"splinters" a producing upthrown block is present. The closures developed on the regional fault splinters appear to be related to domal growth older than that accounting for the other two producing structures at the south.

Sand development throughout the middle Miocene is best in upper parts of this interval, for deeper in the section some sands lose the blanket characteristic found in shallower zones and instead exhibit a channel-like geometry. The origin of deposition of any particular potential reservoir sand provides the limitations for the shape and extent of the bed and probably is a controlling factor in hydrocarbon accumulation.

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Interpretation of Dipmeter Surveys in Mississippi

The study of patterns of closely spaced dip computations throughout the length of continuous dipmeter surveys is producing greatly increased geological information in Mississippi wells. Structural dip (or regional dip if no structure is present) is the basic dip shown by the dipmeter. Superimposed on the basic dip are the dips resulting from faults, unconformities, and local depositional features. These are generally greater than structural dips and in random directions.

Faults are most commonly shown by the increasing dip in the drag zone as the bore-hole approaches the fault plane from the downthrown side. Complex faulting over shallow ridges or domes may be recognized by the change in dips between faulted blocks. Buried bars are detected in wells drilled on the steep slopes by the decreasing dips exhibited by the successively younger beds deposited above them. Other changes in dip indicate the location of unconformities, most of these being reasonably easy to recognize, since they appear at the same general position in the geological column. Cross-bedding shows as erratic dips within sands.

It is emphasized that detailed geological interpretations of the dipmeter survey require numerous closely spaced computations studied in relation to the well log.

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Geology as an Historical Tool

Geology is at best a synthetic science; the general geologist must have a working knowledge of chemistry, physics, biology, mathematics, and many other sciences. This training in a spectrum of skills makes the geologist peculiarly fitted to deal with multiple-variable problems, especially those which can be reduced only to qualitative solutions. Such problems are numerous in historical criticism; history, like geology, is a reconstructive art involving the interplay of large numbers of variables. Many otherwise incomprehensible events, particularly in military history, become logical and understandable when methods of inquiry based on geological information and techniques are applied. Such examples from the Civil War in the Vicksburg area include the location of the ironclad gunboat *Cairo*, the non-intervention of the Confederate trans-Mississippi armies in Grant's march through Louisiana, Grant's decision to march far inland in Mississippi after the battle of Fort Gibson, and several others. Based on such examples, it seems obvious that geologists are not exploiting their peculiar skills to a maximum.

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Palynology and Its Application in Petroleum Exploration

Palynology, the study of pollen and spores, is the only known universal method by which marine sediments can be correlated with fresh-water sediments. Study of the history of pollen analysis shows a rapid expansion in the use of this technique from 1916 onward. The Royal Dutch Shell Group initiated palynological studies in 1938, and many oil companies now have palynological laboratories.

Pollen and spores can undoubtedly be preserved because the outer wall of the grains is extraordinarily resistant. The chemistry of this outer wall (exine) is unfortunately very poorly understood. Relation to terpenes or similar compounds has been suggested.

Although exact information concerning the distribution of pollen and spores by wind is difficult to obtain, there is considerable evidence that they can be transported very great distances. Transportation by water is important, and examples of Recent studies in the Orinoco Delta, Volga River, and Gulf Coast are discussed.

Pollen and spores can not withstand prolonged oxidation. The spore and pollen wall takes up oxygen (autooxidation). This photo-chemical process adds oxygen molecules to double linkages in the pollen and spore wall, with the formation of peroxides. Since oxygen is the main enemy of the spore and pollen wall, it is obvious that strata deposited in reducing environments commonly contain well preserved pollen and spores.

Determination of ancient shorelines, age determination of Gulf Coast salt, and palynological correlations in Venezuela, Canada, and France are examples of practical applications of the palynological method.

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Faulting Associated with Deep-Seated Salt Domes in Northeast Part of Mississippi Salt Basin

Faulting in the northeast part of the Mississippi salt basin is principally of the local graben-type resulting from salt doming. On deep-seated salt-dome structures, the faulting appears to exhibit common characteristics throughout the area which can be applied to great advantage in subsurface interpretations.

The strike of the faults associated with deep-seated salt domes through this area does not exhibit a consistent regional alignment, as the faults are localized over each dome. The general fault strike is usually parallel with the long axis of the deep-seated dome with which it is associated.

Faulting over deep-seated salt domes can usually be related to derivative gravity minimums which are expressions of the salt uplifts causing the faulting. The primary faults generally strike parallel with the long axis of the derivative gravity minimum, and faults on the outer margin of a graben structure are usually downthrown toward the long axis of the minimum. Generally, the relative intensity of the derivative gravity minimum becomes greater as the complexity of the faulting becomes greater.

On complexly faulted structures in this area, the outer faults of a graben system are considered to be the primary faults as they were usually the first faults initiated and they predominate with depth.

Fault dips over deep-seated domes in the northeast part of the Mississippi salt basin average approximately 45° in the Upper Cretaceous and 60° in the Lower Cretaceous.

An increase in throw with depth is exhibited by faults over deep-seated domes at a rate determined principally by the rate of differential uplifting which the salt exhibited during deposition of the sediments through