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Abstracts of Papers

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Porosity and Permeability in Silurian Carbonate Rocks of Hunton Group, Anadarko Basin, Oklahoma

Ninety Hunton cores have been studied, from which 82 Silurian samples from 22 wells were tested for porosity and permeability. Each sample was examined in thin section and was chemically analyzed for $CaCO_3$, $MgCO_3$, and HCl insolubles. The specimens range from limestone and calcareous mudstone having less than 1% $MgCO_3$ to crystalline dolomite with more than 43% $MgCO_3$. Porosity ranges up to 21%, and permeability to 305 md. Rocks with appreciable porosity and permeability have a circumscribed range in texture and composition—specimens with more than 5% porosity are confined to crystalline dolomites with more than 35% $MgCO_3$ (65% dolomite), and those with more than 10% porosity to dolomites with more than 37% $MgCO_3$ (80% dolomite). Much of the pore space is in the form of fossil molds and vacuities in the matrix surrounding oolites. The fossil molds are due to leaching, and the porous oolites probably result from a primary porosity increased by dissolution. Not all dolomites have high porosity, and several specimens with more than 35% $MgCO_3$ have less than 1% porosity; the latter condition appears to result at least in part from preservation of the fossils by calcspar and dolospar rather than as molds. Leaching of fossils and preservation by spar are confined to crystalline dolomite, thus indicating a genetic relation to dolomitization. A suggested sequence of events in the development of porosity is dolomitization and leaching, followed by some secondary cementation of pore space by spar.

Present information indicates a geographic concentration of these porous Silurian dolomites in the north-central and western parts of the Anadarko basin in Oklahoma.

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Stratigraphic Analysis of Cherokee Group, Pennsylvanian (Desmoinesian), North-Central Oklahoma

Cherokee rocks in an area of approximately 14,000 sq mi of north-central Oklahoma were investigated utilizing 1,850 mechanical logs and 110 sample logs. Correlations were established from stratigraphic profiles, constructed so as to form a control network throughout the area.

The Cherokee "genetic sequence" of strata can be defined at its base by a regional unconformity and at its top by the base of the Oswego or Fort Scott Limestone. The Oswego disappears southward into the Calvin Formation and the top of this latter unit (although slightly higher in the section) was used for the top of the sequence in the southeastern part of the area. Based on marker beds the sequence was subdivided into 6 "genetic increments" of strata—Gilcrease, Booch, Bartlesville, Red Fork, Skinner, and Prue-Calvin. These were named, in ascending order, for a prominent sandstone body therein. Isopach maps were constructed for each increment. These showed a general thickening toward the Cherokee, Arkoma, and Anadarko basins, and also indicated that an old drainage system was developed on the underlying eroded surface which flowed into these basins. Isolith maps were constructed for the sandstone bodies within each increment. These showed a general elongated and branching pattern that trends into the Arkoma basin.

It is concluded that the Cherokee sequence was an onlapping, cyclical unit that was deposited on an eroded, stream-dissected surface formed on southeasterly and southwesterly tilted older rocks, and that the sandstone bodies constituted a part of a sediment dispersal system that contributed to the alluviation of parts of the Cherokee, Arkoma, and Anadarko basins.

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Reconstructing a Pennsylvanian Delta System

The Coffeyville interval within the Missourian Series of the Pennsylvanian System in northeastern Oklahoma was studied to determine its origin. The interval is an isochronous unit underlain by the Checkerboard limestone key bed and overlain by the Hogshooter limestone. Through most of the area these transgressive limestone marker beds define a time-rock unit.

Stratigraphic characteristics within the interval are illustrated by cross sections, and specific data obtained from more than 500 well logs were used to make isopachous, sandstone-shale ratio, and isolith maps. Core, E log, and outcrop observations provided information on sedimentary structures, textures, and vertical sequences.

The primary depositional framework is deltaic. From the available data it is possible to delineate 8 separate environmental facies within the delta complex, and to correlate each facies with particular S.P. curve shapes. Outcrop and core studies of trace fossils, textures, and sedimentary structures were correlated to individual facies. Criteria were established to recognize ancient deltaic deposits and methods of environmental analysis.

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Prospecting for Reefs by Gravity

A gravity survey conducted in 1951 by the Panhandle Eastern Pipeline Company resulted in the discovery of gas in the Boyd reef, St. Clair County, Michigan. Subsequent drilling shows that 29 reef discoveries in Michigan are attributed to gravity prospecting between 1952 and 1967. The Wapella East reef in Illinois and the Redwater reef in Alberta, Canada, are other reefs discovered by gravity surveys. Gravity maps have been made of recent discoveries in Ingham and Eaton Counties, Michigan.

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Algal Bank Complexes of Mid-Continent

Algal banks are widely distributed, are important in late Paleozoic carbonate provinces, and commonly are good reservoirs for accumulation of hydrocarbons. The term "'bank" as used herein indicates an unusually thick sequence of carbonate mudstone built by in-place organisms.

Algal banks are formed primarily by phylloid algae; other organisms may also contribute to the development of the banks. Other than algae, fenestrate bryo-