

sorted subarkoses having subrounded to rounded quartz grains. The dune and interdune sandstones are interbedded with wadi and playa-lake deposits having wavy discontinuous laminae. These water-deposited sandstones are not as texturally mature as the dune sandstones. The upper part of the Norphlet includes massively bedded to horizontal laminated marine sandstones. Porosity is principally secondary dissolution with some intergranular porosity. The secondary porosity is a result of decementation of anhydrite and/or calcite and by grain dissolution. Porosity in the marine sandstones is reduced through calcite cementation in down-dip areas. The Permian eolian dune and wadi sandstone reservoirs in the Viking field, North Sea, can be used as analogs for anticipating reservoir performance for the Norphlet sandstones.

MANGER, W. L., Univ. Arkansas, Fayetteville, AR, W. R. RICE, Quintana Petroleum Corp., Houston, TX, J. I. HOGUE, III, Exxon Co., U.S.A., Kingsville, TX, and S. L. HOKETT, Baroid Corp., Baton Rouge, LA

Depositional and Postdepositional History of Stuart City Member, Edwards Limestone (Lower Cretaceous), Washburn Ranch Field, LaSalle County, Texas.

The Stuart City member of the Edwards Limestone (Lower Cretaceous) was cored in 2 wells in Washburn Ranch field, LaSalle County, Texas. Depositional sequences encountered in the cored intervals represent an alternating sequence of reef-derived grainstone, pellet-rich grainstone, near-reef wackestone, and lagoonal mud-rich facies, with a general trend toward more shallow marine conditions. Deposition of the Stuart City member ended abruptly with deepening water conditions and deposition of a pelagic foraminiferal facies.

Porosity in the cored intervals can be related to incomplete cementation of the reef-derived grainstone facies. Four separate and unevenly developed generations of cementation have occurred as determined by standard petrography and cathodoluminescence. Thin, isopachous, syntaxial marine cement is present at some grain contacts. An influx of meteoric waters precipitated a nonluminescent, blocky calcite spar. Following a period of partial dissolution, a brightly luminescent cement lined cavities and indicates deeper burial. The bright cement is followed in optical continuity by an unzoned, faintly luminescent cement forming blocky spar that terminates in rhombic euhedra extending into the remaining pore spaces. It appears that invasion by hydrocarbons expelled meteoric waters and abruptly ended cementation.

MANSFIELD, CHARLES F., and CURTIS E. BRECKON, Univ. Tulsa, Tulsa, OK

Petrology and Porosity of Devonian Misener Formation, West Kremlin Field, Garfield County, North-Central Oklahoma

The Misener formation is a laterally discontinuous, mixed carbonate-siliclastic unit, comprising dolomite-cemented, quartz-rich arenite, and quartz-bearing dolomite. It reaches a thickness of 60 ft in the West Kremlin field, overlies an unconformity that truncates lower Paleozoic sedimentary strata, and is overlain by the Woodford (black) Shale. Based on petrographic and sedimentary features, it appears to have been deposited in a shallow, tide- and wave-influenced, marine environment.

The quartz-rich arenites are fine to very fine grained and well to very well sorted. They contain mostly monocrystalline quartz clasts, very fine grained, well-crystallized dolomite rhombs, and less than 2% K-feldspar. Lithic fragments, which are rare except for chert pebbles in the basal 1-2 cm, include silicified shale, phosphatic shale, and carbonate micrite. Accessory components include glauconite, phosphatic oolites, conodonts, fish scales, and authigenic pyrite. Devonian outcrops of the Ordovician Simpson Sandstone likely supplied most of the quartz detritus.

The best porosity is unevenly distributed in the mixed quartz-dolomite layers. Authigenic clay is rare, and quartz overgrowths are well developed but partly replaced by dolomite rhombs. Partial dissolution of the rhombs has formed a secondary porosity with good permeability due to pore-throat enlargement. Dolomite-poor, quartz-rich sandstones are well cemented by quartz overgrowths, and the pores contain abundant authigenic clay. The quartz-bearing dolomite is tight and, near the overlying Woodford Shale, is partly replaced by chert.

MAPLES, CHRISTOPHER G., Indiana Univ., Bloomington, IN, and ALLEN W. ARCHER, Aztec Research, New Orleans, LA

Penecontemporaneous Facies Relations in Pennsylvanian (Desmoinesian) Deltas of Southwestern Indiana

Lateral and vertical sedimentologic and paleoecologic analyses of rocks and fossils of the lower part of the Dugger Formation (Pennsylvanian, Desmoinesian) in Indiana has delineated the following deltaic sub-environments: (1) distributary sands, (2) upper-, middle-, and lower-interdistributary estuaries, (3) delta-plain lakes, and (4) swamps. In this part of the Illinois basin, terrigenous influx was from the northeast across an extremely low depositional gradient. Because of high surface area to depth ratio, current and wave energies of this shallow epicontinental sea were diminished. Thus, differential compaction rather than marine reworking dominated the deltaic destructive phase in this area. Differential compaction resulted in accumulation of localized anomalously thick sequences. The thickened units occur directly adjacent to penecontemporaneous distributary sandstones because of the greater degree of syndepositional subsidence in these areas. The dominance by differential compaction produced an unusual situation wherein a slow marine transgressive or deltaic abandonment stage was followed by a rapid marine regressive or deltaic progradational stage. Vertical and lateral changes in body- and trace-fossil communities reflect the encroachment of marine conditions and the relatively sudden onset of freshwater deposition. Maximum marine inundation of the area coincided with carbonate deposition. Maximum water depth in the area is estimated to have been less than 80 ft (25m) based on lateral relationships of interdistributary lithofacies with distributary sandstone and delta-plain sediments. The marine-influenced lithology deposited in shallowest water was black shale, which grades downward into coal and upward into calcareous gray shale and limestone. Lateral facies gradation indicates that these divergent lithotypes were produced penecontemporaneously at the delta margin.

MARTIN, RONALD E., Union Oil of California, Houston, TX, and W. DAVID LIDDELL, Utah State Univ., Logan, UT

Bathymetric Distribution of Foraminifera in Jamaican Reef Environments

Recent foraminifera inhabiting Jamaican north-coast fringing reefs display variations in distributional patterns that are related to bathymetry and reef morphology. Sediment samples containing foraminifera were collected along a profile that traversed the back reef (depth 1-2 m), fore-reef terrace (3-15 m), fore-reef escarpment (15-27 m), fore-reef slope (30-55 m), and upper deep fore reef (70 m). Approximately 150 species distributed among 80 genera were identified from the samples. Preliminary analyses indicate that diversity values (S, H') are lowest on the fore-reef terrace (79, 3.0, respectively), increase similarly in back-reef and fore-reef escarpment and slope settings (93, 3.4), and are highest on the deep fore reef (109, 3.7). Larger groupings (suborders) exhibit distinct bathymetric trends with miliolids occurring more commonly in back-reef (comprising 51% of the fauna) than in fore-reef (28%) zones, whereas agglutinated and planktonic species occur more commonly in deeper reef (> 15 m, 9% and 4%, respectively) than in shallower reef zones (< 15 m, 3%, and 0.5%, respectively). Among the more common species *Amphistegina gibbosa* (Rotolina) is much more abundant in fore-reef (28%) than in back-reef (8%) environments, whereas *Archaias angulatus* (Miliolina) is more abundant in back-reef (15%) than in fore-reef (3%) environments, and *Sorites marginalis* (Miliolina) occurs almost exclusively in the back reef, where it comprises 5.5% of the fauna. Q-mode cluster analysis, involving all species collected, enabled the delineation of back-reef, shallow fore-reef, and deeper fore-reef biofacies, also indicating the potential utility of foraminiferal distributions in detailed paleoenvironmental interpretations of ancient reef settings.

MASON, ROBERT M., Southland Royalty Co., Denver, CO

Sedimentology and Stratigraphy of Mississippian Orogenic Sediments, East-Central Nevada: Proposed Solution to a Paradox

Mississippian orogenic sediments deposited during during the Antler orogeny and exposed in east-central Nevada record the initial breakup of the Cordilleran geosyncline. They also contain one of the thickest, rich-