The belt of accumulations extends 600 mi from Peace River, Alberta, to Lloydminster, Saskatchewan. Individual accumulations appear to be controlled by early formed structural and stratigraphic traps that served as loci of deposition for the oil. The Lower Cretaceous oils belong to a single oil system and all appear to be young and immature. The most acceptable hypothesis of origin is that hydrocarbons moved out of the deep basin in micellar of colloidal solution in compaction waters and were deposited on anticlinal structures or in sandstone pinchouts. There has been only limited adjustment in the position of the oil in the traps since a discrete oil phase was formed.

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RATES OF SEDIMENTATION AND INTRABASIN DEFORMATION, UPPER CRETACEOUS, ROCKY MOUNTAIN REGION

Rates of sedimentation during the Late Cretaceous in the Rocky Mountain-Great Plains region compare favorably with rates of sedimentation shown by Quaternary sediments of the Atlantic Ocean basin margins. An average rate of about 1 in./1,000 yr is reported for Quaternary deep-water sedimentation in the Atlantic Ocean by Ericson *et al.* (1964). This rate is prevalent in regions where sediments are largely biogenetic, consisting mainly of coccoliths and foraminifers with few land-derived minerals. In contrast, rates 20–40 times greater are reported in the shoreline zones of the Atlantic. Similar rates are inferred from radiometric dates for Late Cretaceous sedimentation in the region of the Rocky Mountains-Great Plains. Slow rates approximating 1 in./1,000 yr were prevalent near the geographic center of the basin during the time of deposition of rock units such as the Greenhorn, Niobrara, and Mobridge. These units consist largely of coccoliths and foraminifers with small quantities of land-derived minerals. In the equivalent shoreline zone for each time-stratigraphic unit, rates of sedimentation are at least 20 times greater than depositional rates in the basin.

The differential rates of sedimentation greatly influenced the rates of subsidence within the Cretaceous basin. Tectonic downwarping of the basin was accentuated in some areas by sediment loading resulting from deposition in the general shoreline zone, especially in the deltaic areas. Large-scale intrabasin warping developed with structural dips as great as 50 ft/mi. Early migration of petroleum was influenced by these early intrabasin tectonic elements before destruction of the large depositional basin by Laramide folding.

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LOWER CRETACEOUS OF WYOMING AND SOUTHERN ROCKIES

Lower Cretaceous strata (essentially the Dakota Group) of Wyoming and the Southern Rockies are of considerable economic importance. To date recoverable reserves of about 450 million bbl of oil and 1½ trillion cu ft of gas have been discovered in these rocks.

Lower Cretaceous sediments were deposited in the incipient Rocky Mountain geosyncline which seemingly began to subside in this region in Aptian time. The first sediments to be laid down were inland floodplain conglomerate, sandstone, and variegated mudstone (Cloverly, Lakota, Lytle, lower Cedar Mountain, *etc.*) transported into this depression by river systems from the Sioux uplift on the east and from the Mesocordilleran geanticline on the west.

As the transgressing arboreal sea entered this part of the trough, and ultimately joined the southern sea, environmental relations became more complex. Marine shale and siltstone (Skull Creek, lower Thermopolis, and Kiowa) formed in the deeper part of the trough occupied by the sea and graded landward (eastward and westward) into sandstone, shale, and coal of the transitional littoral-marine-lagoonal, paludal, and deltaic environments (Fall River, upper Cedar Mountain, Plainview, upper Cheyenne, *etc.*). These, in turn, graded laterally into sandstone and variegated mudstone of the now restricted floodplain environment.

Toward the end of Early Cretaceous time, a low arch rose in southern Kansas and southern Colorado, separating the trough into two parts. However, continuing subsidence allowed the sea to spread greatly both east and west. Floodplain deposits (now composed of sandstone and mudstone) continued to accumulate between the source areas and the arboreal sea and interfinger seaward with shale and sandstone of the transitional environments (Omadi, "Dakota," Naturita, *etc.*). These in turn interfinger with the marine upper Thermopolis and Mowry Shales. Tongues of these formations (Newcastle, Muddy, "J," *etc.*) project seaward into the marine shale and probably represent deltaic wedges formed during minor regressions of the sea.

Petroleum has been produced from nearly all the units mentioned, representing deposits of marine, littoral, deltaic, paludal, lagoonal, and floodplain environments. Most production has come from Newcastle, "J," and Muddy sandstones which probably are deltaic and littoral marine complexes.

17TH ANNUAL MEETING OF GULF COAST ASSOCIATION OF GEOLOGICAL SOCIETIES
AND
SOCIETY OF ECONOMIC PALEONTOLOGISTS AND MINERALOGISTS—GULF COAST SECTION
AND
REGIONAL MEETING OF THE AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS
SAN ANTONIO, TEXAS, OCTOBER 25-27, 1967

GENERAL

The South Texas Geological Society invites you to the charming city of San Antonio for an outstanding 3-day convention of the GCAGS, SEPM, and AAPG. Our convention committees have developed plans to make this 17th meeting the most interesting of all.