

GEOLOGY AND GEOGRAPHY

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ABSTRACTS

Light Transmission Through Marble. GEORGE J. SCHNEIDER and ERHARD M. WINKLER, Dept. of Geology, Notre Dame.—Translucent marble panels have been used for special interior light effects since ancient times. In this series of tests the light transmission rates of 5 calcite, 2 Mexican Onyx (aragonite), and 1 magnesite marble were measured with a sensitive photometer. Measurements were taken on slabs of different thicknesses both parallel and perpendicular to the optical axes of the grains.

The semi-log plot of light transmission versus thickness is found to be a straight line of constant slope for all the crystalline marbles. The optical equation $I_t = I_1 e^{kn}$ was applied and reduced to $K = (I_t - I_1)/n$ to define the slope of this line: k is the dispersion factor, I_1 the intensity of the source, I_t the intensity of the transmitted light, and n the thickness of the slab. It is also observed that light transmission through different orientations of the same marble differed by only a constant, with more light being transmitted perpendicular to the optic axis.

The semi-log plots of the aragonite are also a straight line but no relation exists between these or the crystalline marbles. Light transmission through different orientations of aragonite marbles is found to be the opposite of the crystalline marbles with more light passing parallel to the optic axis.

The lack of opaque pigments and the orientation of the crystals in most marbles may permit favorable light transmission through thin slabs in many marbles.

Lake Chicago Sediments in Northwestern Indiana. MARK RESHKIN, Indiana University, Northwest Campus.—Some diversity exists in the kinds of sediments which accumulated in glacial Lake Chicago in northwestern Indiana. Clays, up to 30 feet thick, dominate the lacustrine section in Porter County and range from slightly reworked clay till to thinly laminated, varved calcareous clays. These clays overlie clay till of the Valparaiso morainic system except in some post-glacial, pre-lacustrine valleys where as much as 30 feet of outwash sands and gravels intervene.

Westward, in Lake County, and contiguous with the clays are sand deposits up to 30 feet thick and ranging in composition from beach gravels to fine-grained lacustrine sands and silts. North of the Tolleston shoreline, the upper part of the lacustrine section exhibits a distinctive geomorphic expression: numerous low sand ridges oriented parallel to the shoreline. The writer suggests their possible sub-aqueous origin.

Thin organic layers, mostly peat, are found intercalated throughout the sand section in one deep exposure. In some localities the lacustrine sands are separated from the underlying clay till by as much as 15 feet of outwash sands and gravels.

In extreme western Lake County just north of the Glenwood beach few lacustrine sediments are present. The area is considered a wave-abraded plain cut on till of the Valparaiso system. A similar erosional area lies immediately north of the Calumet beach in western Lake County.

Over much of the Lake Chicago plain the lacustrine sediments are covered by eolian sheet and dune sands and scattered polludal deposits.

Peopling the Wabash Valley. BENJAMIN MOULTON, Indiana State University.—A number of studies in recent time have commented on the number of people in the Wabash Valley as compared to past numbers and possible future growth. Predictions have been made and expectations vary from study to study. The paper presented here is critique of those studies, a summary of the present population complex and an insight to the basic reasons for population growth in the next 60 years. The writer implies that a greater understanding of the reasons for growth must be understood and that change cannot be based on mathematical interpretation alone. Likewise decline evaluated on a basis of statistics does not recognize conditions that can alter such a decline.

Social Activities in Selected Middle Western Villages. JOHN FRASER HART, Indiana University.—Door-to-door interviews were conducted in selected Middle Western villages to test the hypothesis that ties of family and friendship are important factors in maintaining the observed phenomenon of village population growth in the Middle West. Most of the friends and social contacts of village people are in their own village, and the principal pastimes include watching television, visiting, and church, school, and club activities. There is little evidence, however, that a vigorous social life attracts people to the village, or keeps them there, and the hypothesis is tentatively rejected.

Ground-Water Pollution in the Mitchell Plain, Monroe County, Indiana. NANCY L. WAYNE and WILLIAM J. WAYNE.—Bacteriological contamination of private water supplies is especially common in the limestone regions of southern Indiana. Monthly testing of water samples from 28 drilled water wells and 3 springs in central Monroe County, Indiana, between June 1963 and February 1964 showed that the degree of contamination varied with the frequency of rainfall and the construction detail of the well.

All 3 springs and 3 of the wells showed large numbers of coliform organisms all 6 times they were tested; 15 wells were variable and contained coliforms from 1 to 5 times; the remaining 10 wells were free of coliforms in all tests. Bacteria count in the variable wells increased immediately after a rain and decreased notably or disappeared entirely during long periods of no precipitation. The largest number of coliform-free tests came during a 6-week period in midwinter

when freezing weather kept both bacterial activity and infiltration of surface water low.

Wells that had been constructed with casing grouted to a great enough depth into the limestone to seal out all surface water were safe under all conditions. Of the 10 wells that had been cased only a few feet to the rock surface, 9 showed coliforms at least once. Wells that had been cased through some rock tended to be safe only if the casing had been driven tightly into a shaly zone in the limestone. The percentage of unsafe wells in the Ste. Genevieve and St. Louis Limestones was greater than in the Salem and Harrodsburg Limestones, probably because the upper units are thinner bedded and transmit water more readily.

The tendency of wells to become free of bacteria during periods of no rainfall means that the aquifer normally is free of pollution. Surface bacteria and sewage wastes evidently enter the poorly constructed wells as continuous or wet-weather seeps through the upper few feet of the limestone. The aquifers evidently recuperated within a few weeks through dilution and die-off when no new bacteria were added.

Airphoto Positive Lineaments in Northwestern Indiana. ERHARD M. WINKLER, Notre Dame University.—Positive relief lineaments are light colored straight lines which mark low ridges composed of coarser sediments than the underlying finer till. A field study in northwestern Indiana suggests filing these features into different groups:

a. Late glacial ice crevasse fillings caused by a stagnant or retreating ice sheet in the direction of the former ice flow in south-southeasterly direction, located between Kentland and Remington, Ind. Some of these very straight lineaments end in an eastward hook; their relief to the surrounding terrain amounts to only a few feet. The sediment is oxidized, wet, loamy, coarse sand.

b. Long, narrow, longitudinal dunes in the area of Monon and Francesville, Indiana, in east-southeast direction of constant azimuth; they frequently end with a large hook into a parabolic dune. Strong northwesterly winds blowing off the receding ice sheet may have shaped these very long dune ridges of well sorted fine grained sand.

A long narrow straight light colored ridge—locally called "Sandy Ridge"—south of Kentland and Remington is of the identical azimuth as the longitudinal dunes near Monon. Sandy Ridge is composed of wind deposited sand on the surface, whereas coarse sand and some fine gravel below depressed the till surface underneath. A glacial crevasse filling following possibly a bedrock fault appears to be combined with the formation of a longitudinal dune of Monon dune age.

Both types of relief lineaments can be easily identified on airphotos of freshly plowed or tilled fields which were photographed with black-and-white aerial films and developed and printed high contrast.

The Geography of Poverty in Indiana. LOWELL I. DILLON, Ball State University.—Although the measurement of poverty is not a simple task, the single most important factor involved is money income. After long

study, The Council of Economic Advisors has defined an annual income of \$3,000 as the poverty boundary for the average American family. Using this figure and information on Indiana cities and counties from the 1960 Census of Population, the following facts become apparent:

- (1) Although Indiana as a whole has a somewhat smaller percentage of families living in poverty than most states, there are wide variations in the percentages of individual cities and counties.
- (2) The percentage of families living in poverty in Indiana generally decreases from south to north.
- (3) The percentage of families with an income of \$3,000 or less is considerably greater in predominantly rural counties than in predominantly urban counties.
- (4) Although major industrial counties and bordering areas may have a large total number of families living in poverty, they usually rank low in percentage of such families.
- (5) The south to north decrease in percentage of families living in poverty is characteristic not only of counties but also of cities.
- (6) Coal mining areas have a relatively high percentage of low income families.
- (7) The problem of poverty is not merely one of Appalachia and the Deep South but is widespread in both rural and urban areas of Indiana.