

GEOLOGY AND GEOGRAPHY

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ABSTRACTS

Identification of Indiana Coal II by plant spores.¹ G. K. GUENNEL, Geological Survey, Bloomington, Indiana.—Spore analyses of six samples, tentatively identified as Coal II, were made in order to determine whether: 1) Coal II could be identified on the basis of spore assemblages; 2) Coal II could be distinguished from the coal seams above and below the Coal II horizon; and 3) Coal II could be correlated on the basis of miospore assemblages with its equivalent in Illinois.

Percentages of spore genera were derived and converted to bar graphs for easy comparison. Species also were recorded. Since the graphs and species lists were remarkably similar, the six samples were verified to be of the same age. The data then was compared to similar data derived from analyses of samples of Coal III and the Minshall coal, which lie above and below the Coal II horizon respectively. This comparison proved that the spore assemblages of Coal II could be distinguished from those of Coal III and the Minshall.

An examination of Coal II statistics and published data of Illinois coals of approximately the same stratigraphic position showed a similarity between Coal II and the DeKoven-Greenbush and Davis-Wiley seams of Illinois.

The petrology of the Block underclays in west-central Indiana. HAYDN H. MURRAY and SAMUEL L. RIELY, Indiana University.—The underclays of the Upper and Lower Block coals occur in the Brazil formation of Pottsville (Pennsylvanian) age. The Upper Block underclay is utilized extensively in Clay and Parke Counties as the raw material in the manufacture of structural clay products in the vicinity of Brazil, Indiana. The Lower Block underclay is used very sparingly because operators claim that its ceramic properties are poor. The purpose of this study is to determine if a relationship exists between physical properties and petrology. The petrologic study of these two underclays involved detailed field studies; differential thermal, X-ray powder diffraction, and chemical analyses; microscopic identification; and pipette analysis. Kaolinite, illite, chlorite, and quartz comprise approximately 95 percent of the minerals in the underclays. Pyrite, limonite, siderite, magnetite, tourmaline, garnet, and rutile were observed in the sand and silt fraction. Three zones are recognized in these underclays in the field: an upper leached zone, a middle nodular zone, and a basal clay-shale zone. The underclay in the upper leached zone has the best ceramic properties and is thickest in the Upper Block underclay.

Other fundamental petrologic characteristics are discussed in relation to the economic usage of these underclays.

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

Wholesaling in metropolitan areas of the United States. JACK C. RANSOME, Indiana University.—In 1948 fourteen metropolitan areas contributed 50 per cent of all United States wholesale sales. A complete correlation fails to exist between the magnitude of population and the rank of an area in wholesaling. Four metropolitan areas have higher per capita sales and eight areas have a higher percentage of their employed population in wholesaling than New York City. Inconsistencies between the population size and rank in wholesaling are the result of many factors—wholesale distribution radius, transportation concentration, volume of foreign trade, value of goods handled, the emphasis placed upon wholesale distribution relative to the emphasis upon other metropolitan functions, and the proximity of competing centers.

In all wholesaling areas there is a fairly close relationship between processing activities and the major commodities distributed. Highly refined marketing procedures accompany the increasing specialization in commodities. Such specialization is most marked as metropolitan centers increase in size, and when they serve as assembly and distribution points for primary materials.

All major wholesaling centers have favorable sites and situations which have given them a comparative advantage over competing centers. Competition tends to space the largest wholesaling centers about 100-400 miles apart, the spacing being somewhat greater in the South and the West than in the East and the Midwest.

Wisconsin stratigraphy of Central and Eastern Indiana.¹ WILLIAM J. WAYNE, Indiana Geological Survey.—The Wisconsin stage in Indiana consists of three recognizable stratigraphic units that are separated from each other by fossiliferous interstadial deposits. The oldest of these tills is the most extensive, and its southern limit constitutes the Wisconsin boundary. Soil profiles on it contain several inches of loess-like silt in the "B" horizon. Comparatively little outwash is associated with the till except along the Wabash Valley where outwash of this age forms the highest level of valley fill.

The ice withdrew from central Indiana during the first Wisconsin interstadial, and during the subsequent readvance deposited the second stratigraphic unit. Generally, the outer limit of this second till is a few miles north of the margin of the earlier substage, and in many places it coincides roughly with the Bloomington moraine. Extensive, thick gravel deposits overlain by till characterize this second stratigraphic unit throughout northern and central Indiana. In many places this till overlies loess and lacustrine deposits that contain mosses, twigs of conifers, and molluscs in the upper few inches, but a true buried soil has not been found.

These two drift layers have long been correlated with the Tazewell substage of Illinois, mainly on the basis of presumed correlation of moraines. East of the interlobate area along the Wabash Valley, however, the relationships of the successive moraines may not be the same as in

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Illinois, and it is possible that the older till is Iowan and the younger till Tazewell in age.

The third Wisconsin stratigraphic unit belongs to the Cary substage and is separated from underlying deposits by fossiliferous silts and clays, peat deposits, or leached zones. The Mississinewa moraine marks the farthest advance of the ice during the Cary substage in northeastern Indiana, but farther south the ice extended beyond this moraine. Cary till contains more clay than do the two earlier tills, which are silty and bouldery. The higher clay content of the Cary till probably resulted when ice of the Erie lobe moved over lacustrine deposits that had accumulated during the Tazewell-Cary interval in ice marginal lakes similar to those that later in Pleistocene time evolved into the present Great Lakes.

The Restoration of the Structure of Degraded Soil. DAVID TELFAIR and MURVEL R. GARNER, Earlham College.—The factors in restoring structure and porosity to soils degraded by puddling and compacting are considered. Prepared cylinders of puddled soil were buried in (a) a cultivated garden (b) a fallow field and (c) a dense forest. Cylinders were exhumed at intervals for the study of restoration processes.

After two years relatively minor changes had taken place, the slightest changes occurring under the forest cover. In the cylinders buried in a fallow field roots had entered into all parts after two years.

The physical and biological factors involved in the restoration processes are considered. Later modifications of the experiments are described.

Cities and Towns of Indiana Geographically Considered. STEPHEN S. VISHER, Indiana University.—Geographic conditions conspicuously influenced the location and development of most of Indiana's concentrations of population. In the earlier decades, most of these were villages or towns. No place attained a population of 10,000 until the 1850's; not until 1890 did Indianapolis have 100,000, and Evansville 50,000 and five others 20-35,000. But now Indiana has many sizable cities. Factors affecting the location of the cities were waterhighways, waterpower for mills, crossings of roads, crossings of rivers by roads, and later by railways; railway intersections. The proximity of good agricultural land and of minerals have also been important. A highly significant influence was also the county seats, generally situated near the center of the county.

Four easily recognized regions as to cities are: 1, the Ohio River Belt; 2, the Gas Belt, in which several towns grew into cities shortly after the discovery of gas in the 1880's and 1890's; 3, the Coal Field, in which there are several cities which grew up chiefly after the coming of railways accelerated coal shipments; and 4, cities of Greater Chicago and somewhat east thereof. These were predominately influenced by railway transportation but Lake Michigan conspicuously affected several. The remainder of the state, region 5, contains the largest city and Ft. Wayne, but otherwise chiefly only small cities whose location and growth reflects especially the conditions mentioned in the previous paragraph.

Township boundaries in Indiana. ROBERT GUILFORD TAYLOR and OTIS P. STARKEY, Indiana University.—One-quarter of the present civil townships have boundaries coinciding with the Congressional township boundaries while only 15 per cent of the townships have boundaries unrelated

to the Congressional Survey. The conformity between the two types of townships is greatest in the northeast and least in the south. Streams are the outstanding cause of departure from the Congressional or township-range system of survey. Oversized or undersized townships created to fit irregular county boundaries explain many partial unconformities. The location of early roads and land grants, mergers in sparsely settled areas, splittings in densely settled areas, and townships created to coincide with municipal units, account for most other departures.

Chester rocks north of the East Fork of White River, Indiana.¹ T. G. PERRY and G. T. MOORE, Indiana University.—Rocks of lower and middle Chester (Upper Mississippian) age crop out north of the East Fork of White River in north-central and northeastern Martin, northwestern Lawrence, the eastern one-third of Greene, central and eastern Owen, western Monroe, and south-central Putnam Counties. Pre-Pennsylvanian erosion removed progressively older Chester formations at increasing distances north of the East Fork of White River. Consequently, the Beech Creek limestone (youngest formation of the lower Chester group) does not crop out in Putnam County, and the Cypress sandstone and the basal portion of the Golconda formation are the only middle Chester rocks in southern Owen County. Although the regional west and southwest dips commonly range from 25 to 40 feet per mile, altitudes on closely spaced Beech Creek exposures indicate that many subdued structural anomalies, such as basins, domes, and arches, are superimposed on the regional structure. Only two lower Chester formations, the Paoli limestone and the calcareous facies of the Aux Vases formation, are presently quarried, and in every case these are mined with the Ste. Genevieve limestone (upper Meramecian). Many inhabitants of rural Indiana depend solely upon springs associated with Chester limestones for their water supply. (Since this paper was presented, Messrs. Gordon and Shepherd have begun quarrying operations in the Beech Creek limestone at a site near the West Fork of White River, about 4 miles south of the village of Freedom, in Owen County.)

Modern floodplain deposits. CLIFFORD ADAMS, Hanover College.—Modern deposits are defined as those accumulating since the introduction of present day agricultural methods. They can be identified commonly as light colored, stratified silts above old soil profiles. The latter typically reveal dark, unstratified soil underlain by lighter subsoil.

Some slides showing the sharp break between the two soils and cross-sections illustrating the ancient and new surfaces are shown. Comparisons between representative valleys of different drifts and unglaciated areas are presented.

Occasionally a pebble band is found just above the old soil horizon. No significant difference has been revealed by mechanical analyses of the new and old soil.

The recent soil varied considerably in depth but most frequently is found to be two to three feet in thickness. This accelerated sedimentation in valleys may profitably be pointed out in introducing man as a geological agent.

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Ground water potential in local upland sand deposits in Southeast Indiana. PORTER E. WARD, U. S. G. S.—On the uplands of southeast Indiana in areas covered by Illinoian glacial drift, ground-water problems are acute. Recent investigations of upland areas confirms the existence of local water-bearing deposits of limited extent that are utilized as sources of water. These deposits generally are shallow and lie close to or on the top of the bedrock. Thicknesses are variable, the average observed being not more than 10 feet. Known deposits consist mainly of fine sand and gravel which may or may not be overlain and underlain by clay or clayey sand.

The potential of these deposits is variable. Differences in occurrences have been observed, such as character of materials deposited, thickness and lateral extent of deposits, and conditions of recharge, storage and discharge.

Although water-bearing, these deposits have definite limitations. This is illustrated by the failure of wells at Milan in Ripley County to produce, at a constant rate, sufficient water from a local occurrence of sand for a public water supply.

Additional studies are needed of the geologic occurrence and hydrologic character of these upland sand deposits in order to fully understand and evaluate their use as sources of available ground water.

A Regional treatment of the agricultural geography of the Calumet Region. ALFRED H. MEYER, Valparaiso University.—About a quarter century ago Edward Duddy made an agricultural study of the Chicago Region which included the Calumet area to the southeast. This was one of the Social Science studies directed by the Local Community Research Committee of the University of Chicago. Data of U. S. Census of Agriculture for 1925 were used to show areal farm values and productivity.

Our present study analyzes the agriculture scene on a geographical or regional basis, using both statistical data of the U. S. Census for 1945 and personally mapped field transects.

Six agricultural regions are differentiated on the basis of landform, soil, vegetation and land-use—two on the Chicago Lake Plain, three on the Valparaiso Moraine and the remaining one constituting part of the Kankakee Outwash Plain. The agricultural patterns of each are examined and evaluated in relation to their major geographic correlations and problems and their relationships to the conurbanized area on the southwest end of Lake Michigan, which has almost exclusively industrial, commercial and residential functions.

The geographical regional analysis of the agricultural patterns and problems of the Calumet suggests the desirability of the establishment of conservancy districts to effect proper soil conservation practices.

To resolve and reconcile the competing agricultural and non-agricultural forms of land-use, county planning commissions should be set up in all counties and their programs should be integrated with one another on a regional geography basis. This might best be managed by inviting the Chicago Regional Planning Association to include the farming program of the Calumet in their regional planning objectives.