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GEOLOGIC QUADRANGLE MAP NO. 34 — 6

Geology of the Yeager Creek Quadrangle, Blanco and Hays Counties, Texas

BY

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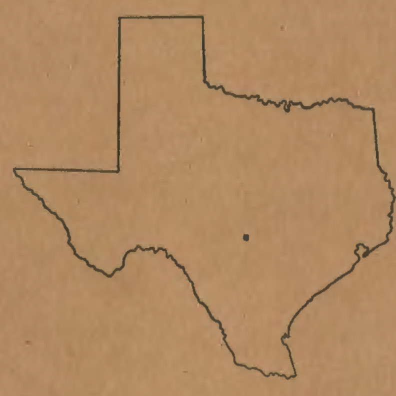
map & text



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THE UNIVERSITY OF TEXAS
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TO ACCOMPANY MAP—GEOLOGIC
QUADRANGLE MAP NO. 34

GEOLOGY OF THE YEAGER CREEK QUADRANGLE, BLANCO AND HAYS COUNTIES, TEXAS

VIRGIL E. BARNES

1967

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GENERAL SETTING

Yeager Creek quadrangle includes part of the southeastern Llano region and part of the eastern margin of the Edwards Plateau where most of the Plateau surface has been destroyed by erosion. Outliers of the Edwards Plateau are mostly in the southeastern part of the quadrangle along the divides separating the Blanco River, Pedernales River, and Onion Creek drainage basins. Those portions of the quadrangle drained by Onion Creek and Blanco River are mostly gently rolling except near divides. The headward tributaries of Wanslow Creek, which empties into Blanco River, are deeply incised. The rest of the quadrangle is also mostly rugged.

The geology of the Yeager Creek quadrangle is shown on a U. S. Geological Survey 7½-minute, 1:24,000 scale, 20-foot contour interval, topographic quadrangle map base. The relief in the quadrangle is about 665 feet, ranging from 1,005±5 feet where Miller Creek leaves the northern edge of the quadrangle to 1,670 feet on an Edwards outlier near the southern boundary of the quadrangle.

About 72 percent of the Yeager Creek quadrangle drains to Pedernales River via Miller Creek and its tributaries —Yeager, Middle, Bates, McCall, and Turkey Creeks, Millseat Branch, and numerous unnamed tributaries. About 5 percent of the quadrangle drains to Pedernales River via Brock and Rough Hollows and 6 percent via tributaries of Flat Creek. Nine percent of the quadrangle is drained by Onion Creek directly to Colorado River and the remaining 8 percent drains to Blanco River.

Yeager Creek quadrangle is high on the southeast side of the Llano uplift. Cretaceous rocks and small Quaternary surficial deposits occupy the entire quadrangle. The relatively flat-lying Cretaceous rocks in the northern part of the quadrangle have an average dip eastward of about 20 feet per mile. This rather uniform dip is interrupted by a fault in the southern part of the quadrangle.

This map of the Yeager Creek quadrangle is the seventh of a series of Central Texas quadrangle maps which are being compiled as topographic bases become available. An index map for geologic maps already published on planimetric bases and others published or planned for publication as new topographic bases become available is shown with the geologic map.

During the period 1948–1951, the writer, assisted by A. R. Palmer, T. M. Anderson, and W. A. Anderson, mapped geologically and completed a gravity survey of the Yeager Creek quadrangle.

GEOLOGIC FORMATIONS

MESOZOIC ROCKS

CRETACEOUS SYSTEM (LOWER CRETACEOUS)

Trinity Group

Shingle Hills Formation

Glen Rose Limestone Member.—Glen Rose Limestone crops out in about 90 percent of the quadrangle and consists of alternating beds of limestone, dolomite, clay, silt, and sand or, more precisely, beds composed of various proportions and combinations of these materials. The beds vary in their resistance to erosion, producing a "stair-step" topography. The less easily eroded beds of limestone and dolomite form the tread of the steps and the softer less resistant zones between form the risers.

A thin fossiliferous zone near the middle of the Glen Rose has been called the *Salenia texana* zone by George (1947, p. 17) and Whitney (1952, p. 66). The top of this zone is characterized by a bed containing *Corbula.* Where the Glen Rose is fully developed the *Corbula* bed is found near the middle of the formation. Within Yeager Creek quadrangle the *Corbula* bed crops out along Miller Creek and all its tributaries, in Brock and Rough Hollows, and along Flat Creek. Along Miller Creek 150 feet of Glen Rose crops out beneath the *Corbula* bed. Southeastward from the Llano region, the portion of the Glen Rose below the *Corbula* bed is composed of massive limestone which contrasts with the thinner bedded upper part. The massive character of this portion of the Glen Rose is well displayed along Miller Creek. The thickness of Glen Rose rocks above the *Corbula* bed is about 350 feet.

The Glen Rose is mostly suited to ranching, although flatter areas in the Onion Creek and Blanco River basins are cultivated. In general, the vegetation on the Glen Rose is sparser than on other units, indicating the relative sterility of its soil.

The *Salenia texana* zone contains in addition abundant casts and molds of pelecypods and gastropods; also common are *Porocystis* and *Orbitolina.* Fossils, although common in several other zones within the Glen Rose Limestone, were not collected. Typical Glen Rose fossils for this part of the Llano region are listed in the text for the Hye quadrangle (Barnes, 1965a).

Fredericksburg Group

Included within the Fredericksburg Group in the Yeager Creek quadrangle are about 13 feet of Walnut Clay, about 30 feet of Comanche Peak Limestone, and about 20 feet of Edwards Limestone. The boundaries of the units within the Fredericksburg are gradational; the boundary with the underlying Glen Rose is distinct.

Walnut Clay

The Walnut Clay within the quadrangle is in outliers of the Edwards Plateau; the Walnut caps three outliers where it is the only unit present of the Fredericksburg Group. The Walnut within the Yeager Creek quadrangle probably averages about 13 feet in thickness; this thickness was measured along the old road from Henly to Blanco at the point where the road crosses into Blanco River basin. The Walnut is silty, calcareous, and yellowish gray mottled yellowish orange. The calcite content increases upward and the boundary between the Walnut and the overlying Comanche Peak is placed at the point in road ditches and along drains where the harder Comanche Peak overhangs the softer Walnut.

The Walnut Clay mostly rests on Glen Rose marly clay of similar appearance except that the basal Walnut is a coquinite of *Exogyra texana* and the Glen Rose clay is essentially unfossiliferous. Pelecypod and gastropod casts and echinoids are also common in the Walnut. Although no fossil collections were made from the Walnut within the quadrangle, typical fossils from this unit are listed in the text of the Hye and Stonewall quadrangles (Barnes, 1965a and 1966).

Comanche Peak Limestone

Comanche Peak Limestone outcrops within the quadrangle flank outliers of the Edwards Plateau; it also is the uppermost unit on eight plateau outliers. The thickness of the Comanche Peak Limestone within the Yeager Creek quadrangle probably averages about 30 feet. The Comanche Peak grades downward into the Walnut Clay and upward into the Edwards Limestone. The upper boundary is placed at the base of the first chert-bearing limestone bed. Although the boundary is seldom exposed, it can be closely approximated by the break in slope between the soft Comanche Peak Limestone and the hard Edwards Limestone. This boundary is easily traced with the aid of a stereoscope.

The lower part of the Comanche Peak Limestone is massive, nodular, argillaceous, yellowish gray, very fossiliferous, and burrowed. The upper part of the Comanche Peak is bedded, in part honeycombed, less fossiliferous, harder, and ranges from yellowish gray to nearly white. No fossils were collected from the Comanche Peak within the quadrangle.

Edwards Limestone

The Edwards Limestone occurs in nine outcrop areas on the large outlier at the head of Onion Creek where it ranges up to about 20 feet thick. It is also the uppermost unit on four other outliers of the Edwards Plateau.

In the Yeager Creek quadrangle the Edwards is composed of carbonate rocks and chert. Although Edwards rocks were not specifically examined within the quadrangle it is likely that both limestone and dolomite are present. The Edwards normally varies widely in composition, texture, thickness of beds, and hardness, and the expression of the lithology is clearly shown on aerial photographs by bands of vegetation. The outcrop of the Edwards Limestone has an average density of vegetation greater than that of the

Glen Rose Limestone, and, in addition, the vegetation is more distinctly banded. Above the abrupt slopes developed on Comanche Peak Limestone the Edwards Limestone forms a gentle slope. The hard limestone beds weather slowly, have only a thin soil cover or are bare, and are nearly devoid of vegetation. The softer beds develop an adequate soil to support a dense growth of scrub oak.

The Edwards surface is mostly rocky and above some beds is chert-strewn. Some of the chert in the Edwards Limestone is of a quality suitable for the manufacture of flint implements, and the chert in the Edwards is usually referred to as flint.

CENOZOIC ROCKS

QUATERNARY SYSTEM

RECENT SERIES

Alluvium.—Deposits of alluvium, mostly along Miller, Yeager, Middle, McCall, Turkey, and Onion Creeks, are composed of sand and silt at the surface and of coarser material beneath. Narrow belts and patches of alluvium follow many of the lesser drainages in the area but are insignificant and have not been mapped. Some of the alluvium is cultivated and some supports a growth of pecan trees.

SUBSURFACE GEOLOGY

The thickness of Cretaceous rocks beneath valley bottoms probably varies from about 200 feet in the northern part of the quadrangle to more than 600 feet in the southern part as judged from the outcrop pattern to the north in the Johnson City area (Cloud and Barnes, 1948, pl. 3), well data to the west in the Monument Hill quadrangle (Barnes, 1967b), and the depth of 130 feet to base of the Cretaceous to the south in the Roland K. Blumberg No. 1 Wagner (Barnes, 1959, p. 14). Rocks of Cretaceous age which do not crop out include the lower part of the Glen Rose Limestone starting 150 feet below the *Corbula* bed, Hensell Sand, Cow Creek Limestone, Hammett Shale, and Sycamore Sand. Lozo and Stricklin (1956) gave the following thicknesses for these units in the vicinity of the Hays-Travis County line near the common corner with Blanco County:

	Feet
Glen Rose Limestone above *Corbula* bed	360
Glen Rose Limestone below *Corbula* bed	250
Hensell Sand	50
Cow Creek Limestone	40
Hammett Shale	70
Sycamore Sand	75

Thicknesses for these units within the Yeager Creek quadrangle vary somewhat; the Hensell Sand and possibly the Hammett Shale probably thin southeastward, other units appear to thicken in this direction. The gentle eastward dip of the Cretaceous rocks is shown on the geologic map.

Estimated thickness of Paleozoic units in the subsurface of the Yeager Creek quadrangle and in the Blumberg well are given in the following table:

	Yeager Creek quadrangle	Blumberg No. 1 Wagner
	Thickness (feet)	
Pennsylvanian System—		
Strawn and/or Smithwick rocks	350+	
Marble Falls Limestone	400±	
Mississippian and Devonian Systems—		
Various units	0–50	
Ordovician System (Ellenburger Group)—		
Honeycut Formation	550–650	590
Gorman Formation	480–500	505
Tanyard Formation	600–650	600
Cambrian System—		
Wilberns Formation	650–710	725
San Saba Member	500–600	615
Point Peak Member	0	0
Morgan Creek Limestone Member	100–130	100
Welge Sandstone Member	10	10
Riley Formation	780–810	770+
Lion Mountain Sandstone Member	40–50	45
Cap Mountain Limestone Member	550–590	600
Hickory Sandstone Member	150–220	125+

The rocks described by Barnes (1959, pp. 348–360) from the Blumberg well are similar to those present in the subsurface of the Yeager Creek quadrangle. Paleozoic rocks directly beneath Cretaceous rocks within the quadrangle probably include Honeycut and younger Paleozoic rocks. From an examination of the fault pattern in the Johnson City quadrangle (Barnes, 1963) and the Johnson City area (Cloud and Barnes, 1948, pl. 3) it appears unlikely

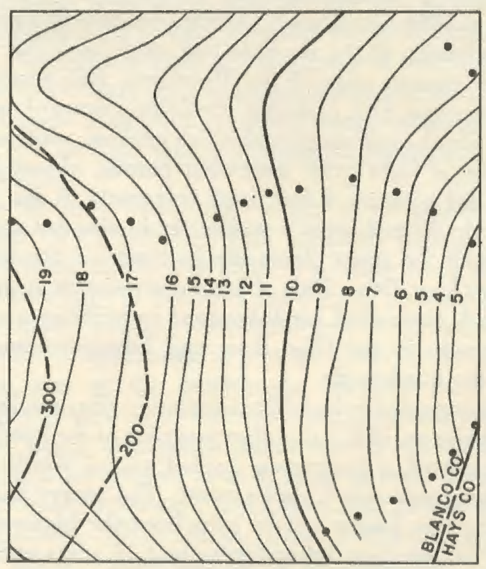

FIG. 1. Gravity and magnetic data, Yeager Creek quadrangle, Texas. Solid lines—gravitational force in milligals (relative); heavy dashed lines—magnetic force in gammas (relative); dots—points of gravity observation.

that rocks older than Honeycut are present directly beneath Cretaceous rocks within the quadrangle.

The Cambrian thicknesses were taken from manuscript thickness maps (Barnes and Bell, MS.) from which the variation in thickness of any unit within the quadrangle can be measured. The Honeycut Formation thickness taken from Barnes (1959, p. 41) is approximate. Other thicknesses are from Cloud and Barnes (1948) and Barnes (1952a).

Sources of information about the Precambrian rocks upon which the Paleozoic rocks lie are limited to gravity data (Barnes, Romberg, and Anderson, 1954a, 1954b, 1955). Gravity values decrease eastward (fig. 1) influenced by the thick sequence of less dense sedimentary rocks forming the Ouachita structural belt (Flawn et al., 1961) the edge of which is near the southeast corner of the quadrangle. In the western third of the quadrangle, spacing of isogals is wider than in the eastern two-thirds of the quadrangle. The fairly uniform north-south trend of the isogals is interrupted in the northern part of the quadrangle by an eastward-plunging gravity trough which is connected with a gravity minimum in the northeastern part of the Monument Hill quadrangle. Generally in the Llano region, large gravity minima are associated with Town Mountain Granite (Romberg and Barnes, 1944). The gravity minimum in the northeastern part of the Monument Hill quadrangle which continues as a gravity trough in the Yeager Creek quadrangle may be associated with the Grape Creek granite mass. The gravity maximum south of the Yeager Creek quadrangle is on an eastward continuation of a gravity ridge extending eastward from Cain City quadrangle (Barnes, 1952b), through Stonewall and Hye quadrangles, and the southwestern part of Monument Hill quadrangle. Gravity maxima in the Llano region generally indicate the presence of Packsaddle schist or diorite; the latter is distinguished from the Packsaddle by high magnetic values. The type of rock causing the gravity maximum south of the Yeager Creek quadrangle cannot be predicted because of absence of magnetic data.

MINERAL RESOURCES

The mineral resources of the quadrangle are limited to construction materials and water. Most of the soils, except those developed on alluvium and to some extent on gentler slopes of the Glen Rose in the Blanco River and Onion Creek drainage basins, are not suited to agriculture. The greater part of the quadrangle is ranch land.

CONSTRUCTION MATERIALS

Dimension stone.—Barnes, Dawson, and Parkinson (1947, p. 166) described a 14-inch limestone bed quarried in the vicinity of the *Corbula* bed south of Miller Creek near the eastern edge of the Monument Hill quadrangle. This limestone bed probably continues eastward into the Yeager Creek quadrangle and is fine grained, white mottled in shades of light gray, somewhat porous, almost free of joints, and contains a few fossil fragments. A few brown iron-oxide stained spots a millimeter in size are scattered throughout the stone. Some blocks quarried are as much as 16 feet long. Other beds of limestone resistant to weathering, hard, and suited for ledgestone in building are probably present in the Glen Rose and Edwards Limestones within the quadrangle.

Subsequent to the building stone study (Barnes, Dawson, and Parkinson, 1947) and after mapping of the quadrangle was completed, a quarry was opened west of Middle Creek a few hundred yards from its mouth. The quarry and large limestone saw blocks can be seen from the highway. The quarry has not been active for the past 10 years or so.

Crushed stone.—Some of the Edwards Limestone may be usable for crushed stone. Although the Glen Rose below the *Corbula* bed is fairly massive this limestone may be too soft to furnish good quality crushed stone.

Sand and gravel.—Sand and gravel confined to thin deposits of poorly sorted alluvial material along creeks is probably of little value because of lack of uniformity in hardness of the constituents.

Road material.—Eight of the 10 road material pits mapped in the Yeager Creek quadrangle are labeled "gravel" pits. Although only two pits were visited it is probable that eight of the 10 pits are in calichified calcareous Glen Rose rocks, that one in the southeastern part of the quadrangle is in Edwards Limestone, and that one along Miller Creek downstream from Millseat Branch may actually be a gravel pit in alluvium. These materials are used for base-course material in highway construction and for surfacing secondary roads.

WATER

A ground-water survey of Blanco County was made by B. A. Barnes and Cumley (1942). Twenty-one wells and 5 springs were inventoried within the Yeager Creek quadrangle. The wells are situated on Glen Rose Limestone and alluvium. Twelve additional wells and 6 springs not included in the inventory are mapped on the Yeager Creek quadrangle.

The wells range in depth from 40 to 426 feet, and at the time of measurement water stood from 14 to 291 feet below the surface. Total dissolved solids range from 296 to 3,350 parts per million. Of the 15 waters analyzed, 10 contain more than 550 parts per million of total dissolved solids; all of these are high in sulfate and unsuitable for domestic use. Many additional wells have been drilled since the inventory; however, depth to water, quality, and quantity are not known.

The level of the water-producing zone can be approximated for a majority of the wells by knowing the stratigraphic level of the bottom of the well as shown in the following table. The elevation of the *Corbula* bed can be closely estimated from the structural contours on the geologic map of the Yeager Creek quadrangle; however, the location of 5 wells could not be closely pinpointed and the elevation for these, as indicated by a ± symbol, may be in error. Two of the wells bottom near the *Corbula* bed, two above the *Corbula* bed, and of the remaining 16, 7 bottom in the first 100 feet beneath *Corbula*, 7 bottom 195 to 235 feet beneath *Corbula*, and the other two bottom at 150 and 170 feet. The two wells above *Corbula* produce a scant amount of water and the most productive well, 52 gallons per minute, is 80 feet below the *Corbula* bed. Water is mostly of good quality from this level upward and of poor quality below this level. The 7 wells which bottom at depths of 195 to 235 feet below the *Corbula* bed probably produce water from the Hensell Sand. Waters analyzed from these wells mostly contain high total solids and high sulfate, indicating restricted circulation (table 1).

TABLE 1. *Well data, Yeager Creek quadrangle, Blanco County, Texas.*

No.[1]	Elev. of well in feet	Elev. of *Corbula* bed in feet	Mouth of well in reference to *Corbula* bed in feet	Depth of well	Bottom of well in reference to *Corbula* bed in feet	Total solids p.p.m.	Sulfate p.p.m.
122	1,395	1,180	+215	286	—70	....	....
123	1,345	1,175	+170	371	—200	714	223
124	1,340	1,175	+165	130	+35	510	15
125	1,180	1,145	+35	65	—30	....	15
145	1,160	1,185	—25	169	—195	2,667	1,750
146	1,160	1,210	—50	118	—170	1,065	571
148	1,160	1,240	+20	40	—20	335	25
149	1,145	1,240	—95	....	—95+	342	20
151	1,285	1,245	+40	265	—225	699	253
152	1,190	1,215	—25	123	—150	742	307
172	1,230	1,270	—40	40	—80	296	22
449	1,350±	1,230	+120	314	—195	....	....
450	1,290±	1,230	+60	86	—25	385	41
451	1,320±	1,230	+90	130	—40	....	....
452	1,495	1,225	+270	372	—100	724	288
453	1,275	1,205	+70	65	+5	551	173
454	1,290	1,265	+25	231	—205	877	412
455	1,220	1,255	—35	199	—235	3,350	2,282
459	1,305	1,220	+85	76	+10	757	280
460	1,440±	1,205	+235	120	+115	....	....
461	1,420±	1,210	+210	426	—215	....	....

[1] Numbers used by B. A. Barnes and Cumley (1942).

Six springs mapped in the Yeager Creek quadrangle and 5 others inventoried by B. A. Barnes and Cumley (1942) issue from various parts of the Glen Rose. The stratigraphic level of these springs is inventoried in table 2 in reference to the *Corbula* bed:

TABLE 2. *Spring data, Yeager Creek quadrangle, Blanco County, Texas.*

Inventory number and location	Elevation of spring in feet	Elevation of *Corbula* bed in feet	Feet above or below *Corbula* bed
Springs shown on Yeager Creek quadrangle			
Millseat Branch	1,340	1,285	+55
Tributary of Millseat Branch	1,340	1,285	+55
North of Miller Creek west of Millseat Branch	1,280	1,280	0
West tributary of Middle Creek, north spring	1,360	1,230	+130
West tributary of Middle Creek, south spring	1,365	1,230	+135
East central part of quadrangle	1,355	1,190	+165
Springs inventoried by B. A. Barnes and Cumley (1942)			
147[2] McCall Creek, 0.5 mile from mouth	1,150	1,240	—90
150 Miller Creek, south bank near Millseat Branch	1,160	1,260	—100
456 Middle Creek 2 miles from mouth, east spring	1,165	1,215	—50
457 Middle Creek 2 miles from mouth, west spring	1,165	1,215	—50
458 Divide between Miller and Yeager Creeks along fault, U, upthrown side,	1,370	1,225U	+145
D, downthrown side		1,195D	+175

[2] Numbers used by B. A. Barnes and Cumley (1942).

The springs are mostly randomly distributed stratigraphically. Those analyzed furnish a good quality water.

The water-bearing possibilities of aquifers in the Yeager Creek quadrangle below the Hensell Sand have not been investigated. Some water probably is present in the Sycamore Sand; however, the quality may be poor. Sandstones of Carboniferous age which may be present beneath the Cretaceous in portions of the quadrangle mostly contain mineralized water.

In a small area in the northwestern part of the Yeager Creek quadrangle calcitic Honeycut rocks directly underlie the Cretaceous at a depth of a few hundred feet. If the joints in these rocks have been widened by solution and if caverns have formed they may be water filled; however, finding water will be fortuitous depending on penetration of solution cavities.

The Hickory Sandstone, which is an aquifer in the Johnson City quadrangle and produces artesian flow in the Stribling ranch well about 5¼ miles north-northeast of Johnson City, is probably too deep to be considered for water supply, ranging from 3,000 feet at the northwestern corner of the quadrangle to perhaps 5,000 feet in the southeastern part of the quadrangle. Hickory Sandstone is probably present everywhere in the subsurface within the Yeager Creek quadrangle unless buried hills of Precambrian rock are present such as those in the Johnson City, Rocky Creek, Stonewall, and Cave Creek School quadrangles (Barnes, 1963, 1965b, 1966, 1967a). The portion of the Hickory penetrated in the Blumberg No. 1 Wagner south of the quadrangle was without porosity; within the quadrangle if porosity is present the water may be mineralized.

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