Examples are known where several of these various types of porosity are present in a single deposit and influence log analysis in either a negative or positive manner. A nonpermeable chalk or calcisphere porosity carrying high water saturation may produce oil if the fracture fabric or associated intergranular permeability is oil-bearing. Likewise the reverse may be true if nonproducible oil is trapped in the high porosity-low permeability deposits and the more permeable fracture and (or) intergranular porosity is water-bearing.

The presence of these varied porosity fabrics can be recognized in samples and a method of logging and estimating the importance of the different types is suggested. Utilization of well sample data coordinated with realistic log analysis can lead to successful completion in zones which might be overlooked in a cursory log analysis. Examples of these sedimentary types from the Mid-Continent area are discussed and illustrated.

CHARLES R. KING, Consultant, Wichita, Kans.

ORDOVICIAN OIL IN SEDGWICK EMBAYMENT

The Sedgwick embayment occupies approximately 8,000 sq mi in south-central Kansas. The area is bounded on the west and northwest by the Pratt anticline and the Central Kansas uplift. The Nemaha ridge limits the embayment on the east. Late Mississippian and Early Pennsylvanian movements were primarily responsible for the development of the embayment.

The most important reservoir for the Ordovician oil is the Simpson sandstone. Other reservoirs contributing significant recoveries are the Viola and Arbuckle.

Simpson sandstone of the area was laid down by transgressive seas, with locally regressive phases, which invaded from a subsiding basin on the south. Source of the sand was on the north and northeast.

The Sedgwick embayment has undergone two phases of exploratory activity. In the late 1920s and early 1930s the large features were found through core-drilling operations. Subsequent to World War II many new fields were found by subsurface studies and seismic activities.

Fields in the Sedgwick embayment have produced approximately 303,000,000 bbls of oil. Of this total, 108,000,000 bbls, or approximately 30%, has come from Ordovician rocks.

Most of the oil fields of the area which produce from the Ordovician exhibit similar geologic characteristics. Among the more important factors governing Ordovician accumulation are thinning of the Mississippian, existence of adequate reservoir rocks, and Permian structure.

Proper geological application of the known factors which control Ordovician oil accumulation will result in many future Sedgwick embayment discoveries.

FRED H. MANLEY, JR., Pan American Petroleum Corp., New Orleans, La.

USE OF CLAY MINERALOGY IN DETERMINING SOURCE OF BASIN SANDS

(No abstract submitted.)

D. W. MARDEN, Consultant, Liberal, Kans.

DEPOSITION OF CHESTER SANDSTONES OF MISSISSIPPIAN AGE IN SOUTHWESTERN KANSAS

The Chester Series of the Mississippian System covers all or part of 12 of the counties that comprise extreme southwestern Kansas. The erosional surface on which sediments of Chester age were deposited was an extremely rough one, representing a major unconformity. Significant commercial oil fields have been found in sandstones of Chester age in this area. Commercial oil accumulated in highly lenticular sandstones. This oil accumulation is mainly stratigraphic. Chester sediments change thickness abruptly in the area that was studied. The Chester seas generally were transgressive with several periods of quiescence. Several facies are recognized, including the sandstone facies.

GARY A. McDANIEL, Midwest Oil Corp., Oklahoma City, Okla.

AN APPLICATION OF DIRECTIONAL FEATURES AND SCALAR PROPERTIES OF SEDIMENTS TO HYDROCARBON EXPLORATION

Ripple marks, cross-bedding, and groove casts are examples of directional features of sediments. Variations in grain size or mineral composition are examples of scalar properties. Although directional features normally are considered to be the domain of the surface geologist, by means of the oriented core and more recently the dipmeter, these features also can be used by the subsurface geologist. Recent literature abounds with reports of new types of scalar properties.

Directional features and scalar properties of sediments are used to determine paleocurrent direction. The integration of paleocurrent data with environmental information yields a paleogeographic map. Prediction of favorable areas for wildcat exploration and the exploitation of wildcat discoveries can then be made from the paleogeographic map.

The Desmoinesian-age Hartshorne Formation of eastern Oklahoma is a shallow but major gas producer within the Arkoma basin. A study in the nature of directional features $\rightarrow$ paleocurrent direction $+$ depositional environment $=$ paleogeographic map is presented. This study indicates that the probable nature of the productive Hartshorne sandstone in the discovery well of the South Pine Hollow field, Pittsburg County, Oklahoma, is a deltaic channel sandstone with a northeast-southwest alignment. This information could have been used to exploit the discovery well.

GEORGE N. MUELLER, Consultant, Wichita, Kans.

CHEROKEE SAND POSSIBILITIES, CENTRAL KANSAS

Cherokee sandstone reservoirs west of, parallel with, and flanking the Central Kansas uplift produce oil primarily from structural traps. Of probable late Cherokee age, these sandstones are the products of the erosion of the nearby positive arch area. Several depositional environments probably are represented, although shallow-water marine conditions from the transgressing Cherokee seas are an obvious influence.

A basinward facies change to dominantly limestone and shale confines the maximum sandstone development within a northwest-southeast trend. This trend generally coincides with the truncated updip limit of the Mississippian, although the sandstones onlap rocks as old as Cambro-Ordovician (Arbuckle) on the pre-Pennsylvanian unconformity surface on which they are deposited.

Sandstones at nearly all levels in the interval produce. Correlation of individual sandstones can be accomplished only on a limited scale, indicating the lenticular nature of the section. Intraformational limestones are not widely persistent.

Pennsylvanian and Permian movements were most important in forming the producing structures. How-