GEOLOGY AND GEOGRAPHY

Chairman: W. D. Thornbury, Indiana University

Robert Karpinski, Indiana State Teachers College, was elected chairman of the section for 1941.

ABSTRACTS

Some observations on the relation of the geography of Indiana to its geological history. J. E. Switzer, Indiana University.—The geologic history of Indiana is responsible to a great extent for its economic and industrial development. Southwestern Indiana's coal deposits are largely due to the accumulation of vegetative material in inland swamps during the Pennsylvanian period. Geologic conditions permitted the formation of supplies of natural gas and oil. In the Mississippian period the clear waters of an inland sea made possible the deposits of pure limestone from Bloomington to Salem. Due to the glacial period we have the rich level plains of more than two-thirds of our state. To it also are due the gravel deposits, the many lakes, and marshes, some of which have been drained and furnish valuable farm land. The Great Lakes, also due to the Ice Age, determined that great transportation lines should cross our state. The topography, which was due to geologic and physiographic forces, determined the routes by which settlers should enter in the state's early history, thus controlling somewhat the type of people composing its population.

Silurian correlations in the East Central Province. E. R. Cumings, Indiana University.—Silurian correlations in Ontario and the Great Lakes states have been vitiated heretofore by the traditional scheme of correlating all the great dolomite formations of this region as Lockport. Thus such formations as the Byron of Wisconsin and Michigan (even the Mayville of these states), the Laurel and Louisville of Indiana, etc., have been correlated with the Lockport. Even the Waldron shale has been so correlated, though its fauna is typical Rochester in character, and it was correlated with the Rochester (Niagara shale) by James Hall. The Mississinnewa shale of northern Indiana is clearly Rochester and not Lockport. More and more of these dolomites and associated beds have in recent years, by the writer, Foerste, and others, been transferred to the Clinton, or at least to a position below the Lockport. It is now definitely proven that the Engadine (Racine) formation of Ontario and Michigan is the true Lockport of the Great Lakes region, and that all beds below it are therefore pre-Lockport. The Manistique coral beds were by Foerste regarded as Clinton. They may occupy the hiatus between the Rochester and the Lockport. With these may be correlated the Louisville formation and the upper Liston Creek formation of Indiana. This makes the Laurel and Waldron definitely pre-Lockport. In this category will also be placed the Joliet and "Waukesha" of Illinois and the lower cherty Hopkinton of Iowa. In Ohio everything below the Cedarville-Springfield

(Durbin) is pre-Lockport. The typical Guelph with *Megalomus*, of northwestern Ohio, probably represents the "upper Huntington" (above the New Corydon) of the Fort Wayne wells; and the New Corydon may correlate with the Eramosa dolomite of Ontario. The Huntington of the Indiana outcrop area is Racine.

Electricity generation in London, England. CHAUNCY D. HARRIS, Indiana University.—During the World War the London area was supplied with 72 different types of electrical current from 65 generating stations operated by 59 distributors and 8 railways. Supply areas were small, because they had been established before electricity could be transmitted more than a few miles. The Central Electricity Board was formed in 1926 to coordinate the generation and distribution of electricity. It replaced the diffuse pattern of small stations located within independent distribution compartments with a linear pattern of stations along waterways. These stations produce for a coordinated interconnected system. Twenty-four small stations have been closed and four new stations have been opened. These four new stations located on the River Thames generated 64% of the electricity for the London area in 1937. Five factors have been used by the Board in its selection of stations to be continued and of sites for new stations: (1) The cost of coal delivered to the station; Thames-side stations have an advantage of about 75 cents per ton. (2) Availability of water for condensing purposes; only the Thames furnishes adequate water for large stations, if cooling towers are to be avoided. (3) Efficiency of the station. (4) Proximity to the load. (5) Possibilities of the site for further expansion. The new organization of coordinated generation, interconnection, and uniform supply has resulted in significant capital economies, operating economies, and strategic advantages.

An unusual case of unified cavern drainage. CLYDE A. MALOTT, Indiana University.—Sloans Valley in southern Pulaski County, Kentucky (Burnside Quadrangle), is a karst valley near the dissected western margin of the Cumberland Plateau, consisting of approximately 9.8 square miles of drainage area. It is adjacent to the deeply intrenched valley of the Cumberland River into which the drainage of the karst valley is discharged through a cavern route. The surface drainage system was formerly a well balanced dendritic system descending from the sandstone ridges into a trunk valley a little more than three miles in length. The floor of this former trunk valley is developed in the Mississippian limestones at approximately 800 feet in altitude and about 150 feet above the present Cumberland River. Only a short stretch of the trunk valley at its upper end is used by the present surface drainage, as underground drainage has been developed both in the perched trunk valley and in its tributary branches. The side branches are dismembered distals, each having its terminus in a swallow-hole. At least 11 accessible openings leading into caverns are present in this well developed karst valley, among them being the Cumberland caverns adjacent to U. S. Highway 27, which crosses the valley.

During the past summer (1940) the caverns were mapped in detail. About 30,000 feet of the cavern routes were mapped within the underground system. It has been definitely ascertained that the caverns mapped comprise a unified underground drainage system. The main route of the storm water course of the invading surface waters is about 3.5 miles in length, fully three miles of which have been mapped in detail. Drainage from 4.3 square miles of the upper part of the surface system, known as Martins Creek, enters swallow-holes in the creek bed or flow directly into Martins cavern. Martins cavern has been mapped for about 2,000 feet. A stretch of approximately 2,200 feet remains unmapped between it and Minton cavern into which the waters enter. The course of the waters in Minton cavern has been mapped for a distance of 5,800 feet. Approximately 1.8 square miles of other drainage from the valley enter Minton cavern. An unmapped break of 350 feet intervenes between Minton cavern and the pieced together Cumberland caverns through which the storm waters pass for a distance of 7,800 feet en route to Cumberland River. The Cumberland caverns receive an additional surface drainage from about 2.3 square miles. Thus, 8.4 square miles of the drainage of Sloans Valley debouch into Cumberland River at the terminus of the cavern system. Only 1.4 square miles of the valley drainage goes through independent cavernous routes to the Cumberland River.

This unified trunk route of an underground system is believed to be the longest most completely mapped underground drainage course in the country. Its bearing on the manner of cavern development is of special importance, as the cavern features and the relations of the older and younger parts of the system clearly reveal the importance of the developmental work of the invading surface waters.

The chorographic bulletin board: a geographic device for evaluating event-environment relationships. ALFRED H. MEYER, Valparaiso University.—Modern geography has come to be known as the "relationship" science, showing the interrelationships existing between the facts of the cultural world and the facts of the physical world. Current events lend themselves excellently to chorographic treatment.

To aid the geography student in this task, particularly in the analysis of present-day world problems, a specially constructed "chorographic bulletin board" is suggested. This "board" supplies an inventory of all the commonly recognized physical and cultural forms of the landscape. All the landscape features, over 500, are classified under conventional headings, and to each is affixed a numbered tack. Pertinent maps and other illustrative material accompany the outline.

A chorographic treatment of a news item determines first of all which of the numbered tack features constitute the basic correlation criteria. Next, rubber bands, representing bonds of geographic relationships, are stretched from such tacks from sides of the board to the center, to link together, as it were, the geographically interrelated stage and story elements.

Cold Winters in Indiana. A. V. LOTT, Sellersburg.—Winter temperatures in Indiana are determined primarily by the major movements of the secondary circulation. Indiana's position, relative to the positions of the permanent pressure areas of the world, is such that the atmospheric drift over the state is usually controlled by the circulation around the permanent pressure areas of the North Atlantic. The slow oscillation of these pressure areas seems to follow a fairly regular cycle and one or more cold winters occur at the critical stage of each half-cycle. The sequence seems to be as follows: mild dry winters, cold winters, mild moist winters, cold winters, mild dry winters, etc. Since each type of winter occurs at a particular stage in the cycle it is suggested that its occurence may be predicted with a fair degree of accuracy.