GEOLOGY AND GEOGRAPHY

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ABSTRACTS

A Programme for Physical Geography: abstract of a paper for presentation to the Indiana Academy of Sciences, October, 1962. B. J. GARNIER, Professor of Geography, Indiana University.—Geography is logically acceptable as an earth science if it is realized that the subject deals with the features of the earth, considering them from the viewpoint of their inter-relationships and distinctive combinations in different areas. It follows from this, that physical geography concerns itself with physical earth features—land, soil, plants, air, and water—the inter-relationships between them, and how their combination contributes to the character of different parts of the world. Each earth feature in which a physical geographer is interested is itself the object of intensive study by one of the systematic sciences. Geography differs from these sciences because its viewpoint concentrates attention upon phenomena significant for inter-relationships at the earth's surface, such as the physique of the terrain, the nature of soil and plant covering, conditions in the lower atmosphere, and the heat and moisture balance at the earth's surface.

The proper development of physical geography along these lines depends on the existence of sound undergraduate and graduate courses. Undergraduate work should include not only the elementary first-year introductory courses in physical geography widely found in Colleges today, but also one or more senior-level courses in advanced physical geography. The latter should be open not only to those with a geographical background, but also to those without such background but who have had specified courses in the systematic sciences. Graduate courses and research programmes should likewise be open to both geography majors and suitably qualified majors in related sciences. This cross-fertilization will maintain high scientific standards in physical geography, and at the same time demonstrate to a wide and critical audience the nature of geography's contribution to scientific knowledge.

Lithologic and Organic Criteria for a Lake Estuarine Environment and the Geologic Development of a Lake Estuary as Studied in Sabine Lake and Vicinity, Texas-Louisiana. HENRY E. KANE, Ball State Teachers College.—Certain lithologic and organic criteria were established for the Recent sediments of a lake estuarine environment, Sabine Lake, Texas-Louisiana, and were compared with criteria established for the Recent sediments of a nearshore neritic environment, the Gulf of Mexico. The organic criteria, especially the Foraminifera, along with the geomorphology and geology of the area, were used to develop the Late Quaternary history of the lake estuary which was coordinated with the Late Quaternary history of the North Central Gulf Coastal Plain.

Seventy-four cores and 20 clam shell samples were taken from Sabine Lake and the Gulf of Mexico. Data from these cores and samples were used to map the types and distribution of the sediments and microfauna of the two environments. Data from auger and bore holes and from topographic maps and aerial photographs were used to establish the history of the geomorphic evolution of the lake estuary and the geology of Sabine Lake and vicinity.

Geomorphic evidence indicates that Sabine Lake occupies the former valley of the Neches and Sabine rivers which is entrenched into Late Pleistocene deposits to a minimum depth of 120 feet at the Gulf of Mexico shoreline. This valley has been filled in by the streams and closed off at its southern end, except for Sabine Pass, by the progradation of the Gulf shoreline to form the present lake estuary. The erosion and subsequent alluviation were caused by a fall and rise in sea level due to waxing and waning of continental glaciers in Late Quaternary time.

Lithologic criteria are not sufficiently distinctive to differentiate the lake estuarine and the nearshore neritic environments.

Organic criteria, especially the foraminiferal biofacies, can be used to differentiate the two environments and to substantiate the geomorphic evidence for the development of Sabine Lake. The types and distribution of the biofacies of the bottom sediments of Sabine Lake differ from those of the Gulf of Mexico, and also differ from those of the deeper sediments in Sabine Lake taken 3 feet and 6 feet below the bottom sediments. The biofacies of the deeper sediments of the lake are similar to those of the bottom sediments of the southern portion of the lake and the present Gulf. The distribution of the biofacies apparently is affected by salinity variations of the water bodies. At the time of deposition of the deeper sediments, the more saline waters of the Gulf of Mexico circulated freely into the open entrenched valley now occupied by Sabine Lake before its southern end was restricted by filling of the valley and progradation of the Gulf shoreline.

Some Linear Glacial Features in West-Central Indiana.[1] ALLAN F. SCHNEIDER, GERALD H. JOHNSON, and WILLIAM J. WAYNE, Indiana Geological Survey.—Recognition of numerous linear features of glacial origin suggests that the sequence of glacial events in Indiana during the Wisconsin Age should be restudied. Three sets of linear features in west-central Indiana are described here. (1) Virtually straight shallow troughs and discontinuous low ridges or elongated knobs composed in most places of sand and gravel occur in a belt about 50 miles long between northwestern Tippecanoe County and southeastern Boone County. The consistent northeast-southwest orientation of these features forms a striking subparallel pattern that indicates ice movement from the northeast. Whether these forms are closely related in time and mode of origin to the complex system of drainageways and eskers in east-central Indiana is not known. (2) Gently rounded swells or weakly developed drumlinoid features, which rise about 20 feet above intervening swales, mark the ground moraine in southern Cass County and northwestern Howard County. The east-west orientation of the

swells and the parallel pattern of westward-flowing streams strongly suggest ice movement from east to west in this area. (3) Discontinuous low ridges composed largely of sand and gravel are present within and adjacent to a weakly to moderately developed morainic belt (Iroquois Moraine or Marseilles Moraine of various authors) that trends across central Jasper and central Newton Counties. Although these forms are here referred to as eskers, they may be crevasse fillings; in either case they are believed to be oriented nearly parallel to the direction of movement of the ice that formed them. Only two of the features are well defined, both of which trend about N. 60° W., but the absolute direction of ice movement in this area is unknown.

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