

GEOLOGY AND GEOGRAPHY

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ABSTRACTS

Earth Science Teaching in Indiana—Twenty Year Later. ROGER F. BONEHAM, Dept. of Geology, Indiana University Kokomo, Kokomo, IN 46904-9003. —Earth science teaching in Indiana public schools began in earnest during the 1960's. This paper is a follow-up report on the progress that has occurred in the twenty years that have elapsed since my original study. The typical earth science teacher has changed over the last twenty years. There are more women in the field, and the teachers are more likely to have at least one of their degrees in earth science. They are generally older and have been in the teaching profession longer than those of the earlier study. The calibre of their students has remained about the same with the majority being in the upper half of their class. The main problem areas for the teachers are: lack of student interest, low ability of the students, and lack of equipment. This was similar to twenty years ago. Increased funds for more laboratory equipment should be cost-effective since much of the material could be used to add an advanced earth science course. Many students could use this advanced course as their second year of high school science.

Historical Evolution of Surface-Mine Grasslands in the Illinois Coal Basin. TIMOTHY S. BROTHERS, Department of Geography, IUPUI, 425 Agnes St., Indianapolis, IN 46202. —Archival records from state reclamation departments and the coal industry show that artificial grasslands have become a prominent new vegetation type in the Illinois Basin. Most of these grasslands have been planted during the last half century as surface-mine legislation and other factors have made grassland reclamation easier and cheaper than the reforestation that dominated early reclamation efforts. Throughout the Illinois Basin surface-mine grasslands are composed almost entirely of a few Eurasian forage species, most prominent of which are tall fescue, orchard grass, clovers, and lespedezas. The genetic variability of these species is generally small, because plantings are typically restricted to one or two favored varieties. Little effort has yet been made to use native species or to restore prairie to mined lands. Though most surface-mine grasslands are used at least sporadically for beef pasture, their long-term economic and ecological stability is uncertain because of regional decline in the livestock industry, low grassland diversity, and the abundance of potential woody invaders.

Bias in Coal-Sample Sources and Its Implications in Estimating Coal-Resource Quality. WALTER A. HASENMUELLER, LOUIS V. MILLER, and JIMMY J. JOHNSON, Indiana Geological Survey, Bloomington, IN 47405. —The Coal Analysis

Database of the Indiana Geological Survey contains biases introduced by the preponderance of samples that Survey geologists collected from the working face in mines. To assess bias magnitude, we compared proximate analyses of 269 Indiana mine and non-mine samples of the Springfield Coal Member (Petersburg Formation). Bias is most obvious in moisture-free ash and coal thickness. Ash averages 16.7 and 10.8 percent in non-mine and mine samples. Ash-content spread is greater in non-mine than in mine samples (standard deviation (SD) = 6.9 versus 3.2 percent). Coal-thickness measurements show similar differences (mean = 4.0 and 4.9 ft, and SD = 2.2 and 1.4 ft). Volatile matter, fixed carbon, and heating value (Btu) show slight differences in mean and SD for the entire sample set, indicating no significant bias. Sulfur bias seems to be time dependent because mean sulfur in mine site samples drops steadily following the Clean Air Act of 1970, which placed a premium on low-sulfur coal. These biases suggest that sample sources must be considered when evaluating the quality of coal resources.

Black Riveran (Ordovician) Conodonts from the Marmorata Area, Ontario Lowlands, Canada. ROBERT B. VOTAW, Department of Geosciences, Indiana University Northwest, Gary, IN 47408.—Conodont elements have been recovered from 35 samples collected at two well exposed sections of Black Riveran limestones near Marmorata in the lowlands of southern Ontario, Canada. Nineteen meters of limestone are exposed in the Ontario Highway 7 roadcut at Marmorata and 44 meters are exposed in the abandoned Marmorata iron ore pit three kilometers southeast of Marmorata in the most complete section of Black Riveran strata in the Great Lakes region. These strata have been interpreted as representing subtidal, intertidal, and supratidal environments (Mukherji, 1969; Walker, 1972). The collections are dominated by “fibrous” elements, typical of shallow water Ordovician sediments, but contain species characteristic of Sweet’s (1984) *Plectodina aculeata*, *Erismodus quadridactylus*, and *Belodina compressa* chronozones. These chronozones encompass the type Black River Group of New York and equivalent strata throughout the Great Lakes region.

Geological Aspects of Sanitary Landfill Siting in Marion County, Indiana. TERRY R. WEST, Dept. of Earth and Atmospheric Sciences, Purdue University, West Lafayette, IN 47907.—Since 1983, the author along with several graduate students has had the opportunity to evaluate four distinctly different landfill sites in Marion County, Indiana. Geology and hydrology of the four sites have illustrated a considerable variation among these sites. Two basic landforms are present in Marion County, the White River floor plain including its tributary streams, and the extensive Tipton Till Plain of Wisconsin age which bounds the White River complex. Landfill sites studied were divided evenly between the two landforms, with two sites located in each. Of the four sites, only one is an on-going sanitary landfill, South Side Sanitary Landfill on Kentucky Avenue near the Indianapolis Stockyards. The two sites located on the Tipton Till Plain involved proposed landfills in Decatur Township in southwestern Marion County and another in Lawrence Township in the east central part of the county. The fourth site is the ash monofill for the new mass burn unit (incinerator) operated by the City of Indianapolis. This site lies within the White River flood plain, located at the Belmont Sewage Treatment Plant facility, south of downtown Indianapolis. Geologic and hydrologic details of the four sites will be compared and contrasted in the presentation.