GEOGRAPHY AND GEOLOGY

Chairman: CHARLES E. WIER, Indiana Geological Survey, Indiana Department of Natural Resources, 611 N. Walnut Grove, Bloomington, Indiana 47401

RICHARD L. POWELL, Indiana Geological Survey, Indiana Department of Natural Resources, 611 N. Walnut Grove, Bloomington, Indiana 47401, was elected Chairman for 1972

Abstracts

Glacial Geology of St. Joseph County, Indiana (Map, 1:62,500). REV. MICHAEL J. MURPHY, C.S.C., and JOHN P. SZABO, Department of Geology, University of Notre Dame, Notre Dame, Indiana 46556.——Northern Indiana was rejuvenated in the Pliocene producing a gently rolling landscape with moderate relief. The La Porte Valley and Elkhart Valley, two buried valleys, reflect this. Two of three ice lobes which penetrated Indiana produced the presently visible glacial features during the Wisconsin's Cary substage. Some features' depositional histories have multiple explanations while those of others are more evident. One interpretation of the St. Joseph River's present course involves piracy of the headwaters of the ancient Kankakee River. The pebble lithologies of various deposits show the underlying bedrock type; there are differences between outwash and till pebble analyses. Some percentages may possibly serve as indicators in distinguishing a lobe's deposits in this area.

Age and Correlation of Middle Devonian Strata of Jasper County, Indiana. R. WILLIAM ORR and WILLIAM D. REBUCK, Department of Geography and Geology, Ball State University, Muncie, Indiana 47306. ——Outcrops of Middle Devonian strata in south-central Jasper County, near Rensselaer, were examined and collected for conodonts as part of a continuing study of conodont biostratigraphy of Middle Devonian rocks of Indiana. Jasper County exposures consist of mostly fine-to-medium grained, dark gray, vuggy dolomite, which lithology is also exhibited by correlative subsurface strata to the south in White, Tippecanoe, and Warren Counties. Conodont faunas of the studied outcrops are dominated by specimens of the important platform genera *Icriodus* and *Polygnathus* and contain as late Middle Devonian zonal indicators *I. latericrescens latericrescens* and *P. varcus s. l.* Middle Devonian strata of Jasper County represent a southwestern dolomitic facies of the Traverse Formation of the Michigan Basin and lie within the *P. varcus* Zone high in the Middle Devonian. These beds correlate with the upper (sub-Squaw Bay) part of the Traverse Group of Michigan, the upper part of the Traverse Formation of northern Indiana, and the Beechwood Member of the North Vernon Limestone of southern Indiana and the Illinois Basin.

Structural Control of Cavern Development in Northwestern Washington County, Indiana. RICHARD L. POWELL, Department of Geosciences, Purdue University, Lafayette, Indiana 47907.——Most caverns in the outcrops area of limestones of Mississippian age in south-central Indiana consist of passages that trend down the local dip of the bedrock. Generally, the regional structure is reflected by numerous caverns or subterranean drainage routes which divert surface karst drainage westward or southwestward to outlets or springs along entrenched surface streams. The gradient of the subterranean passages is generally compatible with the local rate of dip of the bedrock, sometimes dissecting progressively lower strata if the cave stream gradient exceeds the rate of dip. A few cavern passages parallel the strike of the strata, usually owing to a steeper hydraulic gradient to a surface outlet. Examples of subterranean drainage in an updip direction are rare, if not nonexistent, in Indiana.

Several caverns have been surveyed in the drainage basin of Clifty Creek, in northwestern Washington County, Indiana, which exhibit subterranean drainage contrary to the southwestward regional trend. These caverns have commonly developed eastward in a down-dip direction on the east flank of the southernmost nose of the Leesville Anticline. They are tributary to Clifty Creek, a partially strike-oriented, deeply entrenched stream. River (Wet Clifty) Cave is mostly a strike-oriented, northward flowing cavern, a subterranean headward extension of Clift Creek. This example of cavern development in adjustment to local structure is proof of the importance of structural control to the initiation and development of subterranean drainage.

To Harmonize a County——A Proposed Integrated Study of Vigo County, Indiana. JOHN H. CLEVELAND, Department of Geography-Geology, Indiana State University, Terre Haute, Indiana 47809.——The finite nature of a region's natural resources, combined with ever increasing demands upon them, produces a conflict between man and his environment that may lead to extinction, or at best, radical change for both. Challenged by the writings of Indiana "geoecologists" Guernsey, Wayne, and Patton, a comprehensive pilot study of Vigo County is underway to form the orderly framework of information necessary for viable courses of action now to avert future tragedy. The project will: 1) compile and catalogue the extensive data and sources represented by federal, state and local governmental agencies, educational and research institutions, and business enterprises; 2) outline and undertake research projects of both short and long term duration to fill in the information gaps; 3) develop "dynamic equilibrium equations" for the local ecosystem; and 4) disseminate this information to the public and to the decision makers. As an illustration, coal resources are examined.

It is believed that this continuing study will aid in justifying our existence, enhance teaching and research capabilities, and of most importance, aid in rational progress towards a dynamic equilibrium with his environment of man's choosing, permitting a quality survival of both for a significant fraction of geologic time.

Geography's Inherent Role in Environment Control. ALFRED H. MEYER, Department of Geography, Valparaiso University, Valparaiso, Indiana 46383.——Regional populations and their optimally related natural and human resource patterns considered in their total environmental perspectives—social, economic, political and spiritual—may be said to be the basic geographic principle of evaluation of human behavior and life's motivations.

Ethnic and economic concerns of man are necessarily space-related and resource-oriented, whatever the stage of cultural development may be. Hence, the study of human ecology of the environment in sequent occupance form has been traditionally considered a comprehensive challenge to the geographer.

Despite historic antecedents and present-day research and teaching concerned with the basic qualities of the environment, the field of geography today occupies a comparably inferior professional position in the area of Environment Management.

This paper explored the reasons for this condition and suggested some remedial measures establishing professional and public recognition of geography as a distinctly environmental behavior science.

Factors Associated with the Decline of Central Place Functions On the Rural Poor of Monroe County, Indiana. STEVEN K. PONTIUS, Geography Department, University of Minnesota, Minneapolis, Minnesota 55455. ——Between 1910 and 1970 the number of small towns and villages in Monroe County, Indiana, providing the essential retail and service activities has declined from 31 to 2. The result of this decline has spatially isolated many rural residents who previously were within 2 miles of such a village anywhere in the county. To those individuals who have transportation this is of little or no concern.

However, to over 100 of the 294 low-income households interviewed, which represents a 20% sample of all low-income rural residents in Monroe county in 1965, the ramifications are great. They represent people who have no means of transportation. Characteristically these people are 65 or older, have lower incomes, fewer jobs, poorer housing conditions, and who are spatially more isolated from the remaining central places than the low-income people interviewed who had transportation.

The consequences associated with their isolation, due to their lack of transportation and their household location in relation to the remaining central places are: the inability to supplement their income, and thus the inability to maintain their homes, buy nutritious food, and acquire preventive medical care. And, saddest of all is that because of this spatial isolation, some of these people give up in despair, stay home, and become more isolated from the world. In reality they exist in a sort of solitary confinement.

The Relationship of Expensive Residential Dwellings to Hilly Terrain. HENRY W. BULLAMORE, Department of Geography, University of Illinois,

Urbana, Illinois 61801.——A field study indicated no statistically significant relationship between expensive residential dwellings and hilly terrain in the City of Valparaiso, Indiana. The concept of "hilliness" was quantified through the use of the local relief within designated study sectors. The mean true value according to the Assessor of randomly selected homes within each sector was used to quantify "expensiveness". Analysis using Pearson's Correlation Coefficient r, the Chi Square test, and other tests, all failed to substantiate the hypothesis that expensive homes would be found in hilly areas.

Fulmendosa River: A Multipurpose Irrigation Project in Sardinia. F. P. KALLAY, Geography Department, Valparaiso University, Valparaiso, Indiana 46383.——One of the great engineering triumphs of modern man has been his ability to transform acres of barren land into arable areas of large scale productivity. Such a transformation is occurring in the southwest portion of Sardinia, known as the Campidano, an area which is already an intensively cultivated portion of the island, but possessive of much greater agricultural potential. This potential will be realized in the form of a vast project known as the ENTE AUTONOMO DEL FLUMENDOSA (EAF).

The major purpose of the EAF is the utilization of the hydro-electric basin of the Flumendosa River and its tributaries. In addition to providing water for irrigation purposes, the EAF project will supply water for the capital city of Cagliari and several surrounding communities. Furthermore, it will provide hydroelectric power at an annual average of 80 million kilowatt hours.

The effects of the entire EAF project will not be known in their totality for several more years, but it is safe to say that the effects will be far-reaching for the island of Sardinia and will have numerous benefits on the Italian economy as a whole as well.

Coal Age Tree Stumps in Indiana. D. L. DILCHER, Botany Department, Indiana University, Bloomington 47401.——During the spring of 1971 the Paleobotany class of Indiana University located three casts of Sigillarian trunks apparently standing in place where the trees once grew. These were found exposed in the No. 5 pit at the Hawthorne strip mine of Peabody Coal Company. Several more trunks were located during the summer and one was collected by the Indiana State Natural History Museum before mining was stopped in the area. The nature of the trunks, positions, size and relationships were discussed and a photographic record of them was used to illustrate the talk.

OTHER PAPER READ

A Study of the Floras in the Allegheny Series in Green County Indiana. R. N. PHEIFER and DAVID L. DILCHER, Indiana University.