tions should be recorded by the geologist himself to increase file reliability.

BAIN, ROGER J., Univ. Akron, Akron, Ohio

Are Pennsylvanian "Freshwater" Limestones Actually Intertidal and Supratidal Deposits?

Previously, Upper Pennsylvanian carbonate rocks and associated strata in southeastern Ohio were interpreted as freshwater deposits. Detailed examination of these units has led to the recognition of depositional environments which include marine, intertidal, and supratidal.

Upper Conemaugh units contain an abundant marine fauna and grade upward into lower Monongahela sandstone, shale, and coal. Monongahela sandstones occur as elongate, lenticular bodies. Thin sandstone beds which extend from the lenticular sandstone and interfinger with green shale contain rip-up limestone fragments, stromatolites, and mudcracks. Middle Monongahela limestones and dolomitic limestones overlie these sandstones and shales and are interbedded with green shale. The carbonate rocks contain a sparse fauna of ostracods, gastropods, pelecypods and, locally, fish teeth and scales. Carbonate rocks are thick-bedded, brecciated micrites which contain bird's-eye structures, gypsum crystal molds, and stromatolites. Red-mottled claystones dominate the upper part of the sequence and are interbedded with thin, nodular, conglomeratic algal limestones.

Upper Conemaugh strata represent shallow-marine deposition offshore from a shifting Monongahela barrier-bar system. Behind these barrier bars, coal swamps developed which evolved into tidal flats on which dolomitic carbonate muds and clay muds were deposited. As tidal flats became more extensive, supratidal conditions developed, ranging from hypersaline to fresh water and subaerial, and clay and carbonate muds were deposited.

BALKWILL, HUGH R., Geol. Survey Canada Calgary, Alta., and KENNETH J. ROY, Panarctic Oils, Ltd., Calgary, Alta.

Sverdrup Basin Response to Cratonic Events

Sverdrup basin is large (~520,000 sq km) and deep (~13 km), and was long lived (Early Carboniferous to latest Cretaceous). It belongs to a distinctive class of cratonic basins because it received great volumes of terrigenous clastic sediments, but never had a contemporaneous adjacent orogenic belt. Therefore, its stratigraphic record portrays responses to cratonic epeirogenesis unmasked by eccentricities of local orogeny.

Initial subsidence of the basin (Early Carboniferous) was along a system of grabens. During Carboniferous and Permian times, the axial region was relatively starved, whereas thick carbonate deposits and sandstones accumulated on the margins. In the Triassic the axial region received great thicknesses of fine-grained terrigenous clastics but basin-margin successions were thinner and coarser grained. Jurassic and early Neocomian deposits accumulated slowly. Aptian and later Cretaceous marine and nonmarine clastic deposits transgressed widely cratonward over the formerly well-defined basinal margins, and the structural basin lost identity in a broad continental-shelf and coastal-plain complex that existed until the area was fragmented in latest Cretaceous and early Tertiary time.

Mafic volcanism in the Carboniferous, Permian, Early and Late Cretaceous, and gabbro intrusion in the Jurassic and Cretaceous, indicate that crustal fracturing, accompanied by tapping of upper mantle fluids fashioned primary basin subsidence. Sedimentation in phases of accelerated subsidence appears to be dictated by the availability of detritus and the prevailing erosional gradient on the adjacent craton. The basin was relatively starved in the Carboniferous and Permian and relatively "stuffed" in the Triassic. Thick, widely distributed sandstones indicate vigorous erosion of the craton in the intervals late Norian to Sinemurian, late Valanginian to early Aptian, late Albian to Cenomanian, and late Campanian to early Tertiary. In contrast, black, laminated, marine shales mark early phases of marine transgression onto the craton in Leonardian, Griesbachian, Oxfordian, Valanginian, middle Albian, and Cenomanian-Turonian times.

BALSHAW, KATHERINE M., Rice Univ., Houston, Tex.

Cenozoic Clay-Mineral Stratigraphy in South Philippine Sea, DSDP Legs 59 and 60

On DSDP Legs 59 and 60, sites were drilled in the South Philippine Sea along an east-west transect at 17°N lat. Clay minerals from Cenozoic samples at DSDP sites 447A, 449, 450, 452, 453, and 454A were analyzed by X-ray diffraction methods. A semiquantitative determination of the percentages of clay minerals was made for each sample. In addition, illite crystallinities and relative iron contents in illites and chlorites were analyzed using X-ray diffraction data.

At site 447A, on the western flank of the Palau-Kyushu Ridge, the drill penetrated an undated surficial clay zone into underlying early Miocene pelagic clay. The clay is smectite-rich (averaging 95% smectite). The remaining percentage is almost evenly divided between crystalline illite, relatively low-iron chlorite, and kaolinite, all of which reflect detrital input from the Chinese mainland.

Site 449, on the eastern ridge flank, yielded a thick pelagic clay sequence ranging from an undated cover down through middle Miocene to upper Oligocene clays. An increase in smectite content during the late middle Miocene resulted from ash deposition due to volcanism on the West Mariana Ridge. Below this zone, in older middle Miocene clays, the content of chlorite, illite, and kaolinite increases considerably relative to smectite. The mineralogic change is associated with radiolarian-rich deposits of the same age. This change could mark a northward shift in the equatorial countercurrent associated with increased boundary-current circulation that occurred at this time.

Pelagic clays from the other sites in the Parece Vela Basin, Mariana Trough, and Mariana Trench are smectite-rich owing to the ash content of the sediment. However, stratigraphic interpretation of the Mariana Trough