THE DALE OIL FIELD, CALDWELL COUNTY, TEXAS

Approved: [redacted]

Approved:

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Dean of the Graduate School.

THE DALE OIL FIELD, CALDWELL COUNTY, TEXAS

Thesis

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MASTER OF ARTS

By

JAMES MARTIN HANCOCK, B.A.
(Paris, Texas)

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PREFACE

It was through the suggestion of Dr. E. H. Sellards of the Bureau of Economic Geology of the University of Texas that I have attempted to do this piece of researce work.

I wish to acknowledge my indebtedness to Dr. E. H. Sellards for his suggestions, helpful criticism, and encouragement. I also wish to thank Mr. McCullom and Mr. Barrow of the Humble Oil and Refining Company for much valuable information. Mr. J. C. Miller of the Texas Company was of much assistance in furnishing me with samples from wells in the field.

There are many others who have aided me in many ways and I am sincerely grateful for the help that I have received.

J. M. Hancock

August, 1930

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THE DALE OIL FIELD

LOCATION

The Dale Oil Field is located in the northeastern part of Caldwell County, Texas, about two miles east of the town of Dale and about five miles southeast of the Lytton Springs Field. The Missouri, Kansas and Texas Railroad track is less than a mile from the northern limit of the field, and the town of Dale, on this railroad, serves as a convenient shipping point. The relief of the surrounding territory is very low, and probably will not exceed a hundred feet for a considerable distance in any direction. There is a small creek running through the field that drains into Walnut Creek, which, in turn, empties into the Colorado River. Caldwell County is located in the region of the lower Tertiary rocks, at the surface, and is a portion of the Gulf Coastal plain.

HISTORY

Before the discovery well of this field was drilled, it was evident that a considerable mass of serpentine existed in this neighborhood. The Smilock Oil Company's No. 1 Clingensmith well, to the north of the discovery well, logged 220 feet of dry serpentine; the Reiter-Foster Oil Corporation's No. 1 Brown, more than two miles to the south, had 96 feet of serpentine from which a barrel or more of oil was bailed; and the Murchison Fain No. 1 Meirs, about one mile west of a line between these two, had eight feet of dry serpentine. The north and south extent of the serpentine seemed, therefore, to be about two and a half miles.

The discovery well in the field, the Texas Company's No. 1-"A" Beatty, located 150 feet from the northeast line and 450 feet from the southeast line of the Beatty 37½ acre tract in the Nicholas Kelly Survey with an elevation of 515 feet, struck the serpentine at 2121 feet. The well was first drilled to 2179 feet where it was 58 feet in the serpentine. It showed oil, but when bailed mud came in around the packer. Casing was set in cement and the well deepened 92 feet where it topped the Austin chalk.[1] The well swabbed 75 barrels of oil in one night after it had begun to show salt water and the following afternoon it swabbed about 250 barrels of oil, the water not seeming to cause much trouble. This well came in during the first week in

1. Stephenson, B. D., The Oil and Gas Journal, August 11, 1927, pp. 48.

August, 1927, and by August 25 there were seventeen new locations reported near it.[2] The development of the field was soon slowed up, however, as reports began to come in of one failure after another, thus causing uncertainty as to the extent of the pay. The drilling time in the field was between two and three weeks, the depth to the pay horizon being about twice as great as in the neighboring field at Lytton Springs; and, as a rather serious shortage of water developed soon after the field was opened, the development proceeded slowly.

With the slowing up of operations in the field due to numerous disappointments, the operators were about to become completely discouraged. The bringing in of the Texas Company's No. 2-"A" Beatty, a southeast offset to the discovery well, as a good producer along about the middle of September, however, revived activity, and drilling proceeded rapidly until production began to drop off sharply in the best producers in the field. This falling off in production caused the producers to proceed more cautiously and by the middle of October the rush of drilling was over. From this time, the drilling in the field was mostly carried on in close

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2. Stephenson, B. D., The Oil and Gas Journal, August 25, 1927, p. 53.

proximity to producing wells and very few important new developments took place. A few scattered wells were drilled intermittently in the field until, in October, 1928, the last producer in the field, the Texas Company's No. 4, O. T. Moore, was completed as a 20 barrel pumper. Thus, the Dale Field has been a disappointment as compared with Lytton Springs, five miles to the northwest, in that the Dale Field has been irregular, the initial production less, and the field is much smaller.

The first oil field ever discovered in serpentine, which is of volcanic origin, was in Thrall in Williamson County, Texas, the next was at Lytton Springs and the next at Dale, these latter two in Caldwell County, Texas. At the time of the Dale discovery the only other such field was in Cuba. However, since this time serpentine has been encountered in the Chapman Field near Thrall in Williamson County, Texas, and in the Yost Field in Bastrop County, Texas.

GEOLOGY

Stratigraphy

The surface outcrop in the Dale Field belongs to the Tertiary System and consists mainly of sands and clays of the Wilcox formation. The approximate contact of the

Wilcox with the next lower formation in the section, the Midway, is found some three or four miles to the west, while the contact of the Wilcox with the next higher formation, the Mount Selman, is found approximately two miles to the east.[3]

In studying the driller's logs of the wells in the Field, it has been impossible to correlate them satisfactorially, due probably to the poor records kept in rotary drilling; and, as complete sets of well samples or cores have not been available, it seems impossible to make a true vertical section of the field. The samples that it has been possible to obtain have all been from horizons from 1,800 to 2,200 feet in depth, in the neighborhood of the producing horizon, and consequently offer very little assistance in determining the upper formations. The best that can be done under the circumstances, it seems, is to list the formations penetrated by the drill without being able in any way to accurately determine their thicknesses.

There have been two wells drilled in the field to the Edwards limestone, namely, the Texas Company's No. 1 "B" Beatty and the Humble Oil and Refining Company's No. 3

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3. From map showing trace of the contact made by Mr. R. B. **Swiger**, geologist, San Antonio, Texas.

Clingensmith. In both of these logs the determinations seem to have been fairly good from the top of the serpentine on down, hence, there is a fairly accurate basis for the section below the Taylor marl.

The following table indicates the succession of the various formations with their approximate thickness:[4]

System	Series	Formation and Thickness	Description
TERTIARY	Eocene	Wilcox 500-700'?	Sands, sandstones and clays
		Midway 250-300'?	Clay, concretionary limestone and green sands. Fossils: Enclimatoceras vaughani
UPPER CRETACEOUS	Gulf	Navarro 550'?	Light bluish to dark clay and marls, ss layers and limestone concretions. Fossils: Exogyra costata
		Taylor Marl 575'?	Blue calcareous clay and marls. Fossils: Exogyra ponderosa
		Serpentine 2-488'	Light to dark green soft material often with brecciated or fragmental structure.

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4. Note: This table taken in part only from: Bybee, H. P., and Short, R. T., "The Lytton Springs Oil Field," Bulletin No. 2539, p. 8, University of Texas.

System	Series	Formation and Thickness	Description
UPPER CRETACEOUS	Gulf	Austin Chalk 327-405'	Soft, white, chalk-like limestone; some blue marl. Fossils: Gryphaea aucella
		Eagle Ford 23-40'	Dark lamanated petroliferous shale; light yellow fissil shale Fossils: Inoceramus, Fish teeth
LOWER CRETACEOUS	Washita	Buda 40-82'	Hard yellow limestone, thin to heavy bedded
		Del Rio 26-52'	Yellowish to green clay, carrying selenite Fossils: Exogyra arietina
		Georgetown 73-82'	Nodular gray limestone, interbedded with marl and shale
	Fredericksburg	Edwards 500'?	White hard limestone with a few nodular dark flint beds

It was noticed in attempting to correlate the logs that there is a series of thin rock beds ranging from about two to six hundred feet in depth. These beds ranged from two to fifteen feet in thickness and seemed fairly persistent although they could not be definitely correlated. According to Bybee and Short:[5]

> "These rock beds evidently represent the rock ledges so frequently noted in the upper and middle portions of the Navarro formation."

In the Dale field, however, it was not noticed that the beds fell into any definite groups as was noted in the Lytton Springs Field.

STRUCTURE

Surface

There appears to be little or no indication of surface structure in the Dale field, the beds dipping rather uniformly to the southeast, the direction of the regional dip in the area. The amount of regional dip has not been obtained but is probably from 125 to 150 feet per mile.

Subsurface

Due to a lack of accurate well logs or sufficient formation samples, it has been impossible to correlate the horizons above the serpentine with enough exactness to definitely determine if there are any subsurface structural features in the sedimentary beds. The only horizon that seems to have been reliably logged is the

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5. Ibid., p. 9.

serpentine and a contour map on the top of it will be found on page 10. The Austin chalk has been logged, as such, in a large number of wells but there seems to be very little accord between any of them, and, due to the lithologic similarity between the lower Taylor marl and the upper Austin chalk, it is deemed far too unreliable to attempt a correlation of this basis alone.

THE IGNEOUS ROCK

Size of the Producing Area

The proven producing area of the field extends for slightly less than a mile in approximately a northwest-southeast direction and for about half a mile in a southwest-northeast direction. The producing area will probably not exceed 500 acres. It is thus considerably smaller than the Lytton Springs Field and approximately the same size as the Thrall Field in Williamson County, the former covering about 1,360 acres and the latter covering about 470 acres.[6]

It will be noted by referring to the map on page 10 that the Dale Field is somewhat spotted as to production, hence, the discrepency in the description of

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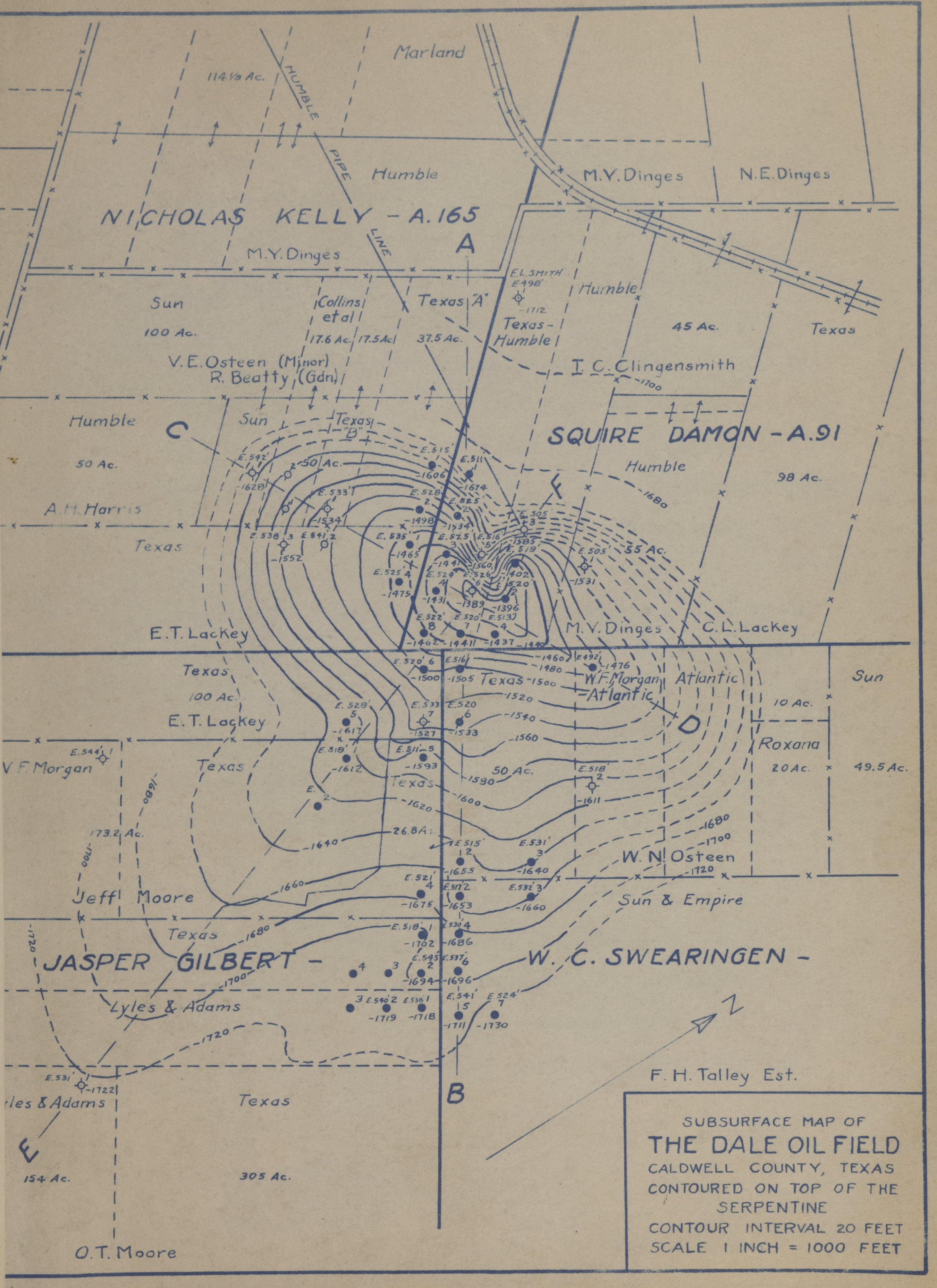
6. *Ibid.*, p. 11.



SUBSURFACE MAP OF
THE DALE OIL FIELD
CALDWELL COUNTY, TEXAS
CONTOURED ON TOP OF THE SERPENTINE
CONTOUR INTERVAL 20 FEET
SCALE 1 INCH = 1000 FEET

the limits of the field as compared to the acreage of the producing area.

Stratigraphic Position of the Serpentine

The serpentine in the Dale Field appears to lie beneath the Taylor marl and, in most wells, it seems to displace the upper part of the Austin chalk, at least, in part; however, in some wells, it appears to lie on top of the chalk. From a study of the available well samples it seems clear that at no place does the Taylor lie beneath the serpentine, whereas, the evidence in each case indicates that the Austin either underlies the serpentine or is impregnated with it. Futhermore, in looking at the logs of the two wells drilled through the Austin in the field, the Texas Company's No. 1 "B" Beatty and the Humble Oil and Refining Company's No. 3 Clingensmith, it is evident that the serpentine occurs almost entirely in the upper part of the Austin chalk, although not necessarily at the top.

Relation between the Austin Chalk and the Altered Igneous Rock

Where the Austin chalk does not lie entirely beneath the serpentine, but, as in most cases, is partially impregnated with it; the relative purity of the serpentine seems to be greater with depth below its upper surface. Thus, it seems that the first serpentine usually encountered by the drill is probably washed or eroded material that has mixed with the chalk while the latter was being deposited on the sea floor. The above statement might not hold true in every case but from the samples studied it appears to hold true in most instances. This explanation of the nature of the serpentine near its upper surface might possible account for its greater porosity in spots, thus accounting for the spotted production in the field even though dry holes that encounter the serpentine high may have a considerable thickness of the supposed pay horizon. This explanation is further emphasized by the fact that the greatest production is usually found in the upper part of the serpentine or more correctly in a mixture of serpentine and chalk near the upper limit of the serpentine.

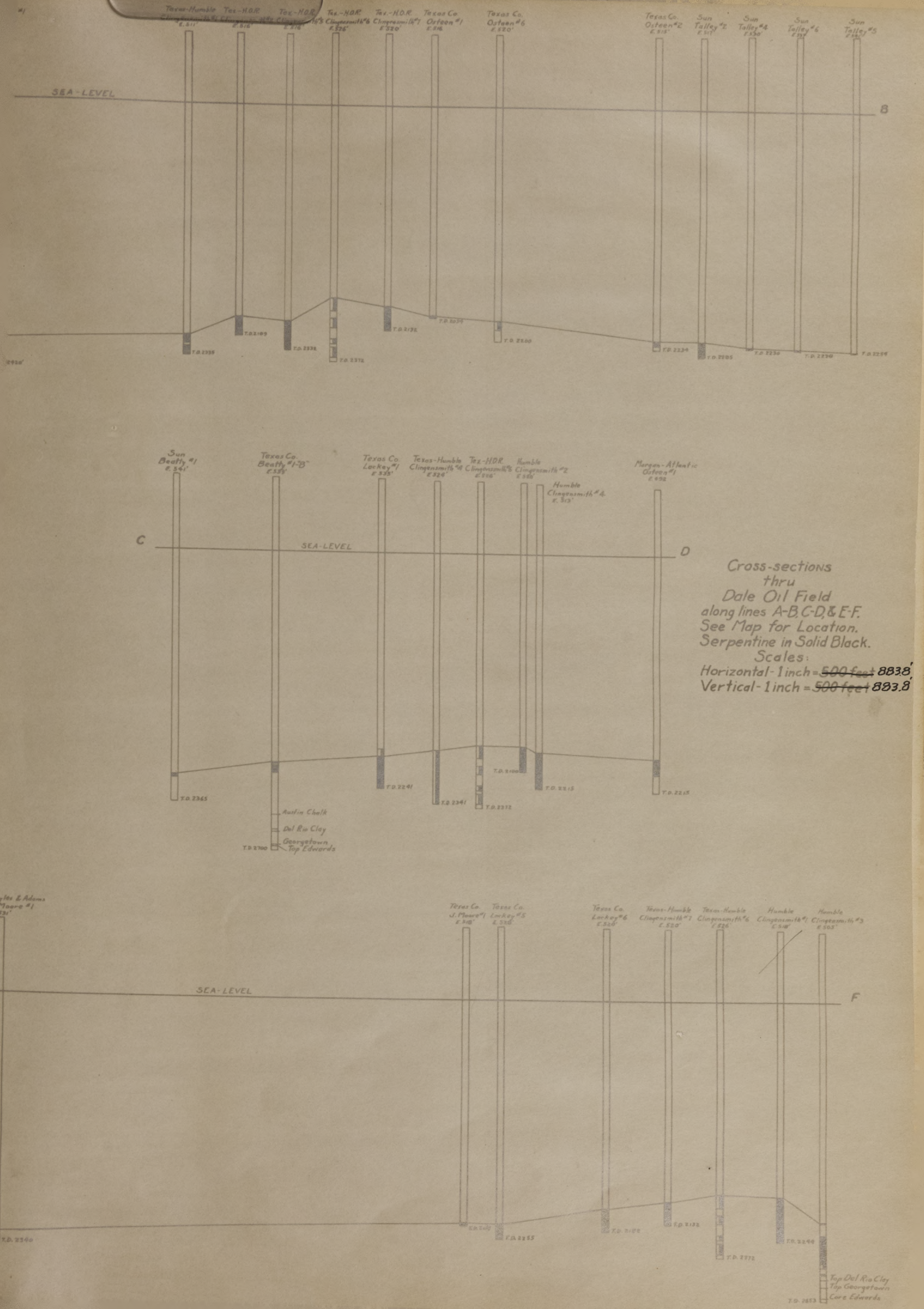
An attempt was made to contour the upper surface of the Austin chalk but it was found to be impossible with the data at hand. This is probably due to the failure of the drillers to properly log the chalk when encountered or to the fact that the serpentine probably occupies the space of the upper part of the Austin in places. From the few correlations made, the upper surface of the Austin seems to be very irregular, this irregularity no doubt being due to the causes mentioned above and not to any particular structure in the sediments.

There are several breaks noted in the serpentine in a few of the drillers logs, notably in the highest well in the field, the Texas Company-Humble Oil and Refining Company's No. 6 Clingensmith, but as the breaks are generally logged as shale or gumbo, it is to be doubted if they are reliable; consequently there is very little basis for saying that sedimentary formations are interstratified with the serpentine. These breaks are probably just a soft or sticky phase of the serpentine and, as the drill behaves similarly to the way it would in these sedimentary formations, the drillers have probably been mislead in identifying them.

The Shape of the Igneous Mass

The upper surface of the Serpentine, as will be noted from the accompanying contour map on page 10, is in the shape of an irregular dome, dipping off rather gradually to the southeast but dipping very abruptly to the northwest with a decidedly deep reentrant cutting in to the apex of the dome. The steeply dipping side on the northwest is rather hard to explain, especially if we consider the igneous mass an extrusion rather than an intrusion, for it is believed and rather definitely proven that the Cretaceous sea has advanced northwestward from the Gulf of Mexico. The sea advancing from the southeast would naturally cause the greatest erosion to have taken place on that side, and such is not the case. Having, thus, to disregard the above reasoning, it seems only natural to look to earth movements as the cause of such a feature in the topography of the mass.

The cross-sections on page 15 show that the serpentine is thicker toward the north and northwest. The greater thickness in these directions would seem to indicate that the igneous extrusion has probably come up through a fault fissure cutting the chalk probably just north of the apex of the dome in the serpentine. It is noticed also that the igneous material continues to be very thick for at least a half mile in a north-west direction to the E. L. Smith's No. Clingensmith well. This greater thickness would probably indicate that the sea floor was lower in this direction, it having probably subsided after the extrusion had started and ceased its



Cross-sections
thru
Dale Oil Field
along lines A-B, C-D, & E-F.
See Map for Location.
Serpentine in Solid Black.
Scales:
Horizontal - 1 inch = ~~500 feet~~ 883.8'
Vertical - 1 inch = ~~500 feet~~ 883.8'

subsidence before the extrusion stopped, thus leaving a decided escarpment facing toward the northwest. The reentrant in this escarpment is probably due to erosion.

The lower surface of the igneous mass, as noted from the cross-sections on page 15, appears to be somewhat undulated, and evidently does not conform to any definite bedding plane of the underlying Austin chalk. A fault is indicated in the Austin northwest of the Humble's-Clingensmith No. 1 well. The strike of this fault is approximately northeast-southwest and the downthrow is to the northwest. The thickest section of the igneous material seems to be in close proximity to the apex of the dome, at its upper surface. In two wells, notably, the Texas-Humble Clingensmith No. 5 and the Humble-Clingensmith No. 1, the drill failed to penetrate below the serpentine after drilling into it for a considerable distance, indicating that probably the vent of fissure, from which the magma came, was probably in this immediate neighborhood.

The Origin of the Altered Igneous Rock

Whether the altered igneous rock in the Dale Field is intrusive or extrusive is probably a debatable question, however, the majority of the evidence seems to indicate that it is an extrusive mass. The shape of the igneous body; being an irregular dome in relief, and having such a considerable thickness toward its center, coupled with the fact that the lower surface is undulating without any particular reference to structure in the sedimentary beds; indicates that the rock is not in the nature of a sill or a laccolith. In addition there is no evidence that the overlying beds are in any way conformable to the upper surface of the serpentine.

There is quite a bit of evidence of chalk being intermixed with the serpentine in most of the wells in the Dale Field, but this is usually the case in only the uppermost part ofthe serpentine, thus probably indicating the erosion and reworking of the surface material by wave action. There is also some calcite included in many of the samples, largely in the form of veins or seams in the altered igneous rock. These same conditions are noted in the Thrall serpentine[7] as well as the serpentine at Lytton Springs.[8] In several of the samples of serpentine studied, small amounts of pyrite were noted

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7. Udden, J. A., and Bybee, H. P., "The Thrall Oil Field," University of Texas Bulletin No. 66., pp. 34.

8. Bybee, H. P., and Short, R. T., "The Lytton Springs Oil Field," University of Texas Bulletin No. 2539, pp. 15, 16.

as well as the fragmental nature of the rock as described by Lonsdale and Bailey[9] from samples in the Lytton Springs Field. In examining the rather meager samples that it has been possible to procure, there was no evidence of metamorphism noted in any of the samples of chalk, marl or limestone. This, however, may not be positive evidence and, more than likely is not, as it was impossible to get a core showing the contact between the sedimentary rock and the serpentine. In a conversation with Mr. J. C. Miller, Paleontologist for the Texas Company at Houston, however, he states that he has seen evidences of contact metamorphism next to the serpentine in some samples from the Dale Field.

The similarity of the occurance of the serpentine at Dale and that at Lytton Springs and to a lesser extent to that at Thrall leads the author to quote at some length extracts from a discussion by Lonsdale[10] on the origin of the serpentine in these fields:

> "A number of modes of origin of the oil field serpentines has been suggested. Among the theories presented, the following are included: (a) The

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9. Ibid., pp. 15,16.

10. Lonsdale, John T., "Igneous Rocks of the Balcones Fault Region of Texas," University of Texas Bulletin No. 2744, pp. 144-149.

serpentine mass is a sedimentary rock; (b) the serpentine represents a volcanic cone extruded in the Austin sea in which case the materials are altered tuff, ejecta and flows; (c) the serpentine bodies have resulted from the alteration of both intrusive and extrusive igneous rocks localized at a volcano. That the general mass of a body of serpentine, as found at Thrall and Lytton Springs, is due to sedimentary processes is inconceivable. The shape and size of the occurances is such as to prohibit any such origin. It is true, however, that the serpentine bodies have been in the zone of sedimentation because specimens from the upper parts of both Thrall and Lytton Springs show sedimentary characters and certain minute fossils. No matter what previous history was involved there was a period in the history of such bodies when the entire mass was beneath water and was in a sedimentary environment.

"It is likewise improbable that the oil field bodies of serpentine as units were intrusive bodies such as stocks, plugs or laccoliths. This suggestion was made by Baker on the basis of the complete crystallinity of specimens from Thrall, but will not hold in the face of other evidence. If the bodies were intrusive then the cover must have been removed to permit erosion and mingling with sedimentary materials as now found in the upper parts. To account for this an erosion interval and unconformity of considerable magnitude would be necessary and no such event is recorded in the rocks of the region. Futhermore, had the serpentine masses been formed as intrusives the characteristic recrystallization of the surrounding limestone would have occured and no such feature has been found. In addition the alteration of a large body of massive intrusive rock into serpentine under such conditions presents almost insurmountable difficulties. Finally when the textures of the rocks are considered it cannot be conceived that the crystallinity of the original rock is more suggestive. Basaltic magmas are notably fluid and it is not uncommon for basaltic flows to be completely crystalline. The rocks from which the serpentines were derived were very basic and the fact that they crystallized does not warrant an assumption that such a condition was due to cooling at depth beneath a cover.

. . .

"There remain the theories which account for the origin of the serpentine deposits through extrusive igneous activity and which classify the serpentine as an altered extrusive rock. . . When the shapes of the serpentine bodies and their degree of alteration are considered there is no escape from the conclusion that these deposits were formed by igneous activity and that the rocks were placed so that thorough alteration was readily accomplished. The extrusions of basaltic material is the only means by which this could be brought about because the exposure of igneous material at the surface, either above or below the surface of the sea, is the only means by which the alteration could be effected.

. . .

"It is impossible to state exactly the history of the serpentine bodies. They are known only through samples from wells, their relations to the surrounding rocks known in only a very small part of the occurances and no exactly similar bodies, even in miniature, are known at the surface. Therefore any statement which goes further than to point out that the deposits were extrusive must be speculative. It seems fairly certain that the original rocks were extrusive, but whether extruded on the sea floor or on land, whether tuffaceous or entirely massive, or whether the eruptions were quiet or explosive, cannot be determined. Certain inferences seem most reasonable but there is at present no proof for further positive statements.

"Collingwood and Rettger have stated that the conflicting evidence on hand leads them to conclude that the Lytton Springs body is both intrusive and extrusive. This can hardly be the case for this or any other serpentine mass, for if the serpentine to an appreciable extent was of intrusive origin, unaltered rock would remain. It is conceded that minor sills or dikes might be present, but judging from the exposed basalts in Texas and other igneous regions, the alteration could not be complete in the case of an igneous mass any essential part of which was intrusive.

"The degree and kind of alteration of the serpentine is one of the most significant features present and suggests if indeed it does not prove the extrusive origin of the material. It is even reasonable to suppose that the complete alteration present argues a tuffaceous character in addition to that of extrusion. Basaltic dikes in the eastern United States exposed at the surface since late Cretaceous times invariably yield some unaltered rock. How great then is the difference in alteration between such rocks and the serpentine? If the serpentine rocks were deposited largely as tuffs then alteration would be most easily accounted for, since this type of deposit offers the easiest passage to the agents of alteration. . .

. . .

. . . Apparently the concluding even in the history of each occurance was the matter of sedimentation in which the upper part was reworked and sorted by wave action. How much of the history of the serpentine bodies is really sedimentary rather than igneous cannot be told, but it would not be surprising to find that sedimentary processes have played a far greater part than hitherto believed. Evidences of local unconformities in Austin times are not lacking, as shown in Onion Creek, Travis County, and it is readily conceivable that the serpentine masses during their alteration may have undergone depression and elevation a number of times in reference to sea level. Furthermore, it is probable that the extrusive action was intermittent and that extrusive masses slightly above sea level were reduced to sea level and again built up by fresh supplies of volcanic material. Such conditions would aid rather than handicap alteration.

"Recent geophysical investigations of the serpentine bodies not yet published are reported as failing to reveal dense rock underlying the serpentine deposits. This is evidence of the extent of alteration and destroys the "plug" theory so commonly held. The extrusions must have come to the surface through relatively small and insignificant passages, a condition to be expected when comparison is made with known extrusions.

The above discussion by Lonsdale, it seems to the writer, covers the subject of the origin of the serpentine in quite a convincing manner and his exposition of the extrusive character of the serpentine seems altogether the most logical theory as yet advanced.

The Origin of the Oil

That the oil in this field has in all probability originated in the Taylor marl overlying the serpentine, and has migrated into the more porous serpentine due to capillary action is in all probability true; as is the case in the Thrall and Lytton Springs Fields, according to Udden and Bybee[11] and Bybee and Short,[12] respectively. The lower part of the Taylor marl is known to have a relatively high organic content and, as it immediately overlies the serpentine at Dale, Lytton Springs, and Thrall, it is evidently the most logical source rock. The overlying Tertiary sediments certainly are to be eliminated as possible sources of the oil as they are mostly sands and clays, which ordinarily are not considered as being capable of acting in this capacity. It

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11. Udden, J. A., and Bybee, H. P., "The Thrall Oil Field," University of Texas Bulletin No. 66, p. 54.

12. Bybee, H. P., and Short, R. T., "The Lytton Springs Oil Field," University of Texas Bulletin No. 2539, p. 28.

is possible that the oil might have migrated from below and had its source in the underlying Cretaceous formations; but, as the organic content is relatively less in these formations, it is more probable that the oil was derived from the Taylor marl above. The pre-Cretaceous formations that have been reached by the drill in this region seem to have very little organic content and are thus eliminated from serious consideration, thus precluding the possibility of deep-seated origin.

The controlling factor in the accumulation of the oil seems to be the relative porosity of the serpentine in different parts of the field, the greatest porosity in the Dale Field being around the highest part of the dome, as is also the case in the Lytton Springs and Thrall fields. This greater porosity in the highest part of the serpentine is probably due to the forces of erosion causing a greater amount of alteration in the igneous rock in this more exposed portion, or it is probably due to the reworking of the material and its impregnation with sediments.

A relative absence of water is noted in the field and this is probably an indication that the source of the oil is comparatively local and has not migrated over any great distance.

Production

The following tables show the monthly production of the field by leases from August, 1927, the date of the discovery well, through February, 1930:

August, 1927

Texas Co.-Beatty "A"-1 Daily bbls.-71? Total-2,254

	No. of Wells	Daily bbls.	Total
September			
Morgan and Atlantic--Osteen	1	7	60
Texas Co.--Beatty "A"	2	198	5,943
Sun Co.--Talley	1	33	759
Texas Co.--Lackey	1	63	502
Texas-Humble--Clingensmith	2	486	5,852
Humble--Clingensmith	1	30	30
Total	8	817	13,146
October			
Morgan and Atlantic--Osteen	1	8	253
Sun Co.--Talley	2	35½	1,060
Texas Co.--Beatty "A"	2	196	6,111
Texas Co.--Lackey	1	31½	984
Texas-Humble--Clingensmith	3	85½	2,667
Humble--Clingensmith	2	89	1,212
Total	11	396	12,284

	No. of Wells	Daily bbls.	Total
November			
Texas Co.--Beatty "A"	2	170	5,100
Texas Co.--Lackey	2	45	1,350
Sun Co.--Talley	2	35	1,050
Texas-Humble--Clingensmith	5	115	3,450
Humble--Clingensmith	3	80	2,400
Total	14	445	13,350
December			
Texas Co.--Beatty "A"	2	130	4,030
Texas Co.--Lackey	2	45	1,395
Texas Co.--Osteen	1	120	3,720
Texas-Humble--Clingensmith		125	3,875
Humble--Clingensmith		45	1,395
Sun Co.--Talley		35	1,085
Morgan-Atlantic--Osteen		10	310
Total	5	510	15,810
January, 1928			
Morgan-Atlantic--Osteen	1	10	310
Sun Co.--Talley	2	30	930
Texas Co.--Beatty "A"	2	120	3,720
Texas Co.--Lackey	3	80	2,480
Texas Co.--Osteen	2	40	1,240
Humble--Clingensmith	3	28	866
Texas-Humble--Clingensmith	7	57	1,752
Total	20	365	11,298
February			
Morgan-Atlantic--Osteen	1	10	290
Sun Co.--Talley	2	25	725
Texas Co.--Beatty "A"	2	85	2,465

	No. of Wells	Daily bbls.	Total
February--Contd.			
Texas Co.--Lackey	4	85	2,465
Texas Co.--J. Moore	1	150	4,350
Texas Co.--Osteen	2	340	9,860
Texas-Humble--Clingensmith	7	128	4,710
Humble--Clingensmith	3	59	1,720
Total	22	882	25,585
March			
Morgan-Atlantic--Osteen	1	10	310
Sun Co.--Talley	3	366	11,110
Texas Co.--Beatty "A"	2	55	1,705
Texas Co.--Lackey	4	55	1,705
Texas Co.--J. Moore	1	95	2,945
Texas Co.--O.T.Moore	1	15	465
Texas Co.--Osteen	3	261	8,091
Texas-Humble--Clingensmith	7	54	3,356
Humble--Clingensmith	3	29	882
Total	25	994	30,569
April			
Morgan-Atlantic--Osteen	1	7	210
Sun Co.--Talley	3	429	12,870
Texas Co.--Beatty "A"	2	78	2,340
Texas Co.--Lackey	5	57	1,710
Texas Co.--J. Moore	1	97	2,910
Texas Co.--O.T.Moore	1	53	1,590
Texas Co.--Osteen	6	296	8,880
Texas-Humble--Clingensmith	8	108	3,240
Humble--Clingensmith	3	32	960
Total	30	1,157	34,710
May			
Sun Co.--Talley	4	359	11,129
Adams and Lyles--O.T.Moore	1	55	1,705
Texas Co.--Beatty "A"	2	103	3,193
Texas Co.--Lackey	5	52	1,612

	No. of Wells	Daily bbls.	Total
May--Contd.			
Texas Co.--Osteen	6	216	6,696
Texas Co.--J. Moore	1	85	2,635
Texas Co.--O.T.Moore	2	50	1,550
Texas-Humble--Clingensmith	8	106	3,286
Humble--Clingensmith	3	28	858
Total	32	1,054	32,664
June			
Sun Co.--Talley	5	338	10,140
Morgan-Atlantic--Osteen	1	6	180
Adams--O.T.Moore	2	50	1,500
Texas Co.--Beatty "A"	2	90	2,700
Texas Co.--Lackey	5	52	1,560
Texas Co.--Osteen	6	171	5,130
Texas Co.--J. Moore	1	52	1,560
Texas Co.--O.T.Moore	2	91	2,730
Texas-Humble--Clingensmith	8	106	3,188
Humble--Clingensmith	3	29	788
Total	35	985	29,476
July			
Sun Co.--Talley	6	300	9,300
Morgan-Atlantic--Osteen	1	6	186
Adams--O.T.Moore	2	112	3,472
Texas Co.--Beatty "A"	2	81	2,511
Texas Co.--Lackey	5	51	1,581
Texas Co.--Osteen	6	133	4,123
Texas Co.--J. Moore	1	41	1,271
Texas Co.--O.T.Moore	2	90	2,790
Texas-Humble--Clingensmith	8	104	3,232
Humble--Clingensmith	3	29	900
Total	36	947	29,366
August			
Sun Co.--Talley	6	267	8,277
Morgan-Atlantic--Osteen	1	5	155

	No. of Wells	Daily bbls.	Total
August--Contd.			
Adams--O.T.Moore	3	112	3,475
Texas Co.--Beatty "A"	2	77	2,387
Texas Co.--Lackey	5	32	992
Texas Co.--Osteen	6	136	4,216
Texas Co.--J. Moore	1	51	1,581
Texas Co.--O.T.Moore	3	76	2,356
Texas-Humble--Clingensmith	8	52	1,628
Humble--Clingensmith	3	38	1,189
Total	38	846	26,253
September			
Sun Co.--Talley	6	224	6,720
Adams--O.T.Moore	2	128	3,840
Texas Co.--Beatty	2	89	2,670
Texas Co.--Lackey	5	35	1,050
Texas Co.--Osteen	6	101	3,030
Texas Co.--J. Moore	1	41	1,230
Texas Co.--O.T.Moore	4	81	2,430
Texas-Humble--Clingensmith	8	52	1,596
Humble--Clingensmith	3	26	774
Total	37	777	23,340
October			
Sun Co.--Talley	6	214	6,634
Adams--O.T.Moore	3	126	3,906
Texas Co.--Beatty	2	63	1,953
Texas Co.--Lackey	5	34	1,054
Texas Co.--Osteen	6	85	2,635
Texas Co.--J. Moore	1	40	1,240
Texas Co.--O.T.Moore	4	66	2,046
Texas-Humble--Clingensmith	8	70	2,140
Humble--Clingensmith	3	20	624
Total	39	717	22,232
November			
Sun Co.--Talley	6	192	5,760
Adams--O.T.Moore	3	93	2,790

	No. of Wells	Daily bbls.	Total
November--Contd.			
Texas Co.--Bea tty	2	79	2,370
Texas Co.--Lackey	5	54	1,620
Texas Co.--Osteen	6	102	3,060
Texas Co.--J. Moore	1	22	660
Texas Co.--O.T.Moore	4	66	1,980
Texas-Humble--Clingensmith	7	108	3,224
Humble--Clingensmith	3	23	687
Total	37	739	22,151
December			
Sun Co.--Talley	6	168	5,208
Adams--O.T.Moore	3	66	2,046
Texas Co.--Beatty	2	61	1,891
Texas Co.--Lackey	5	23	713
Texas Co.--Osteen	6	71	2,201
Texas Co.--J. Moore	1	33	1,023
Texas Co.--O.T.Moore	4	66	2,046
Texas-Humble--Clingensmith	7	101	3,202
Humble--Clingensmith	3	16	499
Total	37	604	18,729
January, 1929			
Sun Co.--Talley	6	160	4,960
Adams--O.T.Moore	3	81	2,511
Texas Co.--Beatty	2	70	2,170
Texas Co.--Lackey	5	30	930
Texas Co.--Osteen	6	68	2,108
Texas Co.--J. Moore	1	11	3 341
Texas Co.--O.T.Moore	4	40	1,240
Texas-Humble--Clingensmith	7	101	3,131
Humble--Clingensmith	3	16	496
Total	37	577	17,887
February			
Sun Co.--Talley	6	166	4,648
Adams--O.T.Moore	3	62	1,736

	No. of Wells	Daily bbls.	Total
February--Contd.			
Texas Co.--Beatty	2	78	2,184
Texas Co.--Lackey	5	27	756
Texas Co.--Osteen	6	77	2,156
Texas Co.--J. Moore	1	26	728
Texas Co.--O.T.Moore	4	45	1,290
Texas-Humble--Clingensmith	5	104	2,912
Humble--Clingensmith	3	19	532
Total	35	604	16,912
March			
Sun Co.--Talley	6	145	4,495
Adams--O.T.Moore	3	55	1,705
Texas Co.--Beatty	2	70	2,170
Texas Co.--Lackey	5	28	868
Texas Co.--Osteen	6	24	1,984
Texas Co.--J. Moore	2	12	372
Texas Co.--O.T.Moore	4	26	806
Texas-Humble--Clingensmith	5	108	3,348
Humble--Clingensmith	3	22	682
Total	34	530	16,430
April			
Sun Co.--Talley	6	142	4,260
Adams--O.T.Moore	3	42	1,260
Texas Co.--Beatty	2	73	2,190
Texas Co.--Lackey	5	24	720
Texas Co.--Osteen	6	58	1,740
Texas Co.--J. Moore	2	49	1,470
Texas Co.--O.T.Moore	4	40	1,200
Texas-Humble--Clingensmith	5	102	3,060
Humble--Clingensmith	3	21	630
Total	36	551	16,530
May			
Sun Co.--Talley	6	120	3,720
Adams--O.T.Moore	3	63	2,015

	No. of Wells	Daily bbls.	Total
May--Contd.			
Texas Co.--Beatty	2	69	2,139
Texas Co.--Lackey	5	27	837
Texas Co.--Osteen	6	36	1,736
Texas Co.--J. Moore	2	58	1,798
Texas Co.--O.T.Moore	4	25	775
Texas-Humble--Clingensmith	5	48	1,488
Humble--Clingensmith	3	15	465
Morgan-Atlantic--Osteen	1	6	186
Total	37	489	15,159
June			
Sun Co.--Talley	6	129	3,870
Adams--O.T.Moore	3	56	1,680
Texas Co.--Beatty	2	61	1,830
Texas Co.--Lackey	5	23	690
Texas Co.--Osteen	6	29	870
Texas Co.--J. Moore	2	37	1,110
Texas Co.--O.T.Moore	4	42	1,260
Texas-Humble--Clingensmith	6	28	840
Humble--Clingensmith	2	20	600
Total	37	425	12,750
July			
Sun Co.--Talley	6	134	4,154
Adams--O.T.Moore	3	61	1,891
Texas Co.--Beatty	2	72	2,232
Texas Co.--Lackey	5	26	806
Texas Co.--Osteen	6	56	1,736
Texas Co.--J. Moore	2	34	1,054
Texas Co.--O.T.Moore	4	26	806
Texas-Humble--Clingensmith	6	49	1,519
Humble--Clingensmith	2	52	1,612
Total	37	516	15,996
August			
Sun Co.--Talley	6	114	3,534
Adams--O.T.Moore	3	44	1,364

	No. of Wells	Daily bbls.	Total
August--Contd.			
Texas Co.--Beatty	2	70	2,170
Texas Co.--Lackey	5	24	744
Texas Co.--Osteen	6	39	1,209
Texas Co.--J. Moore	2	34	1,054
Texas Co.--O.T.Moore	4	22	682
Texas-Humble--Clingensmith	5	50	1,550
Humble--Clingensmith	2	20	620
Total	36	421	13,051
September			
Sun Co.--Talley	6	113	3,390
Adams--O.T.Moore	3	49	1,470
Texas Co.--Beatty	2	57	1,710
Texas Co.--Lackey	5	29	870
Texas Co.--Osteen	6	35	1,050
Texas Co.--J. Moore	2	26	780
Texas Co.--O.T.Moore	4	27	810
Texas-Humble--Clingensmith	5	26	780
Humble--Clingensmith	2	19	570
Morgan-Atlantic--Osteen	1	6	180
Total	37	387	11,610
October			
Sun Co.--Talley	6	85	2,635
Adams--O.T.Moore	3	36	1,116
Texas Co.--Beatty	2	71	2,201
Texas Co.--Lackey	5	23	713
Texas Co.--Osteen	6	53	1,643
Texas Co.--J. Moore	2	23	713
Texas Co.--O.T.Moore	4	27	837
Texas-Humble--Clingensmith	5	27	837
Humble--Clingensmith	2	19	589
Morgan-Atlantic--Osteen	1	0	0
Total	36	364	11,284

	No. of Wells	Daily bbls.	Total
November			
Sun Co.--Talley	6	101	3,030
Adams--O.T.Moore	3	37	1,110
Texas Co.--Beatty	2	63	1,890
Texas Co.--Lackey	5	26	780
Texas Co.--Osteen	6	37	1,110
Texas Co.--J. Moore	2	26	780
Texas Co.--O.T.Moore	4	40	1,200
Texas-Humble--Clingensmith	5	58	1,740
Humble--Clingensmith	2	19	570
Atlantic-Morgan--Osteen	1	7	210
Total	37	414	12,420
December			
Sun Co.--Talley	6	90	2,790
Adams--O.T.Moore	3	30	930
Texas Co.--Beatty	2	49	1,519
Texas Co.--Lackey	5	25	775
Texas Co.--Osteen	6	23	713
Texas Co.--J. Moore	2	25	775
Texas Co.--O.T.Moore	4	27	837
Texas-Humble--Clingensmith	5	64	1,984
Humble--Clingensmith	2	18	558
Atlantic-Morgan--Osteen	1	47	1,247
Total	36	398	12,128
January, 1930			
Sun Co.--Talley	6	87	2,759
Adams--O.T.Moore	3	33	1,023
Texas Co.--Beatty	2	65	2,015
Texas Co.--Lackey	5	18	558
Texas Co.--Osteen	6	54	1,674
Texas Co.--J. Moore	2	24	744
Texas Co.--O.T.Moore	4	25	775
Texas-Humble--Clingensmith	5	42	1,302
Humble-Clingensmith	2	18	558
Atlantic-Morgan--Osteen	1	3	93
Total	36	371	11,501

	No. of Wells	Daily bbls.	Total
February			
Sun Co.--Talley	6	83	2,324
Adams--O.T.Moore	3	24	672
Texas Co.--Beatty	2	65	1,820
Texas Co.--Lackey	5	32	896
Texas Co.--Osteen	6	37	1,036
Texas Co.--J. Moore	2	13	364
Texas Co.--O.T.Moore	4	15	420
Texas-Humble--Clingensmith	5	58	1,624
Humble-Clingensmith	2	18	504
Morgan-Atlantic--Osteen	1	6	168
Total	36	351	9,828

March, 1930,	Total all leases	10,106
April, 1930,	Total all leases	12,090
May, 1930,	Total all leases	8,029
June, 1930,	Total all leases	9,090
July, 1930,	Total all leases	9,951

The total production in the Dale Field by companies through February, 1930:

	Number of wells	Production (in bbls.)
Adams and Lyles	3	42,884
Morgan-Atlantic	1	4,698
Humble Oil and Refining Company	3	24,513
Sun Oil Company	6	143,175
Texas-Humble	7	74,376
Texas Company	19	265,531
Total	39	555,177

The total production of the entire field to August 1, 1930, amounts to 604,443 barrels.[13]

13. All of these production figures were secured from the Humble Oil and Refining Company and show pipe line runs.

WELL DATA

The following are the logs of the two wells in the Dale Field that were drilled to the Edwards limestone. The other logs used in this report are on file with the Bureau of Economic Geology of the University of Texas.

Log of Well

The Texas Company; farm of R. Beatty; Well No. 1 "B"; located 150' from southeast line and 150' from northeast line of 17.5 acre tract; Nicholas Kelly Survey; elevation 533 feet.

0-66	surface sand
129	sand
225	shale and boulders
227	rock
253	rock and pace sand strips
286	shale
289	rock
352	shale and boulders
254	rock
374	sandy shale
378	shale
383	rock
445	shale
446	rock
546	shale
650	shale and boulders
672	sticky shale
725	shale
748	gumbo
896	shale
899	rock
971	shale
972	rock
1088	shale
1091	rock
1120	gumbo
1265	hard limey shale
1375	sandy shale
1432	limey shale
1639	gummy shale
1889	sticky shale
1895	hard lime
1903	hard limey shale
1940	"sticky lime" (?)
1990	shale and lime
2013	hard lime
2021	broken lime
2041	top chalk ?
2048	sticky lime
2056	shale
2067	sticky lime, top serpentine
2076	shale and serpentine
2090	sticky lime
2096	shale and serpentine
2101	sticky lime
2119	shale and serpentine
2125	sticky lime
2139	shale and serpentine
2143	shale
2144	lime
2446	Austin chalk
2469	broken shale and chalk
2551	lime
2569	Del Rio clay
2577	clay and lime
2661	Georgetown lime
2664	Dobe
2700	Edwards lime
T.D.	dry and abandoned

Log of Well

Humble Oil and Refining Company; farm of Troy Clingensmith; Well No. 3; location 150' from southwest line and 1050' from southeast line of lease; Squire Damon Survey; elevation 505'.

0-72 surface clay
113 sand
184 shale and lime
188 sand rock
256 sandy shale
287 rock
294 gumbo
329 rock
355 hard shale
421 sandy shale
425 sand rock
429 rock
436 gumbo
439 rock
487 sandy shale
553 sticky shale and hard lime
990 shale with hard streaks lime
993 rock
1051 shale and lime
1126 shale with lime streaks
1218 sticky shale and hard lime
1883 shale
2066 shale with hard streaks
2090 top serpentine
2098 sticky shale (reamed hole to 1960, to 2028, and to 2085)
2282 serpentine
2285 hard lime
2381 top chalk
2392 serpentine, slight gas show
2417 serpentine and lime (core at 2412 showing lime and crystalline chalk) (reamed hole to 2412)
2420 hard sand showing oil
2460 hard lime and shale
2466 hard lime and serpentine
2491 hard lime (core 2458)
2500 top Del Rio
2504 hard shale and lime
2518 sticky shale
2540 sticky shale, streaks hard lime
2547 sticky shale
2552 top Georgetown
2656 hard lime, 10,000 bbls. sulphur water
T.D.

2615 core Georgetown
2633 core Edwards
2643 core Edwards
2653 core Edwards--sulphur water

The following samples of well cuttings were obtained from the Texas Company and the Humble Oil and Refining Company:

Texas Company No. 3 Osteen Elevation 531'	2171 hard limestone and serpentine 2174 hard limestone and serpentine
Texas Company No. 4 Osteen Elevation 521'	2186 chalk 2189 chalk 2196 limestone and serpentine 2205 serpentine
Texas Company No. 5 Osteen Elevation 511'	2104 limestone and serpentine 2107 limestone and serpentine 2110 limestone and serpentine
Texas Company Osteen No. 6 Elevation 520'	1995 gray shale 2108 limestone, and shale (serpentine?) 2141 soft chalk 2170 soft chalk 2191 hard chalk
Texas Company O. T. Moore No. 1 Elevation 518'	2222 hard and soft limestone 2227 chalk and serpentine 2232 calcite and serpentine 2238 calcite and serpentine 2239 calcite and serpentine
Texas Company O. T. Moore No. 2 Elevation 545'	2217 serpentine and calcite 2227 limestone
Morgan-Atlantic No. 1 Osteen Elevation 492'	1988 serpentine 1997 serpentine 2014 hard chalk 2030 limestone and serpentine 2081 soft limestone 2133 core chalk and shale 2215 core chalk

Sun Oil Company Talley No. 2 Elevation 517'	2187-90	serpentine
Texas Humble Clingensmith No. 8 Elevation 522' (est.)	1942	limestone
	1980	calcite, chalk and pyrite
	2015	nearly pure porous serpentine
	2200	serpentine and chalk

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