shells and burrow fillings. Shales of the La Pena Formation accumulated as still deeper water (environment 3) caused bypassing to cease.

At the type section of the Exshaw Formation on Jura Creek, Alberta, beds of the uppermost Palliser Formation accumulated on a shallow-marine carbonate bank (environment 1). These are overlain abruptly by a 2 to 7 cm sandy bed bearing collophane, bone fragments, and abundant pyrite. This bed may have accumulated in turbid, deeper water (environment 2) during bypassing of finer grained sediment. Further deepening of water resulted in decreased currents, and the black shale of the Exshaw Formation accumulated (environment 3).

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Geology on the Continental Scale: The Decade of North American Geology

No abstract.

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Early Cretaceous Edmonton Channel in Alberta

The Edmonton channel forms part of an extensive Early Cretaceous drainage system on the Alberta plains. Local topographic relief in excess of 160 m was infilled by the Lower Cretaceous Mannville Group. The pre-Mannville unconformity juxtaposes Lower Cretaceous strata on Devonian, Mississippian, Jurassic, and possibly earlier Cretaceous sediments. Erosion was prevalent over sedimentation between the Pennsylvanian and Early Cretaceous Periods, a time of about 150 m.y. This ultimately produced a broad, low-relief alluvial plain with a southwestern dip, blanketed by easterly derived quartzose sandstones.

A prominent lowering of sea level, possibly associated with a worldwide eustatic sea-level fall at about 130 m.y., caused widespread erosion and dissection of the alluvial plain. The north-south oriented Edmonton channel was cut at this time, incorporating elements of an earlier drainage pattern. Flow was to the south and then west to join the Spirit River system which flowed northwest subparallel to the Columbian orogenic belt.

Southward transgression of the sea in Aptian(?)-Albian time led to lowering of stream gradients, deposition of coarser bed load where available, and inundation of the previously established drainage system. The Edmonton channel became a small adjacent sea with somewhat restricted circulation to the main seaway during its early infilling. Numerous estuaries formed in tributaries to the main channel. Sedimentology and paleontology of the Lower Mannville Group sediments in the Edmonton channel indicate deposition is a standing body of brackish water directly upon, or only slightly above, the unconformity. Sedimentation associated with continuing transgression and a subsequent regression accounted for most of the infilling of the Edmonton channel. Local lithostratigraphic nomenclature does not adequately reflect the nature and complexities observed in this sedimentary sequence.

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Application of Computer Graphics to Coal Geology and Coal-Resource-Assessment Studies, Canyon Coal Bed, Birney 1° Sheet, Montana

The National Coal Resources Data System (NCRDS) of the U.S. Geological Survey has the capability through spatial data bases and computer software to depict coal geology and calculate coal resources by computer. The Birney 1:100,000 map in southeastern Montana and the Canyon coal bed were selected to demonstrate this capability. The Birney quadrangle includes parts of Big Horn, Rosebud, and Powder River Counties. Other political entities are the Northern Cheyenne Indian Reservation and the Custer National Forest. The Canyon coal bed locally splits into an upper and lower unit, whose thicknesses range from 1/3 to 33 ft (0.1 to 10 m).

The desired data subset retrieved from the stratigraphic (USTRAT) data base consists of more than 300 drill-hole and 100 outcrop locations and their respective Canyon coal stratigraphic sections. Required digitized information included: X-Y locations (lat. and long.) for each point, township-range intersections, county, and national forest boundaries from the base map, the Indian reservation boundary, the Canyon bed outcrop, and the 200, 400, and 1,000 ft (61, 122, and 305 m) overburden isolines as drafted by the geologist.

GARNET, a NCRDS interactive graphics program, produces isopachs and structure maps, does trend analysis, and allows the user to edit data points, expand areas of interest, and calculate coal-resource areas and tonnages for any defined area. The USGS methodology for calculating and reporting coal resources requires that computations be delimited by criteria of coal thickness, overburden thickness, rank, and distance from points of observation as related to land classification and political subdivisions. GARNET allows interactive graphic combination of digitized and computer-derived lines to produce boundaries of these categories.

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Coralline and Associated Carbonates from Florida Bank (Pliocene), Lee and Collier Counties, Florida

Forty-five rock cores have defined a north-south-trending coralline limestone on the middle of the Florida platform. This is the only known Pliocene bank reef in the Caribbean and differs from Pliocene and Holocene shelf-edge reefs. This bank reef differs from shelf-edge reefs in that (1) its dimensions are smaller, having a maximum thickness of 6 m; (2) pycnodont oyster and molluscan packstones dominate the interreef beds; (3) marine muds are not as abundant; (4) the number of subaerial discontinuities and associated calcitic muds are greater; and (5) dolomitization is not as extensive and appears to be restricted to the oyster facies.

Coralline limestones have been interpreted as boundstones, bioclastic packstones, and monospecific bafflestones. Coralline boundstones usually are divided into two growth episodes separated by calcitic mudstones or subaerial laminated crusts. Oysters and molluscan-rich limestones commonly display current sorting and packing and fining-upward sequences that may be analogous to Holocene sequences associated with sea grasses and/or storm deposits. Environmental information derived from fossils and texture indicates shallow to moderate water depths and moderate energy conditions with sporadic storm events.

Detailed petrographic analysis has identified products of marine, mixing, and freshwater phreatic and vadose diagenetic environments associated with transgressive-regressive cycles related to glaciation. Studied limestones range from 6 m above to 14 m below present sea level in elevation and therefore have been subjected to repeated changing conditions. A complete record of the diagenetic history is lacking in any single rock because of dissolution processes or early tight cementation.

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