Houston, Texas,
August 19, 1935.

Mr. Fred Beuvier,
1713 Esperson Building,
Houston, Texas.

Dear Sir:

I am enclosing with this letter a report on the north central part of Maverick County. This report is based on a study of the geological surface map of the Chittim Ranch by A. E. Oldham and Frank Krey, a structure contour map on the top of the Austin chalk by Dr. D. C. Barton, well logs, and literature pertaining to the region.

Dr. Barton, in a letter of July 28, 1926, states that: "The Chittim anticline was mapped at the surface mainly on the First and Second Sandstone members of the Escondido. Each of these two members is a zone of consolidated sand and sandstone that form scarps easily traced across country. No one sandstone in the zone is continuous, but the zone is. The zone does not furnish a key bed on which 50 foot structures could be mapped, but the zone as a whole is definite enough as a key bed for structures of more than 200 feet. The First Sandstone was detailed from Chapotal Hill to Chillipetin Tank. The Second Sandstone was detailed from the meridian of Chapotal Hill to the "Mustang Creek" of the map and from Chillipetin Tank to a point on about the north edge of the sheet. The continuation of the First and Second Sandstones westward was traced out and mapped by reconnaissance methods to the southeast of Eagle Pass. The Third Sandstone of the Escondido was traced out and mapped by reconnaissance methods from the

vicinity of the Higgins wells for about ten miles northeastward. The Second Sandstone was traced by reconnaissance methods for several miles northeastward of the north end of the detail traverse. The San Miguel-Upson (Navarro-Taylor) contact was picked up three miles southwest of Lehman's Ranch on the Rio Grande and just north of Paloma and a Sandstone ledge in the base of the San Miguel was traced rather indefinitely from the latter point about five miles southwestward. In the area within the bow of the First Sandstone, the Eagle Pass Coal Series, and the San Miguel could be recognized here and there, but with not sufficient definiteness to allow detailed mapping."

Structure

The regional layout is dominated by the Chittim anticline or arch. This anticline trends and pitches from Northwest to Southeast and passes through about the middle of Maverick County. A southeastward continuation of this anticline is the anticlinal structure in Northwestern Dimmit County around Carrizo Springs. To the Northeast of the Chittim anticline lies a syncline which is located in Block 3 and the Northeast of Maverick County. To the Southwest is located another syncline near Eagle Pass. This anticline and the two synclines trend in Northwest Southeast direction and pitch to the Southeast. The regional dip in the syncline around Eagle Pass is exceedingly shallow, approximately 67 feet per mile to the Southeast. This is of great economical importance as will be explained below. The Chittim anticline is decidely asymmetrical; the northeast flank is much steeper

dipping than the Southwest flank. The Northeast flank dips approximately 300 feet per mile while the Southwest flank dips only 135 feet per mile. Therefore, the Northeast flank is about two times as steep as the opposite flank.

The overall pitch of the axis of the Chittim anticline is about 83 feet per mile or somewhat steeper than the regional dip in the syncline around Eagle Pass. In detail the anticlinal axis is not evenly pitching but shows places of steeper and gentler pitch or undulations. Such places are indicated by the shape of the surface outcrops. The Upson Clay outcrop for instance has a width of five miles near the Texas Company Bandera School Land well; the same outcrop is 4.3 miles wide one mile Northwest of Rycade Sullivan 3, indicating gentle pitch between these two wells.

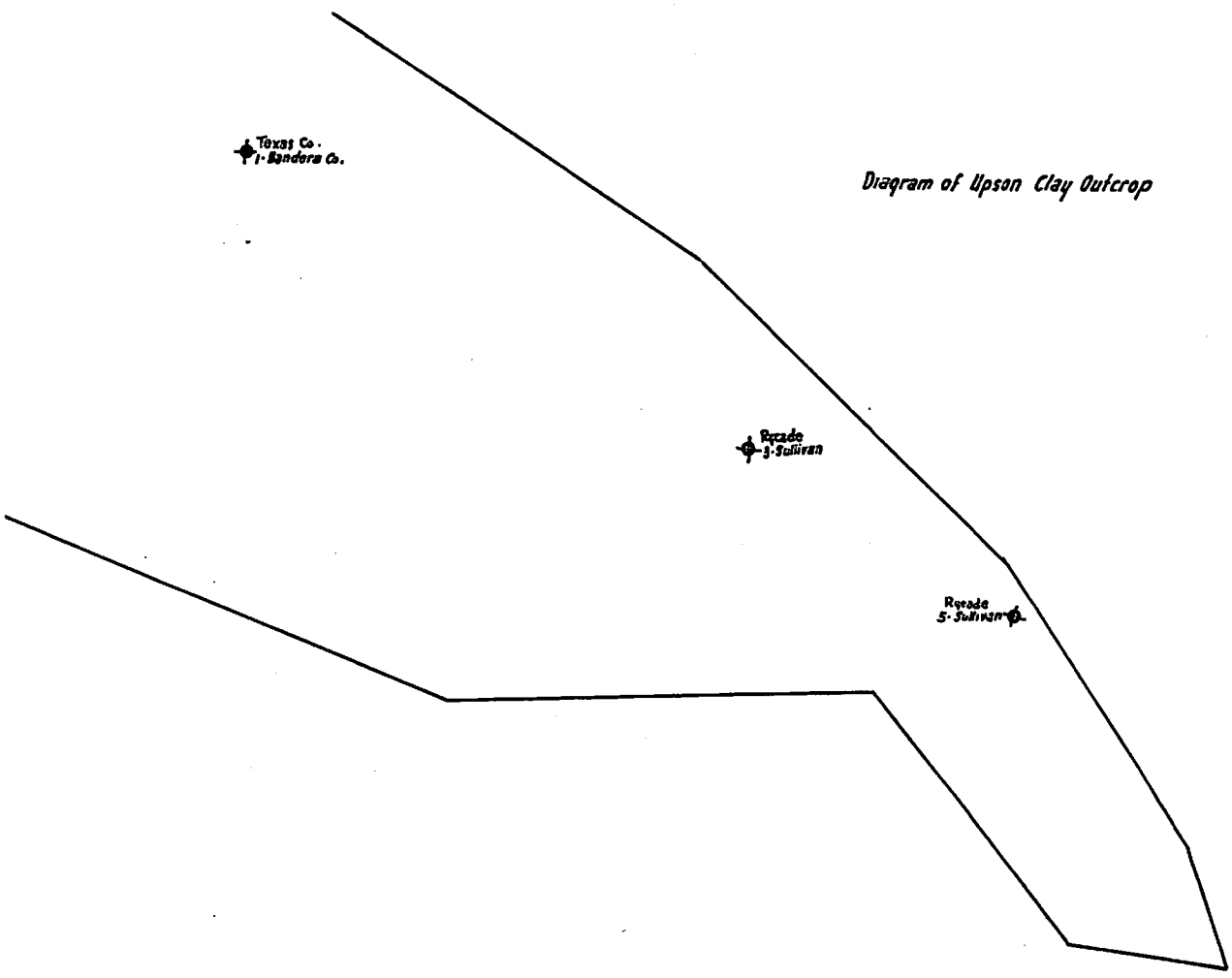

Diagram of Upson Clay Outcrop

However, the width decreases suddenly near this well to only 2.1 mile, this indicates steeper pitch at this place. Further to the Southeast the width of Upson Clay outcrop decreases only slowly and near Section 105 it is still 1.6 miles wide, indicating gentle pitch from about Section 84 to Section 105. To the Southeast of Section 105 this outcrop narrows fast and disappears in Section 115. This indicates steepened pitch in this vicinity.

The San Miguel formation shows very similar changes in the width of its outcrops.

The structure contours (see map) on top of the Austin Chalk too show places of steeper pitch as possibly near Section 126, Block 7, and places of shallower pitch, as between Rycade Sullivan #1 and Rycade Chittim #3 where the pitch is very gentle, only 56 feet per mile. Because the pitch of the axis shows such decided undulations, it is very well possible that some of the undulations are large enough to produce structual terraces and some reversals of the pitch forming separate domes on top of the anticlinal axis.

Several faults are present in this region. One fault cutting the basal sand of the Escondido formation was mapped on the surface in Sections 203 and 204. Two more faults are indicated on aerial maps. One of these is located in Section 169, the other in Section 146. The faults strike SW-NE and are at right angles to the axis of the Chittim anticline. The fault in Section 146 is in line with the fault mapped in Section 204. They might be parts of one continuous fault, but this can not be demonstrated definitely because the beds in the intervening area are soft and devoid of outstanding key beds.

Places of Possible Production

There are two general areas that might be called promising for commercial production:

(1) Chittim anticline.

(2) Eagle Pass syncline.

(1) Chittim Anticline

This anticline is known to be commercially productive of oil or gas. Producing wells are Rycade Chittim #3, Rycade Chittim #5, and Rycade Chittim #6. These wells are located along or near the axis of the anticline.

The producing possibilities of the anticlinal axis have not been fully tested. Outside of the area around the producing wells the deeper tests are several miles apart and that part of the anticlinal axis that lies to the Southeast of Rycade Chittim 2 has not received any deep test at all.

It has been explained above that it is very well possible that the undulations of the axial pitch have in places sufficient size to produce structural terraces or reversals of dip. Such places would be favorable to accumulation of oil or gas. The presence of some faults at right angles to the axis of the Chittim anticline should also be considered as favorable. On the surface such faults can be mapped only at places where they cross beybeds that have been mapped. Therefore, it is possible that there are several more cross faults which have escaped notice because they lie wholly or chiefly in places where beybeds have not been distinguished.

Concerning high points along the axis of the anticline, Dr. Barton states (letter of July 28, 1926):

"1. Between the outcrop of the First Sandstone on the west and the outcrop of the first and Second Sandstone on the east, it has been impossible to do any but very hazy mapping, that is, for a zone along the axis 16 to 20 miles long and 6 to 10 miles wide, it has not been possible to pick out the high points, if any, along the axis, or to determine just where the axis lies.

2. Along the axis from the outcrop of the First Sandstone southeastward, it, likewise, has been impossible to determine from surface geology the presence or absence of any high points along the axis, on account of the indefiniteness in our knowledge of the stratigraphic interval between the First, Second, and Third Sandstones of the Escondido, and the indefiniteness of them as key beds.

3. The presence of the structure as predicated from the surface geology is checked by the oil test -- ours and others, but our Sullivan and Chittim wells are the only ones along the crest.

4. As the structure is over forty miles long, a little over half as wide, and has a maximum uplift on the top of the Austin Chalk of about 1500 feet, it is not expectible that there will be one continuous oilfield along the axis. My expectation would be that there would be a series of pools at high points along the crest of the structure--or possibly, due to "sand" conditions and faulting, some of the pools might be somewhat off the crest.

5. The Chittim and Sullivan wells were located along the guessed position of the axis, and, as said, without any knowledge of whether or not they are on high points along the crest. It would seem to me to be a very great stroke of luck if these first wells happened to be located just right.

6. The Chittim had good shows of oil in the Buda, Georgetown, and Edwards and in the Georgetown and Edwards had good sands that would make ideal reservoir beds under the correct structual conditions. The Sullivan well has just had a good show in the Buda. If, therefore, we can find any high points along the crest of the axis, the situation would seem to me to be very favorable for finding oil in commercial quantities in them."

Such high points along the axis could possibly be found by core drilling. The San Miguel-Upson contact or a coal bed in the Olmos formation could be used as keybeds for this exploration.

There are also very few deep test wells on the flanks of the anticline. The two wells on the Northeast flank of the anticline Storm's Chittim #1 and International Petroleum Black #1, had shows of oil at 1179-1184' and 2020' depths respectively. Flank production could possibly be caused by lenticular character of the beds or fracture zones along the steep flank. It would be expected that the Northeast flank has more or larger fractures than the Southwest flank because it is about twice as steep and has been subject to more deformation.

(2) Eagle Pass Syncline

The most striking feature of this area is the great width of the Escondido outcrops. The width of the outcrops is about 15 miles in the syncline while to the East the width of the outcrops is very much smaller. This is due to several causes. First, the Wilcox group overlays on to successively higher beds to the East. Second, the Escondido thickens to Southwest. But the chief cause of this widening of the outcrop width is the very flat regional dip in this area (±67 feet per mile). This is also shown by the structure contours on top of the Austin chalk (see map).

Key beds distinguished and mapped in this region are the base of the first, the second, and the third Sandstone of the Rosedale formation. Each of these Sandstones forms scarps easily traced across country.

These key beds can be used to map structure of more than 200 feet magnitude; more detailed structure can not be mapped reliably on basis of these Sandstones. The Hopkins High has been mapped with the aid of the third Sandstone.

The three key beds are many miles apart in this region, too far apart to be influenced by structures that might lie between them. It is very well possible that there are other surface structures between or outside of the key beds that were mapped. One such structure is apparently the thin zone of Dr. J. A. Udden's report on a geological survey of the lands belonging to the New York and Texas Land Company, Ltd. in the upper Rio Grande Embayment in Texas, pl. IV. The unusually flat dip of the region makes it rather probable that there are such structures. In regions of flat dips it takes only a small deviation from the normal dip to produce dip reversal, while in a region of steeper dip the deviation would have to be so much larger to produce reversal.

Respectfully Submitted,