

GEOGRAPHY AND GEOLOGY

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Abstracts

An Assessment of Methodologies for Climate Corn Yield Research. GARY WESTERMAN, Indiana State University, Terre Haute, Indiana 47809.——The purpose of this study is to assess the utility of two types of analytic methods, graphical and statistical, for investigating climate and corn yield relationships. Climatic data from southern Indiana are analyzed by a modified climograph method and by the statistical methods of multiple correlation and stepwise regression. To account for considerable variation during the study period in technological factors, a method of adjusting yields is employed, thus enabling yields to be classified as peak (optimum) or deficit. The correlation-regression analysis is of limited usefulness, identifying a significant set of predictor variables for only one of the three study areas. Climographs are found to be useful in identifying several climatic factors which effectively separate peak production conditions from deficit conditions, but the climographs are not suited for predicting the magnitude of yield deficits. It thus would seem that a combination of these methods, graphical and statistical, is needed for a complete analysis of climate-yield relationships.

Land vs. Space in the Middle East: Territorial Experience as a Source of Conflict. MAURIE SOMMER, Saint Mary's College, Notre Dame, Indiana 46556.——The evolution of territoriality in the Moslem Middle East has been sharply distinct from that of the Jewish state of Israel. Whereas the *dar al-Islam* (land of Islam) has been fluid and dynamic in its growth and retrenching for more than ten centuries, *eretz Yisroel* (the land of Israel) has only recently taken on the modern form of a nation-state after centuries of having been nurtured as a fixed and preserved ideal by a people long dispersed from the region. The implications of these divergent pasts and experiences of territoriality have been felt amidst the many other tensions that for more than a generation have plagued the Middle East. The territorial component has become the more critical in recent years in view of demands by Palestinian groups for a separate national entity. These spatial factors will be examined historically, with emphasis on the Arab/Moslem model, in order to elucidate contemporary political behavior patterns and to propose possible programmatic approaches for their resolution.

Thickness and Geographic Boundary of the Terra Rossa in South-Central Indiana. ROBERT D. HALL and THOMAS L. GREENAWALT, Department of Geology, Indiana University-Purdue University, Indianapolis, Indiana 46202.——The geometry of the reddish silty clay (terra rossa) of the karst area in South-Central Indiana is similar to that of continental basins in which sediments

are shed from adjacent uplands. The deposit generally thickens from a zero edge near the escarpments bordering the Mitchell Plain to over 30 feet (9.1 m) at the center of this topographically trough-like area. Local variations in thickness are extreme. The wedge-shaped nature of the terra rossa deposit, together with evidence from earlier investigations of the stratigraphy and origin of surficial deposits in sinkholes, supports the contention that the terra rossa of the Mitchell Plain is primarily a transported sedimentary deposit. The source of much of the terra rossa sediment is probably the adjacent Crawford and Norman Uplands.

A Characterization Study of Crude Oils From Certain Reservoirs In The Phillipstown Field, White County, Illinois. ROLLA M. DYER of Indiana State University Evansville, Warren R. Abbey of Barger Engineering Company, Robert Soaper of Soaper Chemical Company.——Gas chromatograms showing characteristic portions of the crude oil from known oil-producing formations or pay zones were collected. These characterized oils were used to prepare calibration mixtures and standards for the quantitative determination by zones of the crude oil from wells under water flood. This identification technique was and can be used to supplement the geological studies used in oil production, particularly in those oil pools where multiple pay zones are present and open in the same well. This technique allows for an estimation of the portion of the total production that can be assigned to a particular zone.

Aromatic Hydrocarbon Contamination of the Aquifer Supplying West Terre Haute, Indiana. JEFFERY EHRENZELLER, BEN DAILEY, DIANE LANE, TIM O'NEIL, JAY FRANKLIN, LYNN RECKER, and DONALD W. ASH, Department of Geography and Geology, Indiana State University, Terre Haute, Indiana 47809.——Hydrocarbon contamination of the aquifer supplying the town of West Terre Haute, Indiana shows that the response of water levels to ground water pumping is critical—even in unconsolidated sands and gravels of high permeability where drawdown should be minimal. The suspected source of the contaminates is located approximately 200 ft south of the town's two water supply wells. This is down the regional flow path; and theoretically, except for dispersion effects, the contaminates should never have reached the vicinity of the wells. The cone of depression on the pumping wells reversed the gradient on the ground water table in the area of the wells and thus the contaminates flowed to the wells.

Management alternatives include:

- (1) Joining Terre Haute's existing water supply system
- (2) Regulation of pumping to control (reduce) drawdown and recovery times on the wells
- (3) New well field development to replace existing wells

Because of economic reasons, joining Terre Haute's water system was not feasible. Because the existing wells are old and because it was uncertain if the Health Department would allow the wells to be pumped again, new well fields were developed.

Introductory Geology Field Trip Using Indianapolis Building Materials. ARTHUR MIRSKY, Department of Geology, Indiana University-Purdue University, Indianapolis, Indiana 46202.——Largely because of budgetary restrictions, the introductory Geology field trip to rural outcrops had to be

canceled. In its place the Department of Geology has developed a self-directed walking field trip which uses building materials in downtown Indianapolis as a substitute for natural outcrops.

A surprisingly large number of varied geologic features can be seen in these building materials, particularly if one takes the complete walking tour of just over two miles. Students, however, can choose to take one or more of five shorter "loops" and miss very few, if any, features. Among igneous rocks, students can see basalt, diorite, gabbro, granite (in a variety of colors and grain sizes), granodiorite, larvikite (an alkaline syenite), monzonite, obsidian, pumice, and scoria. Among sedimentary rocks are breccia, chert, dolostone, limestone (with and without obvious fossils), sandstone, and travertine. Among metamorphic rocks are gneiss, a variety of marbles, quartzite, and schist. Minerals that are large enough to be visible include biotite, calcite, hematite, hornblende, jasper, limonite, olivine, orthoclase feldspar, plagioclase feldspar, quartz (milky, rose, smoky), and serpentine. Man-made building materials include aluminum, brick (of a variety of colors), brass, bronze, cement, concrete, glass, pebble aggregates of various compositions, and a variety of tiles.

Igneous textures range from glassy, fine- to coarse-grained to porphyritic; igneous structures include segregation zones, dikes, flow, and inclusions. All sedimentary textures are present except natural conglomerate; sedimentary structures include parallel bedding, several types of cross-bedding, laminations, graded bedding, stylolites, flagstone, and trace fossils. Fossil fragments are abundant as fossil hash, and recognizable fossils include several types of bryozoans, crinoid stems, brachiopods, and snails. Metamorphic textures include both foliated and massive; metamorphic structures include schistose, gneissose, pygmatic, and flow.

Both physical and chemical weathering are abundantly represented.

The main shortcoming of the building-material field trip is that some aspects of introductory geology are not represented (such as glaciation, structural geology, landscape development). Also, of course, students can not take a hammer on the tour and collect samples. Still, using building materials in the downtown city is very useful for introductory geology in an urban university.