

## GEOLOGY AND GEOGRAPHY

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### ABSTRACTS

**Mapping of the Beech Creek limestone in southern Indiana.**<sup>1</sup> T. G. PERRY, Indiana University.—During the past two field seasons the Beech Creek limestone (youngest formation of the Upper Mississippian Lower Chester group) has been mapped throughout its Indiana outcrop belt, which extends from the Ohio River to north-central Owen County. This paper is restricted to a consideration of the formation south of the East Fork of White River. Numerous structural anomalies of low character and many previously unknown outliers and inliers have been recorded as a result of this study. A careful consideration of its physical and paleontologic characteristics, among which are the distinctive dark-gray, hard, dense, gastropod-bearing limestone in the basal 2 to 6 feet of the formation, the conspicuously large crinoid stems, and the rare occurrence of oolites, enables the Beech Creek limestone to be distinguished from other Chester limestones. Problems pertinent to the Beech Creek limestone and which merit further consideration are confirmation of its correlation with the Chester section in Illinois and a systematic study of its fauna.

**The relationship of minor element deficiencies to soil type in Indiana.** S. A. BARBER, Purdue University.—The presence of available plant nutrients in a soil is dependent upon the geologic origin of the parent material and upon the subsequent degree of weathering. The availability of minor elements is also reduced by organic matter in the soil since it tends to tie them up in an unavailable form. Manganese and boron are the only two minor elements which are deficient in an appreciable number of soils. The deficiency of these minor elements is related to soil type. The severity of the deficiency is influenced by soil pH, the nature of the crop and weather conditions.

**Sequent occupancy of the Calumet Region of Northwest Indiana-Northeast Illinois.** Fourth (present) Stage. ALFRED H. MEYER, Valparaiso University.—This is the fourth and final stage of sequent occupancy study of the Calumet, the first, second, and third having been previously presented to the Academy. The present stage is one of Agricultural and Industrialization Specialization, Conurbanization, and Planning.

The most remarkable phenomenon of settlement of the present period is the expansion of the western Calumet communities into one large Chicago metropolitan region. A map prepared to show this reveals a southward and eastward extension and consolidation of suburban communities. This reflects the phenomenal 20th Century development of the steel and

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<sup>1</sup>This paper is presented with permission of the State Geologist, Geological Survey of Indiana.

related industries centered about the Gary-East Chicago- Indiana Harbor-South Chicago region.

Today some 200 industries, manufacturing over 1,000 products, are located in this beach-dune sand region, whose marshes as recently as a half century ago were the haven of countless wild fowl and fur-bearing animals. The major industries are grouped in the conurban Chicago-Gary area on sites especially favored by rail and/or water transportation facilities—along the shore of Lake Michigan; both sides of the Grand Calumet River, especially in its lower course; the vicinity of Lake Calumet; and along the course of the Indiana Harbor Canal.

Now it is significant to note that within the last decade the population of the metropolitan area outside of Chicago has grown, on a percentage basis, over four times as fast as that within the city. During the same period Chicago has attracted three times as many manufacturing plants as the area outside of the city. This "Problem of Peripheral Population in Pursuit of Propinquity," as Stanley Berge has characterized it, must be resolved by a comprehensive survey of the region, and the application of sound regional and city planning principles towards the development of a land-use pattern in harmony with the geographic structure and function of the region.

**A preliminary evaluation of the forecasts of the Hoosier Weather Prophet, Mark Purcell.** BENJAMIN MOULTON, Butler University.—Among the many prophets of weather that are revealed in Indiana history the most recent is Mark Purcell of Rushville. During the past several years his forecasts have attracted front page positions on the leading daily papers in the state. His success as a weather prophet is highly acclaimed by many. Through a number of technical devices forecasts of Purcell were analyzed. Difficulties arose in interpreting the generalities of the forecast, time distribution and some unusual terminology. An attempt was made to be as fair as possible. Statistics of actual weather conditions show the forecasts to be subject to great errors. Actually, although the stated method of determining forecasts is recognized, Purcell probably, like anyone else, would have greater success through forecasts based on probability formula.

**Brazil, a regional interpretation.** PAUL F. WACHHOLZ, Staff College, Fort Leavenworth, Kansas.—Brazil, greater in area than the United States and the most populous Latin nation of the world, has been our traditional South American ally. Despite its vital contributions to Allied victory in World War II, only a few specialists in the United States possess the precise knowledge to evaluate her human and economic potential.

The purpose of this survey is to surmount the barriers of Brazil's cultural and geographic remoteness by a series of impressionistic sketches of her varied regions.

The regions treated in this survey are:

1. Amazonia—The world's largest fluvial network and selva complex.
2. The "Backlands" of the Northeast—Brazil's semi-arid "Disaster Zone."

3. The Central Western Plateau—The "Pivot Area" of South America.
4. The "Great Marsh"—The vast seasonal inland fresh water sea.
5. The Southeastern Ranges—The "Backbone," Western Hemisphere strategic minerals storehouse.
6. The Southern Plateaus—The "Workshop and Marketbasket" of Brazil.
7. The Atlantic Seaboard—Brazil's Urban "Archipelago."

*Extra-regional* factors must be recognized for an appreciation of the contrast of Brazil's nationality with the numerous political entities of the Spanish American world.

**The karst topography of Puerto Rico.** ROBERT N. YOUNG, Indiana University.—A geologist has classified the karst area of northwestern Puerto Rico a coastal plain and a physiographer has called it a plateau, yet parts of the region are much too rugged to warrant either designation. In a typical square mile of some of the roughest karst, the local relief is 560 feet, although ninety-five per cent of this area has slopes greater than thirty degrees. Over half of the slopes are more than forty-five degrees and some more than sixty degrees. This landform is one of extremely rugged hills, not "plain" or "plateau."

In contrast, some Puerto Rican karst is similar to a square mile near Mitchell, Indiana, where the local relief is one hundred feet but where there are few, if any, slopes of thirty degrees. In consideration of this, Puerto Rican karst varies sufficiently to encourage one to ponder the meaning of the term "karst."

**Manufacturing in intra-city localities.** BERNARD H. SCHOCKEL, 318 Third Street, Aurora.—The role of conveyance ways within a city to its manufacturing has been stressed by a number of geographers, but the role of intra-city locality in manufacturing has thus far received slight attention. The role of such locality can no longer be ignored in correlations of factory distribution within a city as is attested by this study. But much investigative work remains to be done. There is strong alignment of factories with respect to inner versus outer localities, and with respect to site, situation, and age localities. In isolated cases there is correlation with dedication localities. It is inferred that there is also correlation with localities based upon evolutionary stage.

**The use of geographical knowledge in the field of direct selling.** WALTER BEALE BLAIR, Butler University.—It is the purpose of this paper to describe another of the recurring uses to which geography can, and has, been applied. The field of Direct Selling and the market areas affected by such enterprises are dwelt with to some length in close relation to the human geography of the locality. The desire for homogeneity in each prospective sales territory is the ambition of the selling agent. The task of bounding such a territory in relation to family units, physical, and cultural boundaries is the task of the geographer.

The sources of statistics to be used in population data of our fluid society are many and varied, as to their reliability. Work by people in the field is the only valid way to assure a reasonable amount of accuracy. However, such work is prohibited because of the financial investment. Rivers, streams, rail lines, parks, etc., are combined with standard of living types to draw the many cultural boundaries. The minorities, wherever possible, are usually separated from other classes. The usefulness of geographical knowledge in a field such as this is obvious.

**Some contributions to a geomorphology of the Mohawk Region.**

HELMUT BLUME, Visiting Lecturer from Marburg University, Germany, Valparaiso University.—The Mohawk region is defined as the west-east stretching lowland between the Adirondacks and the Alleghenies in Central New York. Although heavily glaciated and covered thickly with glacial drift, the preglacial landforms of the Mohawk area are nevertheless recognizable. The common explanation of landform development is that the plateaus above the Allegheny Front and above the isolated Tug Hill Cuesta between Black River and the Mohawk, as well as the surfaces of the Adirondack Mountains (all in a rather similar altitude of  $2,000\pm$  feet) represent the Schooley Peneplain. It is assumed by all authorities on the subject that the sedimentary rock cover formerly reached further to the north, and by its removal the hidden pre-Cambrian surface became uncovered, as represented by the southern slopes of the Adirondacks.

The most impressive geomorphological features are in the Mohawk area: peneplained surfaces, independent of rock structure, in the Adirondacks; cuestas and surfaces, dependent on rock structure, in the Allegheny region. It is the purpose of this paper to outline some general ideas about the relations of these two areas which are in contact in the Mohawk region.

Both types of landforms are combined in one feature, the foot level of the Adirondacks, which is the lowest level of a "Piedmonttreppe" on the crystalline rocks; but while continuing upon the sedimentary rocks it is here a structural surface ("Landterrasse"). The foot level is bordered on one side by the lowest "Piedmontslope," which leads to the higher surfaces (Schooley). On the other side it is bordered by the lowest cuesta.

The possibility of reconstruction of surfaces from the peneplained area to that of structural dependence is denied. It is believed that since the pre-Cambrian rocks became uncovered in the center of the Adirondack uplift, a feature corresponding to the present foot level combined the two areas of different landforms at all times. The former foot levels are to be found in the higher surfaces of the Adirondacks today because of the uplift of the area. On the other hand, a result of the uplift is the removal of the sedimentary rock cover, the cuestas wandering away from the center of the uplift.

The writer believes that the pre-Cambrian surface is not to be seen in the present landforms. The southern Adirondacks represent a series of peneplains or erosion surfaces which is called a Piedmonttreppe.

**Milk sheds of Indiana.** JOHN T. HUDSON, Falls City, Nebraska.—During a survey on the milk sheds of Indiana, I found that the Ft. Wayne area is an extremely good example of those that are found in the state.

The present territory that Ft. Wayne draws from, 14 counties surrounding Allen County, used to have quite a bit of competition from Toledo, Detroit, and Cleveland. Today, the present price paid by the Producers Association makes a price above that the other sheds can afford to pay and still transport it to the manufacturers. Also, due to the threat of the manufacturers moving back into the area, the milk price paid by the Ft. Wayne association remains high. From 1947 through 1951 Ft. Wayne paid more than others by about 15¢ per 100 pounds.

An interesting thing has taken place within the last ten years. By improvement of the dairy herds, the number of pounds of butter fat produced per cow has increased so that it now takes fewer cattle to produce more milk than in 1940. Also, today a relatively small amount of cream is sold by the producers in comparison to the amount of whole milk. This may be due to the increased use of margarine on the dinner table. Butter is still three times as high as margarine, yet does not contain the guaranteed amounts of amino acids as margarine is required to do.

So the total number of dairy cattle has decreased, yet milk production has increased. Per capita consumption has increased from 16 to 26½ pounds from 1940 through 1950. Farmers are buying registered cattle. More milk is being sold as Grade A. We are given better milk, more of it, and at relatively less cost to farmers per pound of whole milk.