

THE UNIVERSITY OF TEXAS AT AUSTIN
BUREAU OF ECONOMIC GEOLOGY

TO ACCOMPANY MAP—ABILENE SHEET
GEOLOGIC ATLAS OF TEXAS

GEOLOGIC ATLAS OF TEXAS, ABILENE SHEET

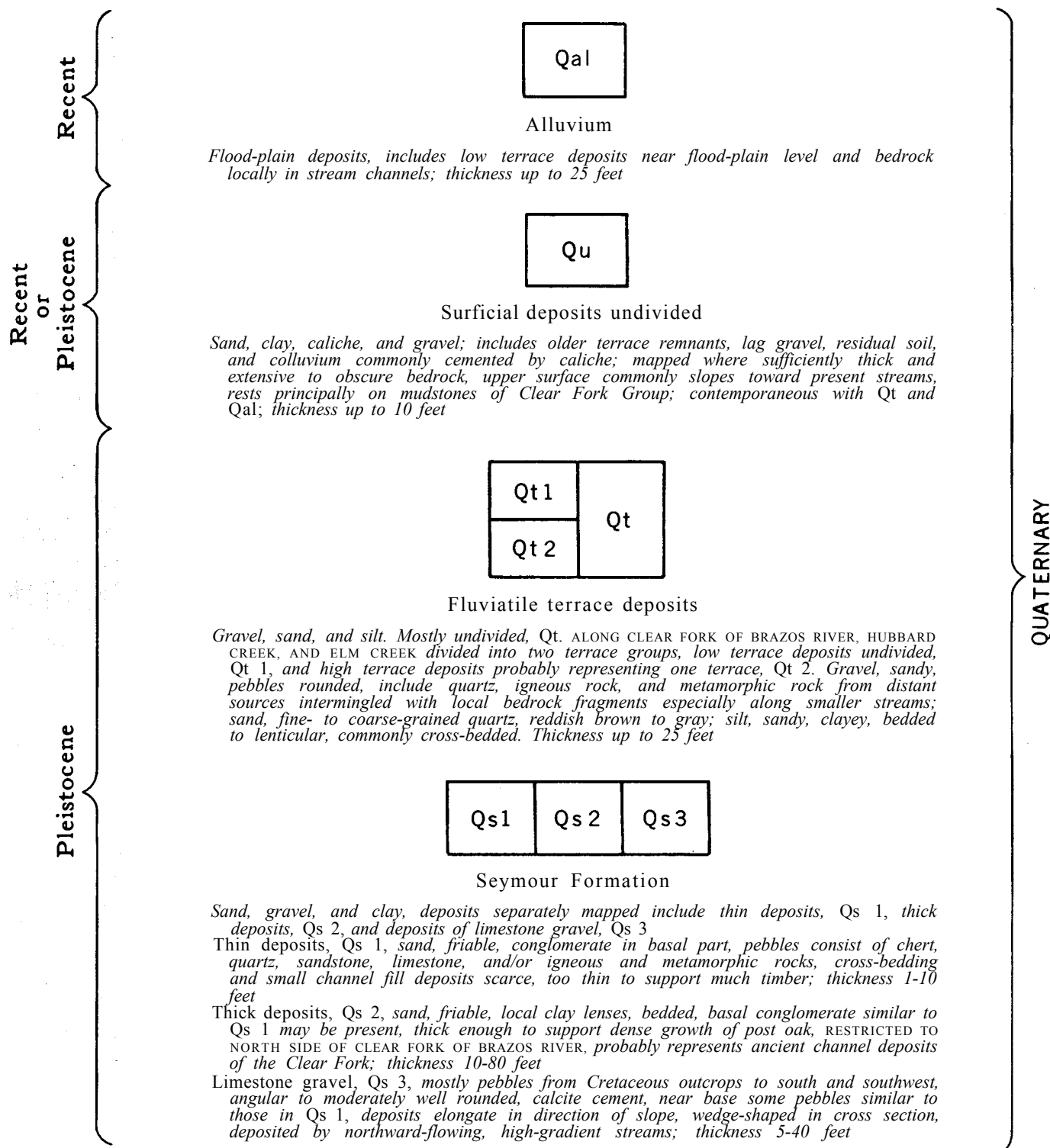
FREDERICK BYRON PLUMMER MEMORIAL EDITION

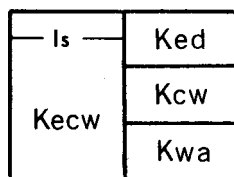
VIRGIL E. BARNES, Project Director



1972

EXPLANATION





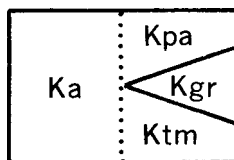
Edwards Limestone, Comanche Peak Limestone, and Walnut Formation

Limestone and clay stone; Edwards Limestone, Ked, SEPARATELY MAPPED IN EASTERN CALLAHAN COUNTY; Edwards Limestone, Comanche Peak Limestone, and Walnut Formation, Kecw, UNDIVIDED IN WESTERN CALLAHAN, TAYLOR, AND RUNNELS COUNTIES; Comanche Peak Limestone and Walnut Formation, Kcw, UNDIVIDED IN EASTERN CALLAHAN AND NORTHERN BROWN COUNTIES; Walnut Formation, Kwa, MAPPED SEPARATELY IN ERATH COUNTY

Edwards Limestone; *limestone*, ls, SEPARATELY MAPPED IN WESTERN PART OF AREA. *Upper part, including at base limestone*, ls—argillaceous, nodular to evenly bedded, light gray, alternating hard and soft units weather recessive compared to lower part, *Exogyra texana* and foraminifers locally abundant, thickness about 40 feet. Lower part—fine to coarse grained, mostly argillaceous, some recrystallized, locally dolomitic with chert in 2-5 inch beds, mostly nodular to massive, locally thin bedded, weathers light gray to light brown, fossils include foraminifers, gastropods, and rudistids as molds and silicified remnants locally, forms steep scarp, thickness about 100 feet. Thickness of Edwards Limestone about 140 feet

Comanche Peak Limestone, *fine grained, argillaceous, nodular, light gray, burrowed*, marine megafossils include echinoids and molds and shells of molluscs; thickness 15-20 feet

Walnut Formation, *limestone and claystone interbedded*. Limestone, in upper part—argillaceous, nodular, thin to medium bedded, iron stained, burrowed; in lower part—fine to coarse grained, hard, in part nodular, ripple marked on bedding surfaces in EASTERN ERATH COUNTY, light brown, gray, white. Claystone, calcareous, limestone nodules in upper part, sandy in lower part, light brown to gray. Megafossils include *Exogyra*, *Gryphaea*, other pelecypods, echinoids, molds of gastropods, *Oxytropidoceras* abundant near middle in ERATH AND CALLAHAN COUNTIES. Thickness 100-140 feet, thickens eastward, cannot be distinguished from Comanche Peak Limestone WEST OF CALLAHAN COUNTY



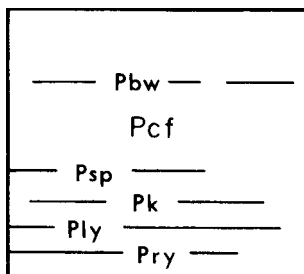
Paluxy Formation, Glen Rose Formation, Twin Mountains Formation, and Antlers Sand

Paluxy Formation, Kpa, *sandstone and claystone interbedded*. Mostly sandstone, very fine to fine grained, in part argillaceous, silty, friable, some calcite cement, cross-bedded to laminated, evenly bedded, mostly light gray, some red, a few channel fill bodies contain pyrite nodules and plant fragments in southern area. Claystone, locally sandy, blocky, gray. Thickness 100-170 feet, thins southward

Glen Rose Formation, Kgr, *limestone and claystone alternating*. Limestone, fine grained, some recrystallized, argillaceous, locally sandy, hard, evenly bedded, light gray to white, marine megafossils; at base in EASTERN ERATH COUNTY a 10-foot unit, fine grained, hard, forms prominent bench. Claystone, calcareous, sandy, blocky. IN EASTERN CALLAHAN COUNTY some thin beds of calcareous sandstone and limestone interbedded. Erodes to distinctive stairstep topography. Thickness up to 100 feet, feathers out north-westward

Twin Mountains Formation, Ktm, *upper part claystone, middle part sandstone above claystone, lower part mostly sandstone, some claystone and conglomerate*. Upper claystone unit, silty, mostly gray, locally green, yellow, purplish red. Middle sandstone unit, fine to medium grained, well sorted, friable, locally siliceous pebbles at base, locally cross-bedded, mostly light gray, some light brown near middle. Middle claystone unit, silty, gray at base, mostly dark grayish red, locally interrupted by broad channel sands with basal conglomerate of sandstone fragments and scattered chert pebbles, fossils are *Charophyta*. Lower unit, sandstone, medium to coarse grained, locally large-scale cross-bedding, light gray; claystone, silty, gray; conglomerate, pebbles of chert and quartz, argillaceous, sandy, gray, brown. Thickness about 150 feet

Antlers Sand (basal Cretaceous or "Trinity Sand"), Ka, *upper part sandstone and claystone interbedded, middle part claystone, lower part sandstone and conglomerate interbedded*. Sandstone, fine grained, some very fine grained in upper part, argillaceous, conglomeratic in lower part, friable, calcite cement in lower part, thin bedded to massive, cross-bedded, gray to yellowish brown. Claystone, sandy, locally calcareous, blocky, brown to purplish pink. Conglomerate, pebbles of chert and quartz, locally green silty clay clasts, argillaceous, sandy, friable, reddish brown, gray. Conglomerate most abundant component of formation in WESTERN CALLAHAN AND TAYLOR COUNTIES where mudstone is scarce. Thickness 180-200 feet, thins westward

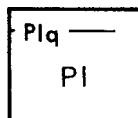


Clear Fork Group

Mudstone, limestone, dolomite, and siltstone; Bullwagon Dolomite, Pbw, Standpipe Limestone, Psp, Kirby Lake Limestone, Pk, Lytle Limestone, Ply, and Rainy Limestone, Pry, separately mapped. Mostly mudstone, commonly silty, some blue-gray shale near base, thin to very thin bedded, red, a few plant fossil fragments. Limestone, commonly thin discontinuous beds mostly in lower part. Siltstone units 1-3 feet thick distributed throughout, red, on bedding surfaces mudcracks, raindrop impressions, and tracks of amphibians and arthropods. Thin dolomite beds scarce. Topography mostly flat to gently sloping with some low hills and benches. Upper part of group does not crop out within area of Abilene Sheet, grades downward to Lueders Formation, extensively covered by Quaternary deposits; Choza, Vale, and Arroyo Formations of Colorado River valley not distinguishable.

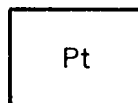
Bullwagon Dolomite, Pbw, fine grained, locally sandy, light gray to white, beds 1-3 feet thick, commonly interbedded with green sandstone and red-green siltstone units 1-foot thick, occurs as overlapping beds within a zone about 40 feet thick.

Standpipe Limestone, Psp, Kirby Lake Limestone, Pk, Lytle Limestone, Ply, and Rainy Limestone, Pry, in units 1-3 feet thick, fine grained, unevenly bedded, locally dolomitic, dark gray to brown, locally marine megafossils; relatively persistent SOUTH OF ABILENE, lenticular and difficult to trace NORTH OF NUGENT. Thickness of Clear Fork Group in map area 700-900 feet.



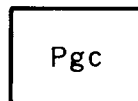
Lueders Formation

Limestone and shale; "Lueders quarry bed" (limestone), Plq, separately mapped. Upper part—shale and alternating limestone; mostly shale in units 1-5 feet thick, calcareous, gray; limestone in units 1-5 feet thick, argillaceous, moderately hard to soft, weathers very light gray to white, produces subdued terraced topography; thickness 20-40 feet. Lower part including "Lueders quarry bed," Plq—limestone and shale; mostly limestone in units 1-5 feet thick, fine to medium grained, rarely argillaceous, hard, gray, evenly bedded, medium to thick beds; some shale in thin units, calcareous; marine megafossil fragments and algal pellets locally, forms broad dip slopes highly dissected by westward-flowing streams; thickness 30-40 feet. Thickness of Lueders Formation 50-70 feet.



Talpa Formation

Shale and limestone. Shale in units 1-20 feet thick, fissile, light gray; locally in lower part thin siltstone beds, sandy, argillaceous, calcareous. Limestone in units 1-10 feet thick more abundant in lower part, medium to coarse grained, thin to thick bedded, gray, locally abundant algae, molluscs, brachiopods, and Talpaspongia, units form prominent benches especially at base. Thickness 90-120 feet, thickens southward.



Grape Creek Formation

Shale, limestone, and siltstone. Upper part—mostly shale, noncalcareous, some thin limestone beds, locally contains siltstone in upper 10 feet, gray, mostly crops out on steep slope; thickness 30-90 feet. Lower part—mostly limestone alternating with shale; limestone units 2-8 feet thick, medium to coarse grained, in part argillaceous, locally friable, medium bedded, sparsely fossiliferous, forms moderately prominent scarp; shale units 15-40 feet thick; nonfissile, gray; thickness 20-60 feet. Thickness of Grape Creek Formation 100-150 feet, thickens southward.

Leonard Series

Wichita - Albany Group

Wolfcamp Series

Pbe

Bead Mountain Formation

Limestone and shale. Upper part—mostly shale, locally contains thin resistant limestone lentils, commonly noncalcareous, gray, mostly crops out on steep slopes; thickness 50-65 feet. Lower part—mostly limestone alternating with shale; limestone units 1-5 feet thick, fine grained, slightly argillaceous, gray, locally contains abundant foraminifers and worm tubes, units support steep scarp; shale units 1-16 feet thick, gray; thickness 100-130 feet. Thickness of Bead Mountain Formation 150-180 feet

Pjv

— ls —

Jagger Bend and Valera Formations undivided

Limestone and shale. Upper part—mostly shale, calcareous, carbonaceous southward, locally contains thin sandstone and siltstone units, some prominent limestone units, mostly gray, some green and red; approximately equivalent to Valera Shale of Colorado River valley of Brownwood Sheet. Lower part—mostly limestone in units 1-8 feet thick, argillaceous, medium to coarse grained, light gray, sparsely fossiliferous; unnamed limestone, ls, mapped near middle and limestones in lower part form prominent scarps. Thickness 150-210 feet, thickens southward

Pec

Elm Creek Formation

Limestone and shale. Upper part—mostly shale, locally contains discontinuous thin limestone units a few feet thick, light gray, some pale red; approximately equivalent to Voss Shale of Colorado River valley of Brownwood Sheet; thickness 20-80 feet. Lower part—numerous limestone units separated by shale; limestone units 1-25 feet thick, coarse grained, thick bedded to massive near base, discontinuous, gray to yellow brown; shale increases in amount northward; forms prominent scarp, thickness about 50 feet. Thickness of Elm Creek Formation 80-130 feet, thins southward

Pad

Po —

— Pho —

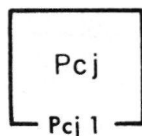
Admiral Formation restricted

Mudstone, shale, limestone, sandstone, and siltstone; Overall Limestone, Po, and Hords Creek Limestone, Pho, separately mapped. Mudstone and shale, mostly gray, some brown and red; some sandstone, siltstone, and limestone in poorly exposed lower part; thin impure limestone lentils in middle and upper parts form indistinct benches; marine megafossils include molluscs

Overall Limestone, Po, fine grained, thin bedded, gray, weathers light brown, megafossils include brachiopods and molluscs, thickness up to 3 feet, thickens southward, occurs as discontinuous lentils NORTH OF CRETACEOUS DIVIDE

Hords Creek Limestone, Pho, fine grained, thin bedded, weathers yellow with dark dull red mottles, thickness 3-5 feet. Thickness of Admiral Formation 150-200 feet; thickens northward

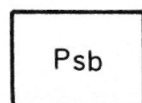
PERMIAN



Coleman Junction Formation expanded

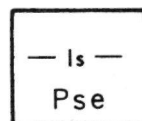
Limestone, mudstone, and sandstone; "Coleman Junction Limestone," Pcj1, at base. Mudstone, in part sandy, locally contains some thin limestone lentils and thin platy sandstone beds, gray, some bluish gray in upper part. Limestone, locally persistent, forms several prominent benches, one bed near top may correlate with lower bed of Hords Creek Limestone IN COLEMAN COUNTY

"Coleman Junction Limestone," Pcj1 NORTH OF CRETACEOUS DIVIDE:—very fine to coarse grained, sandy northward, dark gray, weathers to large rectangular blocks; SOUTH OF CRETACEOUS DIVIDE—two limestone units separated by thin shale unit: upper limestone, nodular, weathers yellow; lower limestone similar to limestone north of divide; locally abundant brachiopods, crinoids, and bryozoans; thickness 1-5 feet. Thickness of Coleman Junction Formation (expanded) 50-75 feet



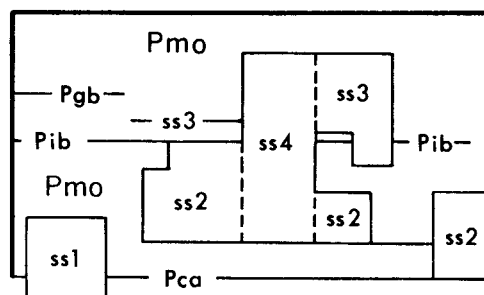
Santa Anna Branch Shale

Mudstone, shale, sandstone, and limestone. Upper part—mostly mudstone, pale red or mottled red and light gray; a few thin limestone lentils, coarse grained, light gray or brown; a few green channel sandstone bodies up to 30 feet thick locally form prominent benches, a sheet sandstone unit normally 1-4 feet thick crops out about 15 feet below top, fine grained, light gray, persistent. Middle part—mudstone, locally contains abundant marine megafossils. Lower part—shale, fissile, gray. Thickness 80-200 feet



Sedwick Formation

Mudstone, limestone, sandstone, siltstone, and conglomerate; limestone, ls, separately mapped. SOUTH OF CRETACEOUS DIVIDE—limestone units at top and bottom separated by mudstone; limestone units 2-5 feet thick, fine grained, argillaceous, nodular, thin to medium bedded, light gray where fresh, weather to orange rubble and thin slabs, form scarps; mudstone, locally contains thin argillaceous limestone, sandstone, and siltstone beds, gray, thickness 15-17 feet. NORTH OF CRETACEOUS DIVIDE:—mudstone, limestone, and sandstone; mudstone, locally contains thin limestone lentils, thin conglomerate beds, and channel sandstone bodies, mostly gray, some red and green, locally plant fragments abundant, marine vertebrate fossils scarce; limestone, three or four discontinuous units 1-3 feet thick including limestone, ls, fine grained, argillaceous, in part sandy or silty, thin bedded, light gray, weathers yellow brown; silicified gastropods and wood in upper limestones; sandstone at base, fine to medium grained, in part conglomeratic in channel fill bodies, locally grades to siltstone or sandy limestone, massive, cross-bedded, some calcite cement, pelecypod molds and crinoid columnals scarce, thickness 1-19 feet, feathers out NORTH OF CLEAR FORK OF BRAZOS RIVER. Thickness of Sedwick Formation 40-70 feet, thickest NEAR U.S. HIGHWAY 80, thins in all directions except down dip, forms scarp in which benches are supported by the basal sandstone and three limestone units, the upper bench being least prominent



Moran Formation

Mudstone, sandstone, and limestone; Gouldbusk Limestone, Pgb, sandstone and mudstone, ss4, sandstone, ss3, Ibex Limestone, Pib, sandstone and mudstone, ss2, sandstone, ss1, and Camp Colorado Limestone, Pea, mapped separately. Mostly mudstone, in part carbonaceous, thin sandstone and siltstone units in upper part, locally thin coal seams beneath Ibex Limestone, gray, red, and black, sponges locally abundant above Ibex Limestone and above ss3, some plant fragments; an unmapped sandstone unit near top locally forms prominent bench

Gouldbusk Limestone, Pgb, upper part—thinly interbedded argillaceous limestone and gray shale, limestones form subdued benches; lower part—limestone 5-6 feet thick, fine grained, gray, forms ledge and moderate bench; thickness about 15 feet

Sandstone and mudstone, ss4, includes ss2 and ss3 where Ibex Limestone is missing, mostly channel fill bodies, some sheet sands in upper part; thickness 25-60 feet

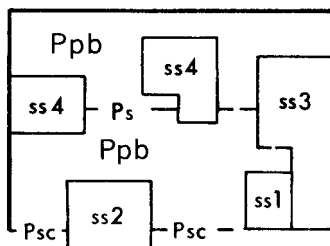
Sandstone, ss3, fine to medium grained, channel fill bodies contain some limestone conglomerate in basal part, cross-bedded, ripple-marked, some sheet sandstones, gray; mapped only where thick and areally extensive; thickness 20-30 feet

Ibex Limestone ("Dothan Limestone"), Pib, fine grained, in part sandy, bioclastic, locally limestone conglomerate lenses, gray to brown, Pinna and algae scarce; locally cut out by ss3, may grade laterally to ss3, forms moderate bench southward; thickness 4-6 feet

NEAR SOUTHERN EDGE OF MAP, commonly 1 foot thick in SHACKELFORD COUNTY
Sandstone and mudstone, ss2, sandstone units 5-12 feet thick, fine to medium grained, ripple-marked, cross-bedded, gray to brown; only broad dip slopes mapped, thickness including mudstone 20-40 feet

Sandstone, ss1, fine to medium grained, locally contains chert pebble conglomerate, forms elongate channel fill bodies, reddish brown, locally cuts out Camp Colorado Limestone; thickness up to 60 feet

Camp Colorado Limestone ("Noodle Creek Limestone"), Pea, two limestone units separated by shale; upper limestone—nodular, recessive, yellowish gray, weathers to slabs and rubble, thickness 2-11 feet, NORTH OF U. S. HIGHWAY 180 absent; shale—locally contains limestone lentils a few inches thick, fissile, marine megafossils, thickness 6-8 feet; lower limestone—fine grained, thin to medium bedded, ledge forming, light gray, weathers to thin slabs, marine megafossils, NORTH OF U. S. HIGHWAY 180 grades laterally into sandstone, ss2, cut out by ss1 NEAR SOUTHERN EDGE OF MAP, thickness 1-6 feet; total thickness of Camp Colorado Limestone 3-25 feet, thins northward. Thickness of Moran Formation 180-190 feet



Pueblo Formation

Mudstone, shale, sandstone, siltstone, and limestone; sandstone and mudstone, ss4, sandstone, ss3, Stockwether Limestone, Ps, sandstone, ss2, Saddle Creek Limestone, Psc, and sandstone, ss1, separately mapped. Mudstone, upper part—red and green, locally shale, carbonaceous, dark gray to black; lower part below Stockwether Limestone—a few sandstone and siltstone units 2-10 feet thick, thin limestone lentils scarce, fissile, gray, locally marine megafossils, some plant fragments

Sandstone, ss4, fine to medium grained, conglomeratic, some blocks of Stockwether Limestone in channel fill bodies, locally interbedded mudstone, sheet sandstone, and channel sandstone bodies, near middle of area several such deposits superposed, individual units up to 30 feet thick, thickness up to 60 feet

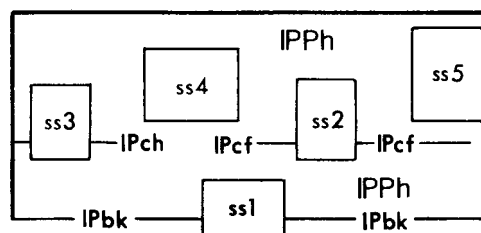
Sandstone and mudstone, ss3, sandstone units fine to medium grained, locally conglomeratic, some interbedded mudstone similar to that in upper part, thin impure limestone lentils may be equivalent to Stockwether Limestone, cross-bedded, reddish brown; interval consists of two or three superposed channel sandstone deposits interbedded with mudstone, siltstone, and sheet sandstone, thickness 50-100 feet, thickens northward

Stockwether Limestone, Ps, *fine grained, locally argillaceous*, SOUTH OF CRETACEOUS DIVIDE contains gray and brown chert distributed irregularly through an interval of about 2 feet, gray to light brown, locally cut out by broad channel fills of ss4, some crinoid columnals and burrow casts in basal part; thickness 1-12 feet, in central area 1-3 feet, feathers outnorthward NEAR U. S. HIGHWAY 180

Sandstone, ss2, *fine grained, locally calcareous*, locally contains chert pebble conglomerate, some blocks of Saddle Creek Limestone in east-west elongated channels, massive, cross-bedded, contorted bedding, gray, brown, thickness up to 40 feet

Sandstone, ssl, *upper part calcareous*, in part equivalent to Saddle Creek Limestone NORTH OF HUBBARD CREEK, lower part noncalcareous, irregularly thin bedded, ripple-marked, coalesces with base of ss3, north of Saddle Creek Limestone pinch-out, forms prominent scarp; thickness about 5 feet

Saddle Creek Limestone, Psc, *fine grained, thin bedded, gray*, grades to ssl NORTH OF U. S. HIGHWAY 180, approximately equivalent to thin limestone lentils in ssl, thin bedded, gray, locally contains fusulinids, corals, brachiopods, Pinna, phylloid algae, thickness 2-10 feet, thickens southward. Thickness of Pueblo Formation 150-175 feet, thins northward



Harpersville Formation

Mudstone, coal, limestone, and sandstone; sandstone, ss5, sandstone and mudstone, ss4, sandstone, ss3, sandstone, ss2, Crystal Falls Limestone, IPcf, and equivalent Chaffin Limestone, IPch, sandstone, ssl, and Breckenridge Limestone, IPbk, separately mapped. Mudstone, upper part—locally silty, gypsiferous, carbonaceous, discontinuous thin coal seams (prominent coal bed 10-20 feet below Saddle Creek Limestone) and thin limestone beds common, some channel sandstone bodies, mostly gray, in part variegated, maroon, green, and yellow brown; lower part—kaolinitic below Crystal Falls Limestone, a few thin discontinuous coal seams, thin limestone beds, and sheet sandstones, in part maroon

Sandstone and mudstone, ss5, sandstone, SOUTH OF CLEAR FORK OF BRAZOS RIVER—very fine to fine grained, in part silty, locally calcareous, cross-bedded, thin bedded, mostly sheet sandstones, locally burrowed, thickness 1-4 feet; NORTH OF CLEAR FORK OF BRAZOS RIVER—fine to medium grained, some clay clasts and chert pebbles, friable, massive, some convolute bedding, mostly channel fill bodies, dark brown, up to 30 feet thick; mudstone, similar to that above Crystal Falls Limestone, discontinuous argillaceous limestone beds and thin coal seams locally; thickness 5-80 feet, thickens northward

Sandstone, ss4, locally conglomeratic, upper part thin bedded, silty, cross-bedded, locally highly contorted, some sandstone dikes, load casts, mostly channel fill bodies elongate southeast-northwest, up to 40 feet thick, feathers out 1 MILE NORTH OF LAKE CISCO.

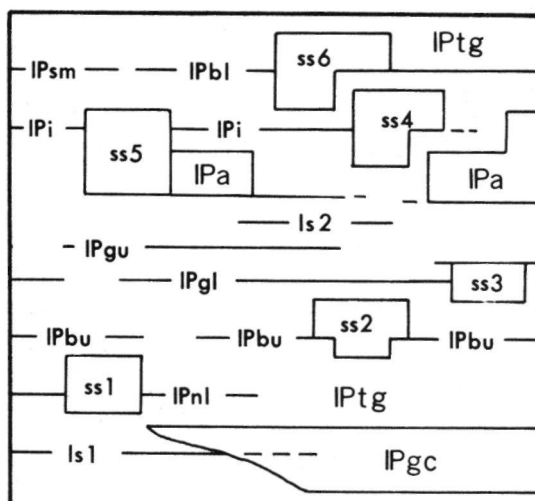
Sandstone, ss3, fine to medium grained, locally some chert pebble conglomerate in channel fill bodies, locally cuts out Chaffin Limestone, approximately equivalent to ss4 NEAR CISCO, gray to reddish brown; thickness 15-20 feet

Sandstone, ss2, very fine to medium grained, locally conglomeratic, channel fill bodies elongated northwest-southeast, possibly in part equivalent to ss4 NEAR LAKE CISCO; up to 15 feet thick

Crystal Falls Limestone, IPcf, and Chaffin Limestone, IPch, *fine grained*, locally two limestone beds separated by 1 foot of shale, mound-like structures up to 15 feet in diameter common, gray to yellow brown, locally mottled maroon and gray, locally marine megafossils, missing and possibly cut out by channels IN NORTHERN PART OF AREA AND IN VICINITY OF LAKE CISCO; an unmapped limestone 20 feet above IN NORTH-CENTRAL AREA converges southward with IPcf; Crystal Falls Limestone may be equivalent to Chaffin Limestone of Colorado River valley; thickness 1-4 feet

Sandstone, ssl, fine to medium grained, along with some mudstone forms elongate channel fill bodies, cuts out Breckenridge Limestone SOUTH OF BRECKENRIDGE AND NEAR HARPERSVILLE TOWNSITE, reddish brown to gray; thickness 5-20 feet

Breckenridge Limestone, IPbk, *fine grained*, locally bioclastic, upper part, nodular, recessive, poorly exposed, lower 2 feet, massive, ledge forming, mottled red and gray on weathered surfaces, locally abundant fusulinids near base; thickness 3-7 feet. NORTH OF THE CLEAR FORK OF BRAZOS RIVER AND IN EASTLAND COUNTY, an unmapped limestone occurs 5-25 feet above Breckenridge Limestone. Thickness of Harpersville Formation 175-210 feet, thickens northward



Thrifty and Graham Formations undivided

Mudstone, sandstone, and limestone; sandstone, ss6, Blach Ranch Limestone, **IPbl**, and equivalent Speck Mountain Limestone, **IPsm**, SOUTH OF CRETACEOUS DIVIDE, sandstone, ss5, sandstone, ss4, Ivan Limestone, **IPi**, Avis Sandstone, **IPa**, limestone, ls2, Gunsight Limestone, **IPgu** and **IPgl**, sandstone, ss3, sandstone, ss2, sandstone, ss1, Bunker Limestone, **IPbu**, North Leon Limestone, **IPnl**, limestone, ls1, and Gonzales Creek Member, **IPgc**, separately mapped. Mudstone, sandy and silty above Avis Sandstone; in each of the intervals between the Avis Sandstone and Gunsight Limestone and the Gunsight and Bunker Limestones, more silty, sandy, and thinly bedded upward, some thin sandstone and limestone lentils. Mudstone, gypsiferous, locally thin coal seams, argillaceous to bioclastic limestone lentils, thin ripple-marked sandstone units, mostly gray, in part variegated olive green to maroon between Bunker Limestone and Gonzales Creek Sandstone. Mudstone, silty, sandy upward, locally thin limestone and sandstone lentils, dark gray to black, between Gonzales Creek Sandstone and Home Creek Limestone. A thin persistent coal bed beneath Blach Ranch Limestone, some thin bituminous coal seams in lower part, mostly light gray, in part variegated yellow and maroon in upper part, dark gray to black below Gunsight Limestone, molluscan fauna and corals abundant at level where Gunsight Limestone is missing, marine megafossils and plant fragments locally common in most mudstones

Sandstone, ss6, medium grained, locally contains chert pebble conglomerate, some mud clasts, reddish brown, forms east-west elongate channel fill bodies, locally cuts out Blach Ranch and Ivan Limestones; thickness 5-20 feet

Blach Ranch Limestone, **IPbl**, and equivalent Speck Mountain Limestone, **IPsm**, two limestone units separated by shale; upper limestone, argillaceous, nodular, recessive, fossiliferous, thickness about 1 foot; lower limestone, bioclastic, thick bedded to massive, ledge forming, gray, weathers to large orange-brown blocks and slabs; directly overlies thin, impure coal; thickness 2-5 feet

Sandstone, ss5, includes sandstones stratigraphically equivalent to both Avis and ss4, where Ivan Limestone is absent IN EASTLAND COUNTY

Sandstone, ss4, fine to medium grained, locally limestone and mudstone clasts in basal part, locally interbedded with plant-rich mudstone, massive, forms east-west elongate channel fill, highly contorted bedding near axis, ripple marked, locally cuts out Ivan Limestone, reddish brown; thickness 10-35 feet

Ivan Limestone, **IPi**, mostly fine grained, locally bioclastic, silty, sandy, in two units separated by 2 feet of shale, irregularly bedded in thin to thick beds, light gray; varies widely in thickness and composition, normally 1-8 feet thick, thickens to 22 feet 1 MILE NORTH OF U. S. HIGHWAY 180

Avis Sandstone, **IPa**, fine grained, lenses of chert pebble conglomerate locally at base of channel fill deposits, locally calcareous, laminated to cross-bedded, thick bedded, thickness up to 30 feet in channel fill bodies, normal thickness up to 9 feet

Limestone, ls2, southwestward grades into thin, poorly bedded, calcareous siltstone, limestone thin bedded, gray, sponges locally abundant; thickness about 3 feet

Gunsight Limestones, **IPgu** and **IPgl**, two limestone units separated by mudstone; upper Gunsight Limestone, **IPgu**, fine grained, thin bedded to massive, gray, weathers yellow gray and forms angular fragments, marine megafossils and algal structures, thickness 1-5 feet; mudstone, some sandstone lentils, gray, thickness 20-30 feet; lower Gunsight Limestone, **IPgl**, southward, massive, dark gray; northward, argillaceous, nodular, irregularly bedded, gray to light brown, locally at this level sandstone, calcareous, indurated, gray, marine megafossils, locally grades laterally into unit composed of the coral Caninia; thickness up to 2 feet

Sandstone, ss3, fine to medium grained, some thin shale intercalated with sheet sandstone, some east-west elongate channel fill bodies which cut the lower Gunsight Limestone, an unmapped thin limestone lies above ss3 immediately NORTH OF CLEAR FORK OF BRAZOS RIVER; thickness 5-20 feet

Virgil Series

Cisco Group

Sandstone, ss2, medium grained, chert pebble conglomerate locally in lower part, massive, contorted bedding, mostly east-west elongate channel fill bodies, locally cuts out Bunker Limestone, weathers reddish brown; thickness 5-30 feet
 Bunker Limestone, **IPbu**, fine grained, thin bedded with beds separated by very thin shales, gray, marine fossils include fusulinids, crinoid columnals, and brachiopods, algae produce wavy bedding; thickness 3-8 feet
 Sandstone, ssl, similar to ss2, locally cuts out North Leon Limestone in LEON RIVER VALLEY; thickness 5-15 feet
 North Leon Limestone, **IPnl**, fine grained, wavy bedded, gray, weathers yellow brown, similar to Bunker Limestone; thickness 2-5 feet
 Gonzales Creek Member, **IPgc**, sandstone, shale, and mudstone, forms prominent bench, interbedded silty and sandy mudstone contains locally marine megafossils; some plant-rich shales; sandstone, fine to medium grained, conglomerate lenses locally in elongate channel fill bodies having contorted bedding, sheet sandstones in upper part, individual beds commonly 1-9 feet, locally 25 feet thick
 Limestone, **ls1**, argillaceous, thin bedded, gray to brown, marine megafossils, thickness 1-2 feet, forms low scarp, in central area occurs as discontinuous lentils not necessarily equivalent, may correlate with Jacksboro Limestone northeastward. Thickness of Thrifty and Graham Formations (undivided) 330-490 feet, thickens northeastward

IPhc

Home Creek Limestone

Limestone and shale. Upper limestone, bioclastic, nodular, irregularly bedded, dark gray, weathers to rubble with pitted surface, locally abundant crinoid fragments, brachiopods, and fusulinids, a few gastropods and algae; thickness 6-26 feet, thickens northeastward to 18 feet and locally down dip to 26 feet. Shale, locally contains thin sandstone lentils and nodular limestone lentils about 1 foot thick, light gray, weathers yellow brown; thickness 7-22 feet. Lower limestone, bioclastic, unevenly bedded, medium to thick bedded, gray, weathers to mottled gray and tan slabs and blocks with pitted surfaces, moderately fossiliferous including brachiopods, fusulinids, crinoid fragments, and algae; thickness 7-40 feet, thickens northeastward. Thickness of Home Creek Limestone 20-50 feet, thickens northeastward and down dip, forms prominent scarp and moderately broad dip slope

IPcc

Colony Creek Shale

Shale and sandstone. Shale, in part calcareous, silty, some light brown siltstone, iron-stained concretions locally beneath brown noncalcareous shale, in part gray, locally crinoid columnals, bryozoans, brachiopods, and gastropods. Sandstone, channel fill deposits form prominent rounded benches, fine grained, massive, cross-bedded, dark brown; locally 40-70 feet thick; sandstone lentils, calcareous, light gray to reddish brown, 5-10 feet thick, sandstone increases in amount northeastward. Thickness 35-110 feet, thickens northeastward, crops out on steep slope

IPr

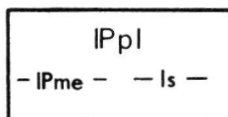
Ranger Limestone

Limestone and shale. Upper limestone, bioclastic, unevenly bedded, light brown, weathers gray; thickness about 5 feet. Shale, calcareous, gray; thickness about 12 feet. Lower limestone, locally argillaceous, contains dark brown chert nodules with white fossil fragments, massive, in upper part nodular and thick bedded, prominently jointed, weathers to large rectangular blocks, light gray, abundant algae, brachiopods in nodular part; thickness 30-50 feet. Thickness of Ranger Limestone 50-70 feet, thickens northeastward

PENNSYLVANIAN

Missouri Series

Canyon Group

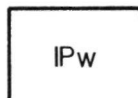


Placid Shale

Shale, sandstone, and limestone; Merriman Limestone, *IPme*, and limestone, *ls*, separately mapped. Upper part—commonly calcareous shale alternating with calcareous sandstone, silty, micaceous, gray; sandstone, cross-bedded, ferruginous, channel fill bodies locally, about 20 feet thick. Lower part—shale, zone of abundant molluscs, brachiopods, corals, and crinoid columnals

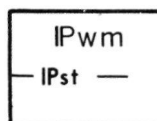
Merriman Limestone, *IPme*, fine grained, light yellow, weathers to rectangular blocks, up dip appears to converge with Winchell Limestone, possibly equivalent to limestone, *ls*; thickness 5 feet; thickens northeastward

Limestone, *ls*, bioclastic, argillaceous, brown, possibly equivalent to Merriman Limestone; thickness 1-10 feet. Thickness of Placid Shale 100-150 feet, thickens northeastward except at POSSUM KINGDOM LAKE where it thins over thickened Winchell Limestone



Winchell Limestone

Limestone and shale. Upper limestone, fine grained, thick bedded in south to thin bedded northward, gray, contains brown algal structures; thickness 4-10 feet, thickens northeastward. Shale, calcareous northeastward, thin limestone lentils, gray; thickness 3-15 feet, thins scutwestward. Lower limestone, fine grained to coarsely bioclastic, calcareous shale a few inches thick between beds, black chert nodules with white fossil fragments in lower part, irregularly and thin to medium bedded, nodular upward, marine megafossils. In thickened portion, bioclastic, algal, about 65% fine grained, thin bedded, locally nodular, 30% coarse grained, thick bedded, rest thin interbeds of shale, gray, forms broad dip slope and prominent scarp. Thickness of Winchell Limestone 15-50 feet, thickens northeastward, abruptly thickens to about 190 feet NEAR POSSUM KINGDOM LAKE, inter fingering with overlying Placid Shale and underlying Wolf Mountain Shale



Wolf Mountain Shale

Shale, sandstone, and limestone; Staff Limestone, *IPst*, separately mapped. Shale, gray, weathers brown; above Staff Limestone—contains limestone, argillaceous, bioclastic, and sandstone in channel fill bodies which display contorted bedding, more abundant northeastward; below Staff Limestone—some ironstone concretions, locally thin, calcareous, fossiliferous sandstone and siltstone lentils, lignite 10-15 feet thick NORTH OF BRAZOS RIVER near base; probably equivalent to upper part of Brownwood Shale in Colorado River valley of Brownwood Sheet

Staff Limestone, *IPst*, about 95 feet above base, fine grained, sandy northward, thin bedded with shale partings, gray, weathers brown, abundant fusulinids in upper part; beyond pinch-out to north sandy fusulinid limestone lentils and calcareous sandstone occur at this stratigraphic position; probably equivalent to Adams Branch Limestone of Colorado River valley of Brownwood Sheet; thickness about 6 feet, thickens southwestward. Thickness of Wolf Mountain Shale 100-270 feet, thickens northeastward except for thinning beneath Winchell Limestone NEAR POSSUM KINGDOM LAKE

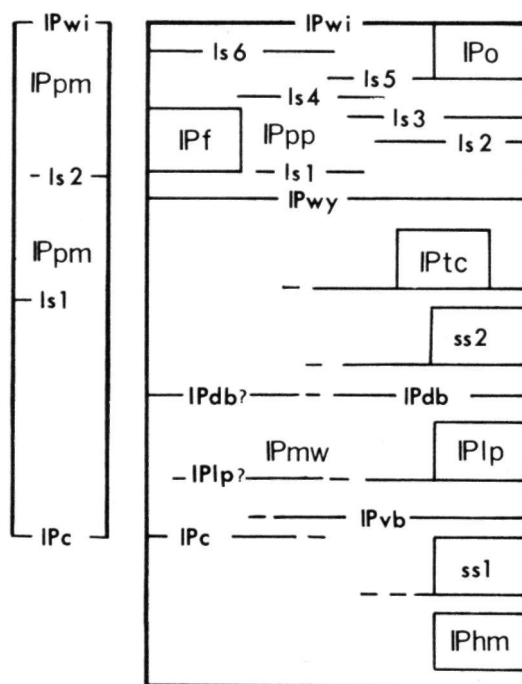
Missouri Series

Canyon Group

?

Des Moines Series

Strawn Group



Palo Pinto and Mineral Wells Formations, undivided in southern area

Palo Pinto Formation, **IPpp**, dominantly limestone and marl, some sandstone and shale; Wiles Limestone, **IPwi**, Oran Sandstone, **IPo**, limestones, ls6 to ls1, Fambro Sandstone, **IPf**, and Wynn Limestone, **IPwy**, separately mapped. Shale, in part sandy, commonly calcareous, numerous thin unmapped limestones; several sandstone lentils, gray

Wiles Limestone, **IPwi**, fine grained, locally coarse grained, bioclastic, irregularly bedded, thick bedded to massive, dark gray, forms prominent scarp, algae common, in part represented northward by limestone? lentils of approximately equivalent ages, thickness 1-15 feet

Oran Sandstone, **IPo**, fine to medium grained, ferruginous, locally cross-bedded, channel fill bodies in lower part, thin bedded at base, massive upward, jointing more prominent upward, forms rounded bench, southward grades abruptly into thin limestone beds and shale of upper one-third of Palo Pinto Formation, plant fragments common in lower part; thickness up to 50 feet

Limestones, ls6 to ls1, fine grained, in part bioclastic, massive, in part nodular, distributed through about 50-175 feet of section, all units play out either in one direction or both directions within map area

Fambro Sandstone, **IPf**, fine to medium grained, locally conglomeratic, pebbles of chert and claystone, massive to thick bedded, cross-bedded, ferruginous, reddish brown, weathers to large blocks, forms rounded bench, northeastwardly grades abruptly to shale and thin limestone beds of lower half of Palo Pinto Formation, plant fragments scarce; thickness up to 45 feet

Wynn Limestone, **IPwy**, fine grained, bioclastic, irregularly thin bedded to nodular, gray, weathers to large blocks, cherty NORTH OF U. S. HIGHWAY 180, forms prominent scarp, basal Palo Pinto limestone, fossils include brachiopods and crinoid columnals, fusulinids in upper part, algae in lower part, thickness about 25 feet, thins southwestward. Thickness of Palo Pinto Formation, 100-175 feet, thickens northeastward, in part equivalent to the Brownwood Shale of Colorado River valley of Brownwood Sheet

Mineral Wells Formation, **IPmw**, shale, sandstone, conglomerate, and limestone; Turkey Creek Sandstone, **IPtc**, sandstone, ss2. Dog Bend Limestone, **IPdb**, Lake Pinto Sandstone, **IPlp**, Village Bend Limestone, **IPvb**, Capps Limestone, **IPc**, sandstone, ss1, and Hog Mountain Sandstone, **IPhm**, separately mapped. Shale, calcareous, several unmapped limestone lentils between **IPc** and **IPwy**, especially SOUTH OF BRAZOS RIVER, sandstone more abundant northeastward, dark gray to black, a few plant fossils

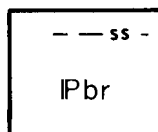
Turkey Creek Sandstone, **IPtc**, coarse-grained, locally chert conglomerate, cross-bedded, massive, reddish brown; thickness 10-50 feet, feathers out abruptly southwestward

Sandstone, ss2, fine to coarse grained, thin bedded to massive, brown; thickness 10-12 feet, feathers out southwestward

Dog Bend Limestone, **IPdb**, one to four discontinuous limestone units separated by shale; limestone, fine grained, slightly argillaceous, light gray, individual units 1-3 feet thick, locally grades to sandstone in southern area

PENNSYLVANIAN

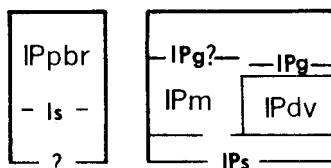
- Lake Pinto Sandstone, **IP_{lp}**, *medium to fine grained, locally conglomeratic, thick bedded, brown, prominent* NEAR MINERAL WELLS, *less prominent southward; thickness 20-50 feet*
- Village Bend Limestone, **IP_{vb}**, *fine grained, locally sandy, thick bedded, yellow gray, weathers to small blocks, marine megafossils, consists of several laterally discontinuous limestone lentils, locally where limestone is absent, calcareous sandstone occurs in this stratigraphic position; thickness 2-3 feet*
- Capps Limestone, **IP_c**, *fine to medium grained, wavy bedded, crinoid columnals, fusulinids locally abundant; thickness up to 8 feet, thickens southwestward, feathers out north-eastward*
- Sandstone, **ss₁**, *locally conglomeratic, crops out* NEAR MINERAL WELLS; *thickness about 30 feet*
- Hog Mountain Sandstone, **IP_{hm}**, *fine to medium grained, thick bedded to flaggy, brown, occurs* NEAR MINERAL WELLS; *thickness about 25 feet. Thickness of Mineral Wells Formation 275-700 feet, maximum thickness* NEAR MINERAL WELLS
- Palo Pinto and Mineral Wells Formations, **IP_{pm}**, *UNDIVIDED IN SABANA AND LEON RIVER VALLEYS because Wynn Limestone which marks the boundary is absent; Wiles Limestone, **IP_{wi}**, limestone, **ls₂**, limestone, **ls₁**, and Capps Limestone, **IP_c**, mapped separately; mostly shale similar to that in the Mineral Wells Formation except possibly more sand, silt, and thin sheet sandstone units are present; locally some limestone and calcareous sandstone lentils.*
- Wiles Limestone, **IP_{wi}**, *similar to exposures in BRAZOS RIVER VALLEY, 6-8 feet thick*
- Limestones, **ls₂** and **ls₁**, *fine grained, gray, not necessarily equivalent with any limestone* IN BRAZOS RIVER VALLEY, *3-5 feet thick*
- Capps Limestone, **IP_c**, *fine to medium grained, irregularly bedded and massive, varies widely in composition and thickness, consists of lenticular limestone units locally, Chaetetes colonies locally, thickness up to 8 feet*



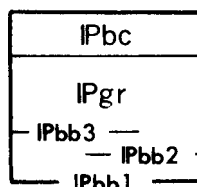
Brazos River Formation expanded

Sandstone, conglomerate, and mudstone; sandstone, ss, separately mapped NORTH OF U. S. HIGHWAY 80. *Sandstone, NORTHEASTERN PALO PINTO COUNTY AND IN SABANA AND LEON RIVER VALLEYS—coarse grained, ferruginous, cross-bedded, thick bedded to massive, reddish brown, locally conglomerate lentils; IN SOUTHERN PALO PINTO COUNTY—fine to medium grained, calcareous, thin bedded, some marine megafossils, grades laterally into interbedded thin sandstone and shale beds. Some gray, silty mudstone lenses locally*

Sandstone, ss, conglomerate NEAR BRAZOS RIVER, *angular pebbles of chert, some clay ironstone, sandstone* EAST OF MINERAL WELLS, *forms high scarp; thickness about 25 feet. Thickness of Brazos River Formation 100-200 feet, thickens southwestward*

Pre-Brazos River Formation rocks undivided and
Mingus Formation redefined

- Mingus Formation, **IP_m**, *shale, sandstone, and limestone; Goen Limestone, **IP_g**, Dobbs Valley Sandstone, **IP_{dv}**, and Santo Limestone, **IP_s**, separately mapped. Shale, sandy, one thin coal seam (Thurber Coal) in middle part, poorly bedded, gray to buff*
- Goen Limestone, **IP_g**, *increasingly sandy southwestward, forms discontinuous lentils at approximately same stratigraphic position, crinoid columnals, brachiopods, and corals locally abundant, gray to tan, thickness up to 2 feet*
- Dobbs Valley Sandstone, **IP_{dv}**, *medium grained, locally calcareous, commonly massive, reddish brown, outcrop discontinuous, some interbedded sandy shales, forms prominent scarp, thickness up to about 45 feet*
- Santo Limestone, **IP_s**, *dark gray, fusulinids, abundant; thickness 2-4 feet. Thickness of Mingus Formation (redefined) about 230 feet.*
- IN THE LEON AND SABANA RIVER VALLEYS *small inliers of pre-Brazos River Formation rocks, **IP_{pbr}**, have not been precisely correlated with those in the BRAZOS RIVER VALLEY and for this reason are undivided. The rocks are mostly mudstone with thin sandstone units and a few limestone lentils; one lenticular limestone, **ls**, is separately mapped*

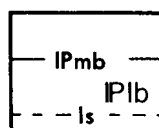


Grindstone Creek Formation expanded

Shale, sandstone, and limestone; Buck Creek Sandstone, IPbc, and Brannon Bridge Limestones, IPbb3, IPbb2, IPbb1, separately mapped. Shale, in part sandy, locally contains thin lignite beds and sandstone lentils, gray

Buck Creek Sandstone, IPbc, coarse grained, massive, reddish brown, forms prominent scarp, thickness about 30 feet

Brannon Bridge Limestones, IPbb3 to IPbb1, limestone separated by shale, limestone fine grained, dark chert lenses in IPbb2, bedding indistinct to medium, unevenly bedded, gray, IPbb3 grades northeastward to sandstone, individual limestone units up to 15 feet thick, form good scarps, interbedded shale about 10 feet thick. Thickness of Grindstone Creek Formation (expanded) about 250 feet



Lazy Bend Formation

Shale and sandstone; Meek Bend Limestone, IPmb, and unnamed limestone, ls, separately mapped. Shale in part sandy, in part silty, local coaly zones, local limestone lentils such as at LIPAN CEMETERY, poorly bedded, dark gray

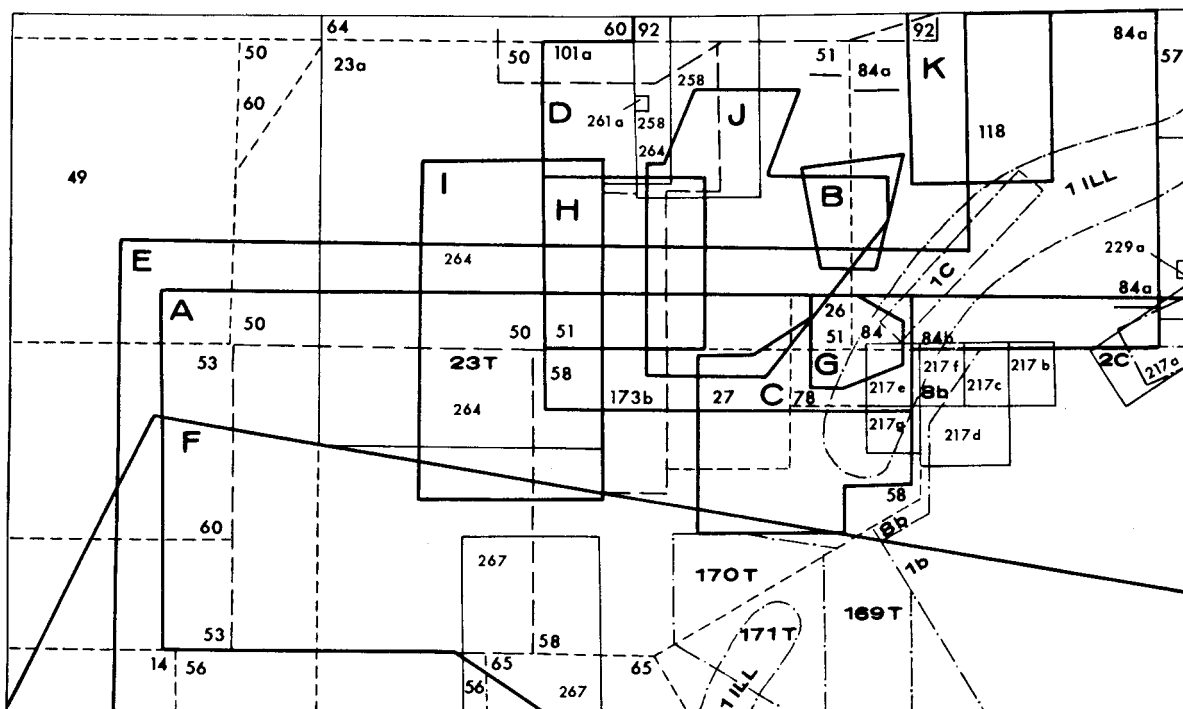
Meek Bend Limestone, IPmb, fine grained, thin flaggy to massive, gray, locally marine megafossils, forms prominent scarp; thickness up to 12 feet

Limestone, ls, fine grained, medium to thin bedded, gray to brown, locally grades into sandstone, marine megafossils; thickness 1-6 feet, very poorly exposed in KICKAPOO CREEK INLIER. Thickness of Lazy Bend Formation about 250 feet, base not exposed in map area

Geologic mapping mostly by L. F. Brown, Jr., and J. L. Goodson, Bureau of Economic Geology, The University of Texas at Austin, with contributions gratefully acknowledged from Southern Minerals Corporation, Humble Oil & Refining Company, Shell Oil Company, Shell Development Company, and sources shown on Index of Geologic Mapping. Geology compiled on high altitude aerial photographs by Brown, Goodson, and Peggy Harwood. Map scribed by J. W. Macon, Mary Jane Graham, and Richard Dillon.

Geologic mapping reviewed by Geologic Atlas Project Committees of the Abilene Geological Society, R. R. Bloomer (Independent Geologist), Chairman, G. C. Fraser III (Independent Geologist), H. Lease Bonifield (Independent Geologist), W. Henry Conkling (Independent Geologist), C. M. Ferguson (Independent Geologist), and Earl P. Harrison (Independent Geologist); Fort Worth Geological Society, W. J. Nolte (Independent Geologist), Chairman, and Leo Hendricks and Edward Heuer (Texas Christian University); and Dallas Geological Society, R. J. Cordell (Sun Oil Company), Chairman, E. G. Wermund, Jr. (Mobil Oil Corporation), and J. E. Brooks and R. L. Laury (Southern Methodist University). Informal subsurface terminology approved by Abilene Geological Society Geologic Atlas Project Committee, R. R. Bloomer, Chairman.

Numbers in outlined areas refer to items in bibliography in "Index to Areal Geologic Maps in Texas, 1891-1961," by T. E. Brown (1963) Bureau of Economic Geology, The University of Texas at Austin. For area A, see P. A. Boone (1966) Outcrop and Thickness of "Basal Trinity" (Lower Cretaceous) Sands of Central Texas: Baylor University M.S. thesis; for area B, see P. Bretsky, Jr. (1966) Geology of Upper Canyon Group in Stephens and Palo Pinto Counties, Texas; Graduate Research Center Jour., vol. 35, no. 2, Pl. I; for area C, see D. E. Feray and J. E. Brooks, Preliminary Geologic Map of Part of Canyon Group, North-Central Texas: unpublished ms. map; for area D, see D. E. Feray, J. E. Brooks, and Edward Heuer (1966) Pennsylvanian Strata, North-Central Texas: Graduate Research Center Jour., vol. 35, no. 2, Pl. I; for area E, see W. L. Fisher and P. U. Rodda (1966) Geologic Map of Basal Cretaceous Rocks between Colorado and Red Rivers, Texas: Univ. Texas, Bur. Econ. Geol. Rept. Inv. No. 58, Pl. I; for area F, see J. G. Frost (1967) Geologic Map of Edwards Limestone of Central Texas, in Comanchean (Lower Cretaceous) Stratigraphy and Paleontology: Permian Basin Section, Soc. Econ. Paleon. and Min., Pl. I; for area G, see R. L. Laury (1962) Geology of the Type Area, Canyon Group, North-Central Texas: Graduate Research Center Jour., vol. 30, no. 3, Pl. I; for area H, see J. H. McGowen (1964) Geologic Map of Harpersville and Pueblo Formations, Stephens County, Texas: Baylor University M.S. thesis; for area I, see J. R. Ray (1968) Geologic Map of Putnam and Moran Formations, Callahan, Eastland, Shackelford, and Stephens Counties, Texas: Baylor University M.S. thesis; for area J, see T. H. Waller (1966) Geologic Map of the Upper Caddo Creek, Graham and Thrifty Formations, Southeastern Stephens County, Texas: Baylor University M.S. thesis; for area K, see E. G. Wermund, Jr. (1966) Geologic Map of Possum Kingdom Vicinity: Graduate Research Center Jour., vol. 35, no. 2, Pl. I.



APPROXIMATE
CORRELATION OF SURFACE AND SUBSURFACE
NOMENCLATURE

Informal Subsurface Names Used on Eastern Shelf of West Texas Basin*/	Rock Units Mapped on Abilene Sheet
MORAN FORMATION	
Dothan limestone	Ibex Limestone, Pib
Moutray sandstone	Sandstone, ss4 (lower) Sandstone, ss2 Sandstone, ss1
Noodle Creek limestone	Camp Colorado Limestone, Pea
PUEBLO FORMATION	
Frye sandstone	Sandstone, ss 4 Sandstone, ss 3 (upper)
Tannehill sandstone	Sandstone, ss3 (lower) Sandstone, ss2 Sandstone, ss1
HARPERSVILLE FORMATION	
Bluff Creek sandstone	Sandstone, ss5 (upper)
Flippen sandstone	Sandstone, ss5 (middle) Sandstone, ss4 (upper)
Cook sandstone	Sandstone, ss5 (lower) Sandstone, ss4 (lower) Sandstone, ss3 Sandstone, ss2
Upper Hope sandstone	Sandstone, ss1
GRAHAM AND THRIFTY FORMATIONS (UNDIVIDED)	
Lower Hope sandstone	Sandstone, ss6
King sandstone	Sandstone, ss5 (upper) Sandstone, ss4
Swastika sandstone	Sandstone, ss5 (lower) Avis Sandstone, Pa
McMillan sandstone	Sandstone, ss3 ? Sandstone, ss2 Sandstone, ss1
Lower Cisco sandstone	Gonzales Creek Sandstone, Pgc
PALO PINTO FORMATION	
Palo Pinto sandstone	Oran Sandstone, Po Fambro Sandstone, Pf
MINERAL WELLS FORMATION	
Cross Cut sandstone	Turkey Creek Sandstone, Ptc
Moran sandstone	Sandstone, ss2
Morris sandstone	Lake Pinto Sandstone, Plp
Upper Fry sandstone	Sandstone, ss1 Hog Mountain Sandstone, Phm
BRAZOS RIVER FORMATION	
Lower Fry sandstone	Brazos River Formation, Pbr
MINGUS FORMATION	
Jennings sandstone	Dobbs Valley Sandstone, Pdv
Gardner limestone	Santo Limestone, Ps
GRINDSTONE CREEK FORMATION	
Gardner or Gray sandstone	Buck Creek Sandstone, Pbc

*/ Correlations by Abilene Geological Society Geologic Atlas Committee,
R. R. Bloomer, Chairman.