beds are found to thicken and dip steeply away from the salt core, indicating structural movement both during and after deposition. Thinning of Upper Cretaceous sediments over the deeper-seated domes where the evidence has not been obliterated confirms this structural growth. The basin position of these domes and the time of origin indicates that the Lower Cretaceous sediments dip toward the domes.

Deep-seated domes are found to have many of the aspects of anticlinal structures. These domes began their growth much earlier than piercement domes and are located, and have always been located, on locally high areas. Thinning of Lower Cretaceous sediments furnishes evidence for their early origin, and uniform thinning of Upper Cretaceous beds suggests that these domes grew uniformly throughout Upper Cretaceous and Tertiary time and were never subjected to the violent displacements which affected their neighbors, the piercement domes. These structures are ideal reservoir anomalies and seven out of ten are now producing, with the possibility that some of the others will produce with subsequent development.

6. "Merigale-Paul Field, Wood County, Texas," Hastings Moore, Danciger Oil and Refining Company, Henderson, Texas. Prior to 1947, this field was classified as two separate fields—Merigale and Norman-Paul fields.

The Merigale-Paul field in central Wood County is the most important sub-Clarksville (upper Eagle Ford) reserve now known.

The Merigale-Paul field was discovered in December, 1944, by Bobby Manziel. As of July 1, 1949, the field had produced 3,269,813 barrels from 160 sub-Clarksville wells and 64,790 barrels from the single Woodbine producer.

The oil column is 235 feet; maximum net effective sand thickness is 38 feet, with the average about 16 feet.

Reservoir energy is gas expansion plus a probable limited water drive.

Structurally the Merigale-Paul field is a faulted monocline dipping southeastward, 550 feet to the mile. The trapping fault is a low-angle continental fault (average dip 32°), which parallels very closely the strike of the strata.

The eastern end of the field is at the intersection of the water table with the fault zone, and the western end is at the facies change of the sub-Clarksville sands into ash beds.

7. "Blackfoot Field, Anderson County, Texas," D. O. Branson, Stanolind Oil and Gas Company, Tyler, Texas.

This paper presents a review of the structure, stratigraphy, and history of the Blackfoot field, Anderson County, Texas.

The Blackfoot producing structure is a relatively small, faulted, elongate, domal, closure situated on an anticlinal trend which extends from northeastern Freestone County through west-central Anderson County into southeastern Henderson County and is known as the Blackfoot-Bradford Tennessee Colony trend.

Productive formations include the Rodessa and Pettit limestones, and the Travis Peak sands of the Trinity group. The productive limits are not defined since the field is only partly developed.

Faulting, although present at Blackfoot, is thought to be of minor significance and known faulting does not effect the local accumulation of gas and oil. Control furnished by development wells shows a typical graben fault pattern; however, the exceptional feature in Blackfoot is the termination of both faults at the point of intersection.

8. "Petroleum Exploration in Eastern Arkansas," C. A. Renfroe, Arkansas Resources and Development Commission, Division of Geology, Little Rock, Arkansas.

The area with which this paper is concerned lies in the Gulf Coastal Plain in Arkansas north of the Arkansas River. The following conclusions are based on a study of the available samples and electric logs.

Tertiary rocks are for the most part non-marine in origin. Some of the beds in the Jackson and Claiborne groups may be thin tongues of either marine, deltaic, lagoonal, or estuarine deposits. The Wilcox group is predominantly thick, coarse-grained sandstones which are ordinarily water-bearing. The Midway group consists of two formations: the Porters Creek clay and the Clayton. None of the Tertiary rocks is considered promising as a potential oil reservoir.

In the Cretaceous two formations offer possibilities for oil and gas: the Nacatoch sandstone and a basal transgressive sandstone, probably Ozan in age overlying the Paleozoic floor. The Nacatoch is of sufficient thickness and porosity to serve as a reservoir bed. However, local variations in porosity or in the sand-shale ratio should be expected. The basal sand is coarse- to medium-grained, commonly pyritic and glauconitic. Electric logs show a well developed self-potential curve in this unit. If found on structure or as a wedge-edge pinch-out, this basal sand has good possibilities as a future oil source.

Paleozoic rocks, ranging in age from Pennsylvanian to Cambro-Ordovician, are present below the Cretaceous. A paleogeographic map of the pre-Cretaceous surface shows that older Paleozoic formations (Plattin, *et cetera*) are found as far south as Cross and Crittenden counties. This indicates a marked change in strike of the truncated older rocks. With sufficient cover these older beds may be excellent oil traps. The St. Peter sandstone is considered a particularly good possibility.

There is also a possibility that oil traps may be associated with intrusive igneous bodies similar to the nepheline syenite plugs near Little Rock.

9. "Surface and Subsurface Correlation of Wilcox Formation in West-Central Louisiana," D. A. Robertson, C. M. Schwartz, and A. H. Trowbridge. (Work completed as students of Centenary College, Shreveport, Louisiana).

Surface samples of the Wilcox and Midway formations were collected and examined for lithologic characteristics and faunal content. These formations exhibit a cyclic pattern of deposition. Fossils are rare.

The surface equivalents were examined in the subsurface and it was noted that the cyclic pattern exhibited in the outcropping formations extended with marked regularity into the subsurface.

Microfossils and macrofossils were examined from cuttings and a number of these were used along with the cyclic pattern, to correlate the surface formations with their equivalents in the subsurface.

10. "Cairo Field, Union County, Arkansas," L. A. Goebels, The Carter Oil Company, Shreveport, Louisiana.

The Cairo field was discovered in July, 1948. Production is from the Reynolds oölite member of the Smackover limestone of Jurassic age. The field is almost completely developed with 15 producing oil wells and 3 dry holes. The reservoir does not have a gas cap. The structure of the field is essentially an anticline trending northeast-southwest and oddly enough at right angles to the Schuler structure. There are no indications of faulting. The Cairo field is unique in several features. 1. Although regionally updip from the Schuler field, its apex is almost 100 feet lower than that of Schuler. Wells on the west flank of Cairo produce oil 180 feet below the oil-water contact at Schuler. 2. It is the first field in South Arkansas to show definite south limits of the Buckner red shale and anhydrite section. 3. Each producing well has a different oil-water contact. Evidence can be shown to support the theory that the various oil-water contacts are part of a tilted surface rather than the result of different zones of porosity. 4. Wells on the east side of the field where the oil-water contact is high recover oil-saturated porous limestone in cores but on drill-stem tests recover salt water. The subsea depth of 7,540 feet appears to have been the original oil-water contact. Factors which might have affected the original oil-water contact are discussed.

High recoveries with the diamond core-barrel and a complete analysis of all cores made possible a detailed study of the lithologic character of the oölitic limestone. Oölite zones vary laterally and vertically and it is difficult to correlate them from one well to another. The highly porous, loosely cemented oölite zones are best developed in the central and south portions of the field. The transition from clastic to chemical deposition is evident in the top of the Smackover on the north flank of the structure. There is no evidence to suggest that the structure is of reef origin.

11. "Facies Changes in Gulf Cretaceous Beds in Mississippi," Tom McGlothlin, consultant, Laurel, Mississippi.

It has long been recognized that facies changes occur within Gulf Cretaceous beds in Mississippi. Sands which are marginal or near-shore deposits grade to dark gray shales which are considered deeper-water deposits. Red "non-marine" type shales grade to dark gray "marine" shales.

In tracing the various stratigraphic units across the state, it becomes apparent that the base of the Gulf Cretaceous chalk is not a true time line. Neither is the top of "the Marine Tuscaloosa shale."

By noting the general direction of the facies changes in Gulf Cretaceous beds, it is possible to establish in general the direction of the depositional strike and thus arrive at an estimate of the general direction of the shore line of the Gulf Cretaceous seas.

12. "Brookhaven Field, Lincoln County, Mississippi,"[1] Robert Womack, Jr.,[2] The California Company, New Orleans, Louisiana.

The Brookhaven oil field, located in Lincoln County, Mississippi, was discovered in 1943. A period of inactivity followed, due to poor results of the discovery well. In 1945 the second producer was completed which led to the development of the field. The Brookhaven structure is anticlinal and is probably due to deep-seated salt movement. The structure is crossed by three normal faults which

[1] Presented by permission of The California Company.

[2] The writer wishes to express his appreciation to the Brookhaven Unit Operators for permission to present the structure and isopachous maps of the lower Tuscaloosa formation and to give full credit for the preparation of these maps to the Brookhaven Geological Committee.