper, rubber goods, as a heat insulator, and as an absorbent for nitroglycerine.

MINERAL WATERS

Mineral water is found in Texas in various localities, and is utilized for drinking and medicinal purposes. The mineral water shipments approximate a value of \$50,000 per year.

MOLYBDENITE

Composition.—Sulphide of molybdenum, MoS_2 . A soft gray mineral occurring chiefly in foliated masses or flakes.

Occurrence.—In the Central Mineral region where it has been produced to some extent.

Use.—A source of molybdenum which is used in steel.

MOULDING SAND—See sand

NATURAL GAS—See gas

NITRATE OF SODA—See Soda Nitre

NITRE

Composition.—Potassium nitrate. KNO_3 .

Occurrence.—Nitre is found in small quantity in Brewster, Hudspeth, Presidio, and Val Verde counties.

Uses.—As a fertilizer, in curing meats, in manufacturing gunpowder and other explosives.

NIVENITE—See rare earth minerals

NOVACULITE

Composition.—A very fine-grained siliceous rock.

Occurrence.—Brewster County, near Marathon.

Use.—Whetstones and hones.

OIL—See petroleum

ONYX

Composition.—An ornamental marble.

Occurrence.—San Saba County.

Uses.—As an ornamental stone.

OPAL

Composition.—Hydrous silica.

Occurrence.—In the opal granite of Llano County and near Haley Peak in Brewster County.

Use.—As a gem and ornamental stone.

PEARLS

Composition.—Chiefly calcium carbonate CaCO_3 .

Occurrence.—Found on San Saba and other rivers.

Uses.—As a gem.

PETROLEUM

Composition.—A complex mixture of liquid hydro-carbons.

Occurrence.—Widely distributed over the State and through a great series of formations.

Uses.—Fuel, lubricant, solvent, source of greases, waxes, and a large series of refined products.

PHOSPHATE

Composition.—Calcium phosphate.

Occurrence.—Found in limited quantity in the Midway formation in Medina County; also reported from Fayette and Bexar counties.

Use.—Chiefly in fertilizers.

POLYHALITE

Composition.—A hydrous potassium, calcium magnesium sulphate, CaSO_4 MgSO_4 K_2SO_4 H_2O .

Occurrence.—Occurs associated with common salt in the salt basin of West Texas, where it has been recognized in many wells from the Pecos Valley to the northern Panhandle.

Uses.—Polyhalite if found in quantities will doubtless be used as a source of potassium in fertilizers and for other purposes.

POTASH

Composition.—Potash is a term applied in commerce to any one of several potassium minerals. In Texas the most common mineral is polyhalite.

PSILOMELANE

Composition.—Hydrated manganese oxide.

Occurrence.—Llano County.

Use.—An ore of manganese.

PYRITE

Composition.—Iron sulphide, FeS_2 .

Occurrence.—Widely distributed in relatively small quantity through various formations.

Uses.—A source of sulphuric acid.

PYROLUSITE

Composition.—Manganese dioxide, MnO_2 .

Occurrence.—Dickens and Mason counties in small quantities; also in Nolan, Brewster, and Hudspeth counties.

Uses.—As a source of manganese alloys, as a flux for the production of chlorine and permanganate.

QUARTZ

Composition.—Silica, SiO_2 .

Occurrence.—Abundant over the State.

Uses.—In manufacture of quartz ware and pottery, as a flux, as an abrasive, and for many other purposes; highly colored variety used as gems.

QUICKSILVER—See Mercury

RADIUM

Composition.—A metallic element derived from Uranium.

Occurrence.—Radium is found only in minute quantities with uranium minerals. These uranium minerals are found in Texas at Barringer Hill, Llano County.

Uses.—Radium is used as a curative agent in medicine.

RARE EARTH MINERALS

Composition.—The rare earth minerals are a group of silicates containing yttrium, cerium, and other metals.

Occurrence.—Rare earth minerals are found in Texas at Barringer Hill, and some other localities in Llano County. Among the more common rare earth minerals at this locality are allanite, fergusonite, gadolinite, mackintoshite, rowlandite, and yttrianite.

Use.—Source of rare earth metals.

ROAD MATERIALS

Composition.—The term road material is applied to rock of various kinds suitable for surfacing roads and in making road foundations.

Occurrence.—Rock suitable for road foundations is widely distributed in Texas, and includes basalt, granite, gravel, limestone, and trap rock.

Uses.—Road foundations and surfaces.

ROWLANDITE—See rare earth minerals

SALT

Composition.—Sodium chloride, NaCl.

Occurrence.—Salt beds occur extending through the great salt basin of West Texas, also in the salt domes of the Gulf region of Texas.

Uses.—In food, and as a source of soda and other sodium compounds; as a source of chlorine and hydrochloric acid; as a glaze in pottery, and for other purposes.

SALTPETER—See nitre

SAND AND GRAVEL

Composition.—The sands most commonly utilized are silica sands, although calcite gysum and other sands occur. The gravels utilized are chiefly siliceous.

Occurrence.—Very widely distributed.

Uses.—As road material and ballast; for mortar and concrete. Sands of requisite quality are used in glass making, as moulding sand, and as an abrasive, for lining furnaces and other purposes. The value of sand and gravel produced in Texas in 1925 was \$3,478,517.

SANDSTONE

Composition.—A rock resulting from the cementing of sand grains.

Occurrence.—Occurs widely.

Uses.—Chiefly for building, also as a source of glass sand.

SAND CLAY

Composition.—Sand and clay mixed.

Occurrence.—Occurs widely.

Use.—Road surfacing material.

SATIN SPAR—See gypsum

SERPENTINE

Composition.—Hydrous magnesium silicate, 3MgO , $\text{SiO}_2 \cdot 2\text{H}_2\text{O}$.

Occurrence.—In the northeastern part of Gillespie County, and as an alteration product in Uvalde and other counties.

Uses.—Chiefly as an ornamental stone.

SIDERITE

Composition.—Iron carbonate, FeCO_3 .

Occurrence.—Bastrop, Marion, and San Augustine counties.

Use.—An iron ore.

SILVER

Silver occurs native or in its ores. In Brewster County silver-bearing galena has been mined near Alpine. Silver ores are found also in Hudspeth and Presidio counties. Silver has been produced continuously during the past forty years or more from mines at Shafter in Presidio County.

SMITHSONITE

Composition.—Carbonate of zinc, Zn CO_3 .

Occurrence.—Near Eagle Flat in Hudspeth County and two miles west of Shafter in Presidio County.

Uses.—An ore of zinc. Some small shipments of smithsonite have been made from the Hudspeth County locality.

SODA NITRE

Composition.—Nitrate of soda, NaNO_3 .

Occurrence.—Found sparingly in Presidio, Ward, and Brewster counties.

Uses.—In fertilizers, in making nitre for gun powders, and in making nitric acid.

SPHALERITE

Composition.—Sulphide of zinc, ZnS .

Occurrence.—East side of Quitman Mountains in Hudspeth County; in the central mineral region and in Montague County.

Uses.—An ore of zinc. Some shipments of sphalerite have been made from Hudspeth County.

SPODUMENE

Composition.—Lithium aluminum silicate.

Occurrence.—Llano County.

Uses.—As gems and as a source of lithia.

STRONTIANITE

Composition.—Strontium carbonate, SrCO_3 .

Occurrence.—At Mt. Bonnell in Travis County.

Uses.—A source of strontium salts.

SULPHUR

Sulphur occurs native and in the sulphides.

Occurrence.—The principal sulphur producing region of the world is in the Gulf coastal plain of Texas, where about 75 per cent of the world's output is obtained. Sulphur is found also in Culberson County, where it has been mined to some extent; reported also from Burleson, Brazoria, El Paso, Orange, Reeves, Smith, and Tyler counties.

Uses.—Sulphur has a great variety of uses, some of which are in the manufacture of sulphuric acid, in making wood pulp by the sulphite process, in making insecticides, in rubber industries, and as a fertilizer.

TALC

Composition.—A hydrous magnesium silicate, $\text{H}_2\text{O} \cdot 3\text{MgO} \cdot 4\text{SiO}_2$. Talc is soft and has a greasy feel.

Occurrence.—In the Central Mineral Region.

Uses.—Electric insulation, in paper and in paints, and as lubricator.

TETRAHEDRITE

Composition.—Copper antimony sulphide, $\text{Cu}_8\text{Sb}_2\text{S}_7$.

Occurrence.—Hazel Mine, Culberson County.

Use.—Ore of copper, sometimes carrying silver.

TIN—See the tin ore cassiterite

TITANIUM—See illmenite

TOPAZ

Composition.—An aluminum fluosilicate.

Occurrence.—Mason County.

Uses.—As a gem.

TRAP ROCK—See basalt

TRONA, URAO

Composition.—Carbonate of soda, $\text{Na}_2\text{CO}_3 \cdot \text{HNaCO}_3 \cdot 2\text{H}_2\text{O}$.

Occurrence.—In Ward County and sixteen miles north of Palestine in Anderson County.

Uses.—Source of sodium carbonate.

TURQUOISE

Composition.—Hydrous phosphate of aluminum and copper.

Occurrence.—Six miles west of Van Horn in Culberson County, and in El Paso County.

Uses.—As a gem. Has been mined at the Culberson County locality.

URANINITE

Composition.—A uranium mineral containing also rare earths, radium, helium and lead. A black mineral with pitch-like appearance.

Occurrence.—Quitman Mountains, Hudspeth County.

Use.—Source of uranium salts and radium.

VOLCANIC ASH

Composition.—Finely broken igneous rock of glassy texture.

Occurrence.—Volcanic ash occurs at many localities in the State. It has been reported from Lampasas, Hutchinson, Burleson, Dickens, Trinity, Fayette, Kent, Knox, Grimes and other counties.

Uses.—Abrasive, scouring, compounds, soaps, and other purposes.

WAD—See Psilomelane

WOLFRAMITE

Composition.—Tungstate of iron and manganese.

Occurrence.—Near Figure 2 Ranch in Culberson County, 32 miles north of Van Horn, and 12 to 15 miles north of El Paso in El Paso County.

Use.—A source of tungsten and its compounds.

YTTRIALITE—See rare earth minerals

ZINC—See the zinc ores, Smithsonite and Sphalerite

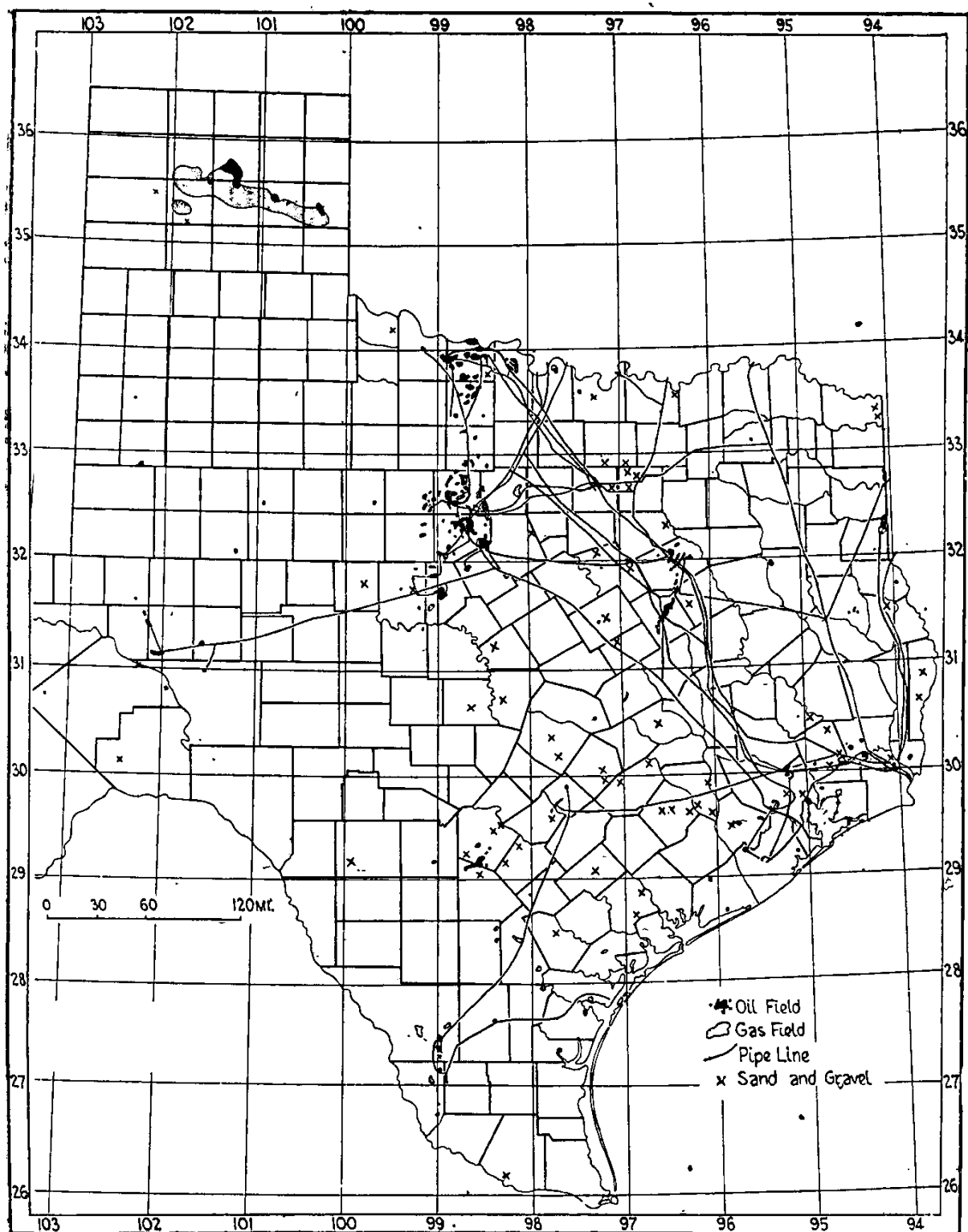


Fig. 2.—Map showing location of oil and gas fields and oil pipe lines; also sand and gravel pits.

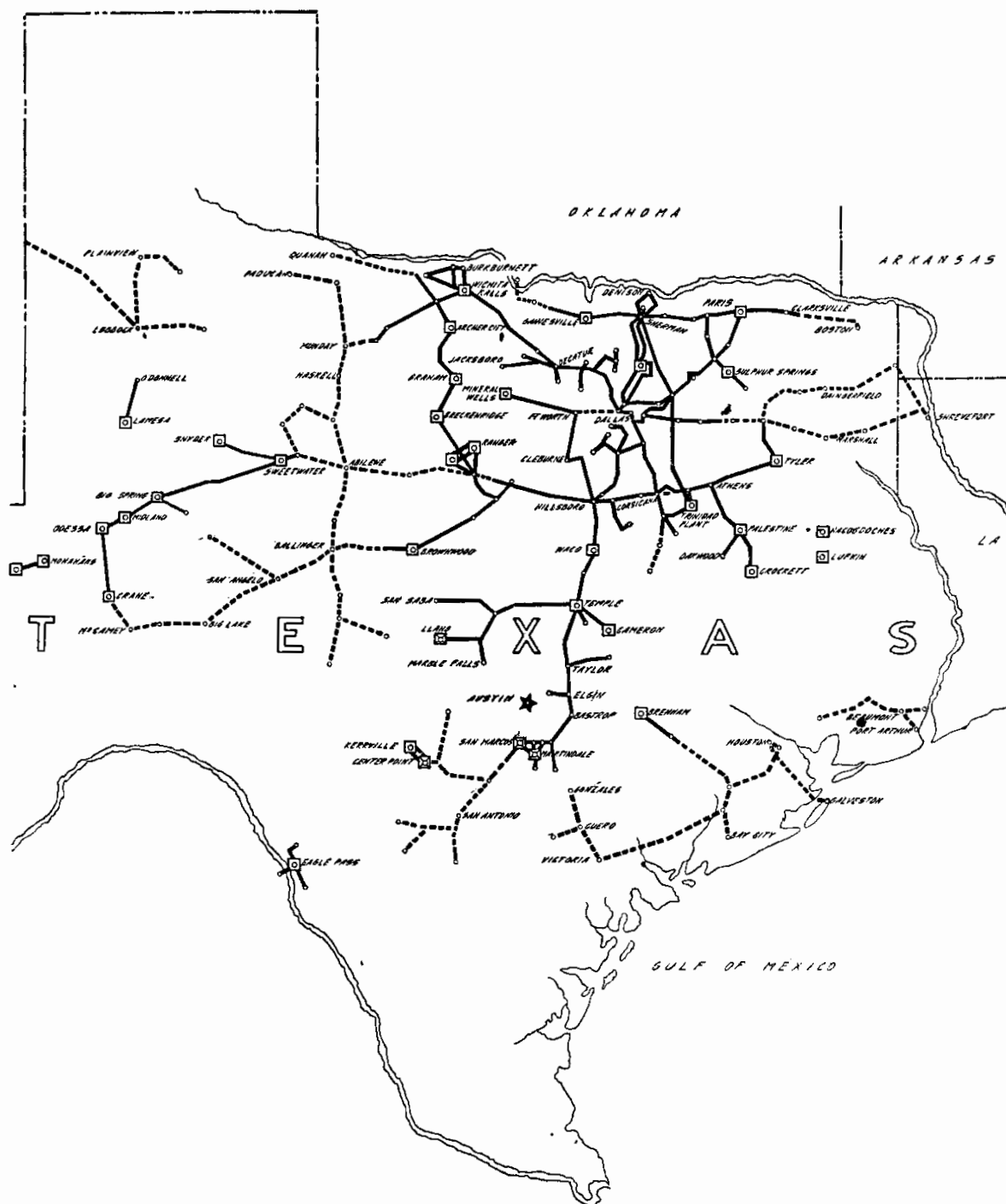


Fig. 3.—Power transmission lines in Texas.