grained, ($Y = 3.7\ \mu m$) and has a dull luminescence. *Type 2* mud, which coexists with type 1 mud, is coarse grained ($\overline{Y} = 5.7\ \mu m$), lighter gray, and has a brighter luminescence. *Type 3* mud is darker gray, coarser-grained ($\overline{Y} = 6.7\ \mu m$), and is nonluminescent. *Type 4* mud is gray brown, and is the coarsest grained ($\overline{Y} = 8.8\ \mu m$) and most brightly luminescent of all bioherm mud. For comparison, interbioherm mud has the finest mean grain size ($\overline{Y} = 3.36\ \mu m$ and the brightest luminescence of all mud types examined.

It is proposed that synsedimentary marine cementation of biohermal muds and within synsedimentary stomatactis is the causative factor for bioherm stabilization and growth. Dark gray nonluminescent bioherm muds reflect a significant component of synsedimentary marine cements while lighter gray luminescent bioherm muds reflect a higher proportion of post-burial intergranular cements. This interpretation is supported by the oxygen and carbon isotopic composition of the lime-mud types. For example, synsedimentary stromatactis cavities lined by fibrous marine cements are constructed from nonluminescent type 3 muds which possess the heaviest isotopic signatures (-1.8 to -2.7 ‰$\delta^{18}O$; $+4.81$ to $+4.1$ ‰$\delta^{13}C$). In contrast, cavities infilled by post-burial granular cements are associated with luminescent mud types 1, 2, and 4, which possess lighter isotopic signatures (-2.3 to 14.4 ‰$\delta^{18}O$; $+2.0$ to $+4.2$ ‰$\delta^{18}O$). Interbioherm muds, interpreted to have lithified at a later stage than bioherm muds, possess lighter isotopic signatures (-3.8 to -6.7 ‰$\delta^{18}O$; $+2.3$ to $+2.5$ ‰$\delta^{13}C$).

Because of the heterogeneous distribution of synsedimentary cemented muds within the bioherms, the formation of the stromatactis cavities characteristic of Waulsortian bioherms is interpreted to occur from the slumping and subsequent removal of uncemented grains from beneath patches of early marine cemented mud. As such, this study emphasizes the role of early marine cements in fine-grained sediments as an active process which merits careful consideration in determining original porosities and diagenetic histories in ancient fine-grained carbonate facies.

CRANE, DAVID C., D. C. Crane, Inc., Dallas, TX

Interactive Video Digitization of Well Logs

An interactive microprocessor-based system is under development which converts the curve data on paper well logs to a computer-usable digital format. The system can be adapted to convert log curves from microfiche. The system is expected to reduce the cost, time, and drudgery associated with current hand-tracing and editing techniques, without sacrifice of quality.

The initial system consists of a 64K (64,000 character) memory, a Zilog Z-80B microprocessor, a TV camera, a color monitor, a video digitizer with 256K of raster-refresh buffer, and almost 30 million bytes of on-line magnetic storage.

The hardware semiautomatically captures log images in raster form. Software converts the raster imagery to an X-Y coordinate model. The operator then makes model corrections interactively by using a small digitizer tablet as a pointing device and with pattern-recognition assistance from the system.

The author hopes to add software to allow "slipping" digital logs on the same equipment. The next logical development would be a plotter, a floating-point processor, and software to add contouring capability to the system.

CRASS, DAVID B., Baylor Univ., Waco, TX

Distribution of Carbonate and Evaporite Facies of Mississippian Mission Canyon Formation

Thirty-five oil fields have been developed in the Mission Canyon Formation in northern Bottineau and Renville Counties, North Dakota. Six cyclic sedimentary units have been defined in the Mission Canyon in that area. They are, in ascending intervals: Landa, Wayne, Glenburn, Mohall, Sherwood, and Bluell. These intervals or sequences were deposited during marine regressions in the intracratonic Williston basin. A brief but widespread transgression at the initiation of each cycle resulted in deposition of a thin argillaceous marker which can be correlated over large areas.

The depositional setting during Mission Canyon time was similar to that of shallow epeiric seas. Limited circulation resulted in hypersaline conditions and widespread evaporite deposition. A shelf-to-basin configuration probably never existed; rather, deposition occurred on a shallow ramp with little topographic relief. Exposure and the resultant vadose leaching caused occurrence of porosity on depositional highs such as oolite shoals and organic banks. Anhydrite plugging of this porosity is common where evaporite environments migrated basinward over the porous facies.

Three types of stratigraphic traps have been recognized, these are: (1) a carbonate-evaporite facies change where porous carbonates are sealed by the overlying evaporite facies; (2) porous carbonates sealed by nonporous carbonates; (3) porous carbonates subcrop beneath the Triassic Spearfish shale which serves as the updip seal. An understanding of the distribution of porous facies is essential to determining areas of future exploration.

CUMMINS, GLORIA D., Shell Oil Co., New Orleans, LA

Paleoenvironmental Factors Affecting Mine Planning of Pocahontas No. 3 Coal Seam in Southwestern Virginia

The Pocahontas Formation (Carboniferous) in southwestern Virginia and West Virginia ranges in thickness from 600 to 750 ft (183 to 229 m). A major mineable coal seam known as the Pocahontas No. 3 (P3) is a laterally continuous, low-sulfur coal extending throughout Russell, Tazewell, and Buchanan Counties. It lies within 1,500 to 2,000 ft (457 to 610 m) below the surface and ranges in seam height from 0 to 72 in. (0 to 1.8 m).

Identification of potential roof hazards in the preliminary drilling stages of mine development is possible by reconstructing the depositional setting of the P3. Rock types overlying the P3 coal primarily consist of coarsening-upward shales and sandy shales, and thin-bedded graywacke sandstones deposited in the central and northwest parts of the study area. In addition, thin coals overlying clay partings and massive, fining-upward, cross-bedded graywacke sandstones are present in the east and southeast. Thus, the depositional setting is interpreted as an upper delta front system of distributary channels, splays, and adjoining interdistributary bays which prograded from the southeast over the transitional environment of the P3 seam.

Knowledge of this setting, integrated with previous in-mine research, revealed potentially hazardous areas with respect to continuous and longwall mining practices. Also, preliminary evaluation techniques developed in this study make it possible to initiate a more effective secondary drilling program resulting in the definition of stable areas for the driving of mine entries.

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