Named herein the Richlands channel, the bed of this fluvial channel is as much as 6 mi wide and truncates as much as 125 ft of the underlying strata along a regionally significant disconformity. The channel is at the base of the Dismal sandstone member of the New River Formation and is filled with polymictic conglomerate and conglomeratic subgraywacke consisting mainly of well-rounded quartz pebbles that decrease in size toward the northwest. The northwest end of the channel is at a strandline marked by a well-winnowed orthoquartzite of a northeast-trending, barrier-bar complex. The absence of the characteristic deltaic morphologies, which are typical of fluvial sandstones in the underlying Pocahontas Formation, suggests that sediments at the channel terminus may have been reworked and redeposited by the southeastward-transgressing Appalachian seaway. The Richlands channel and other channels in the New River and Pocahontas Formations in the Richlands area define a major depocenter for Early Pennsylvanian clastics that were prograding from the southeast—a relationship that fits the barrier model applied to these strata rather than a braided, southwestward-flowing river system.

FEDOSH, MICHAEL S., U.S. Army Corps of Engineers, New York, NY

Exploratory Drilling in Northern Newark Basin, New Jersey

Extensive drilling is in progress along the right-of-way of a proposed flood diversion tunnel in northern New Jersey. This 21.8-km tunnel would cut across the strike of the Newark basin in an area where rock exposures are few because of glacial deposition.

Approximately 2,400 m of the 6,300-m thick northern portion of the Newark basin is represented in rock cores. The uppermost 870 m of Upper Triassic strata has been drilled along with 1,620 m of Lower Jurassic strata. The Jurassic strata include the three Watchung Mountain sheet basalts sandwiched between fluvial and lacustrine sedimentary deposits.

What emerges for the first time is a continuous picture of the previously poorly exposed Jurassic lacustrine deposits. These cyclic deposits containing kerogen-rich layers are some of the youngest strata found in Mesozoic rift basins. These westernmost Newark basin deposits can be correlated to similar age deposits in outer continental shelf drill holes and possibly help the wildcat exploration starting to appear in the Newark basin.

FILER, JON, West Virginia Geol. and Economic Survey, Morgantown, WV

Upper and Middle Devonian Stratigraphy of Northwestern West Virginia "Devonian Shale" Play

Since 1981, an active oil and gas play has developed in Upper and Middle Devonian fine-grained clastics above the Onondaga Limestone and Huntersville Chert in part of northwestern West Virginia. Activity has been greatest in Ritchie and Pleasants Counties, but Wood, Wirt, Roane, and Calhoun Counties are also involved.

Recent drilling activity has facilitated a more detailed understanding of the Upper and Middle Devonian stratigraphy of the area. The section thickens from west to east, from about 2,000 ft to more than 4,000 ft. To the west, it is composed primarily of interbedded basinal organic dark-brown and gray to black shales and inorganic lighter gray and gray-green shales.

This section is also equivalent to the coarser grained clastic units of the Catskill delta to the east. As the section thickens to the east in the study area, the influence of the delta can be seen in the decrease of organic shale content and the progradation of siltstone bundles into the area. These delta-front siltstones are probably of predominantly turbidite origin and can be correlated with the well-known Upper Devonian drillers' "sands" of central West Virginia.

These facies changes across the area can be used to divide the area into three oil and gas plays: (1) The area west of the Burning Springs anticline, where gas is produced primarily from inorganic and organic shales. (2) The area immediately east of the Burning Springs anticline, where oil and gas are produced from transitional facies including inorganic and organic shales and siltstone. (3) The eastern fringe of the study area, where gas produced primarily from siltstone bundles has been the significant exploration result to date.

FRIEDMAN, GERALD M., Brooklyn College and Rensselaer Center of Applied Geology Affiliated with Brooklyn College of the City Univ. New York, Troy, NY

Setting of Early Ordovician (Arenigian) Carbonate Sedimentation in Appalachian Basin: Arid Climatic Epicontinental Seas Interrupted by Intermittent Conditions of Emergence

Epicontinental seas with sea-marginal sabkhas persisted within the tropic zone of what is now the Appalachian basin. The arid climate and hypersaline conditions influenced the accumulation of carbonate sediments. Conditions of intermittent emergence interrupted cycles of carbonate sedimentation.

Evidence of hypersalinity includes calcitic, dolomitic, or siliceous pseudomorphs of former anhydrite nodules; calcite and euhedral quartz infilling solution-enhanced vugs after evaporite nodules; carbonate pseudomorphs after gypsum and halite; euhedral quartz; authigenic K-feldspar; paucity of skeletal debris; preservation of stromatolites; and length-slow chalcedony, including chalcedonic spherulites, half-moon ooids, and dedolomites. Intermittent emergence is inferred from solution-collapse features, desiccation cracks, eroded surfaces, surfaces of induration such as silcrete, and lag concentrates of micrite chips (flat-pebble conglomerate). Angular clasts of dolostone and limestone resulted from collapse and brecciation of overlying strata, when evaporites underlying them dissolved.

GHAHREMANI, DARIOUSH T., Terra Tech Internatl., Inc., Cleveland, OH, and PHILIP O. BANKS, Case Western Reserve Univ., Cleveland, OH

Applications of Surface Geochemical Prospecting for Shale Gas Exploration in Western Appalachian Basin

Results of a regional radiometric survey in northeastern Ohio revealed several sites where anomalous values of radon, hydrocarbons, and associated gases were found. Laboratory analysis of soil-gas samples and comparisons between radon activities at anomalous sites and scintillometer readings at the same sites indicate that the anomalous gas components are of bedrock origin.

Deeper soil-gas hydrocarbon sampling techniques and various film cups and electronic detectors were used to interpret the significance of radon-hydrocarbon relationship. Highly sensitive FID and TCD gas chromatographs were used to separate and measure soil-gas light hydrocarbons (C_1-C_4) and associated gases.

Results were consistent with earlier anomalous values for total hydrocarbons, C_2/C_1, and C_2/C_3 ratios in areas of higher radon activities, supporting the hypothesis of gases leaking from depth. Gas components considered to be particularly significant in this regard are the light (C_2-C_4) hydrocarbons, He, H_2, H_2S, and CO_2, because the presence of high CH_4 may partly result from microbial or chemical reactions in the soil or subsurface bed rock. Deeper soil-gas hydrocarbon compositions, as measured by ratios of C_1/C_2, C_1/C_n, and $C_3/C_1 \times 1{,}000$, were found to be more consistent with known samples of Devonian shale gas than with Clinton or other gases in Ohio. This compositional relationship offers support for the viability of radon/hydrocarbon soil-gas prospecting. Recent blowouts in eastern Ohio where soil-gas anomalies were discovered prior to actual drillings also support this conclusion.

GIBSON, G. G., Univ. North Carolina at Charlotte, Charlotte, NC

Carolina Slate Belt: A Review of Thoughts of Its Age and Position in Appalachian Orogene

The Carolina slate belt (CSB) is located in the southeastern Appalachian Piedmont, cropping out as a narrow continuous zone extending from central Virginia southwestward to central Georgia. Geologic investigations of the CSB began in the 1820s, shortly after discovery of gold in Cabarrus County, North Carolina. Early workers established the general distribution and character of the CSB relative to adjacent belts, and more recently, mappable units have been delineated. Present interest in the CSB is in part due to recognition of similarities between slate-belt rocks and those associated with sulfide deposits in New Brunswick, and in part to the recent recognition of sedimentary features in the relatively undeformed slate-belt rocks.