

GEOGRAPHY—GEOLOGY

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ABSTRACTS

A Systematic Theory of Silicification. WILLIAM W. DAVIS, Eli Lilly and Company, Indianapolis, Indiana 46206.—A theory was presented in which the contact of carbonic acid with soluble silicate bearing waters under a variety of explicit circumstances causes the deposition of silica in its several forms. These processes include its crystallization as 1) macroscopic quartz crystals, or 2) microscopic needle crystals of low temperature quartz, commonly referred to as chalcedony, or 3) the formation of common opal, which is hydrous silica.

The peculiar alternation between deposition of chalcedony and quartz often seen in agate nodules is believed to be due to change in the surface tension of the solution from which silica separation occurs. The occurrence also of common opal often interspersed between quartz and chalcedony deposition was also discussed.

The primary data upon which this theory rests are microscopic structural details made visible by a special optical system. Photographic slides of this structural detail were shown and discussed in connection with the implications of the theory. The optical photographic method was applied to lap-ground polished sections of siliceous stones. The detail which was revealed derives from the chronological sequence of events in the process of formation.

Some Physical Factors Concerning Land Use on the Mitchell Plain of South-Central Indiana. RICHARD L. POWELL, Indiana Geological Survey, 611 N. Walnut Grove, Bloomington, Indiana 47401.—The Mitchell Plain of south-central Indiana is a karst plateau characterized in part by subterranean drainage fed through sinkholes and sinking streams. The uneven bedrock surface is mantled with clay, sand, loess, and gravel. These materials are of varied origin and include alluvial sediments, weathering residues, lacustrine sediments, colluvium, solifluction debris, convoluted periglacial material, and collapse debris. Where unconsolidated materials are thin, subterranean drainage prevails; where the cover is thick, surface drainage predominates.

Most of the area of the Mitchell Plain, excepting flood plains, is marginal as cultivatable land, owing to the clayey and stoney nature of the soil and the resultant rapid runoff, which creates an erosion hazard. Residential use is limited by the generally inadequate and unsafe groundwater supply, by difficulty in developing surface water supplies, and by lack of soil permeability adequate to dispose of septic tank effluent. In addition, urban and industrial development is ham-

pered by foundation and subsurface construction problems related to the uneven bedrock surface, the cavernous nature of the bedrock, the varied and unpredictable thickness of unconsolidated materials, and the expansive behavior of the clay.

Inadequate preconstruction planning and site testing by architects results in increased construction costs or damage to completed structures owing to collapse, squeezing, sapping, piping or erosion of disturbed unconsolidated sediments, and flooding caused by disruption of normal surface and subsurface drainage channels.

Nearly all current land use practices contribute to rapid runoff, surface erosion, excessive flooding, stream and groundwater pollution, and sedimentation of surface and subsurface drainage routes.

Quantitative Measurement of Rock Textures. NELSON G. LUDWIG and TERRY R. WEST, School of Civil Engineering, Purdue University, Lafayette, Indiana 47909.—Utilizing newly developed microscope techniques, quantitative, textural measurements of selected carbonated aggregates from Indiana and Wisconsin were made in thin section. Numerical values were obtained for specific surface, grain angularity, sphericity, grain diameter and interlock. The overall research objective was to qualify rock texture measurements, establish the utility of the new measurement techniques, and determine the relationship between the textural parameters and the physical strength of the rocks studied.

Some standard highway materials tests were performed on the aggregates. Preliminary results indicate good correlation between textural measurements and the highway test values. Findings from this study, which are a portion of continuing research on rock texture, contribute to the basic understanding of engineering properties of rocks.

Decision-making and the Spatial Campus. WILLIAM D. BROOKS, Department of Geography and Geology, Indiana State University, Terre Haute, Indiana 47809.—Any area of the earth's surface exhibits a complex but functional land-use pattern adjusting to socio-economic requirements. It is obvious that these land-use patterns, when subjected to close inspection, reveal an agglomeration of features occurring in association with linkages of a reciprocal nature, thus supporting a concept of interdependence that is a consequence of specialization of activity.

One specialized activity of man that manifests a peculiar land-use pattern is education, in particular higher education. The spatial distribution of individual components on the bounded campus represents a physical structure. Juxtaposed is a decision-making or functional organization which together with the physical structure can be perceived as a spatial system. Unlike the physical structure, which is tangible and passive, the functional organization is intangible and dynamic. The functional organization with its decision-making is a

space adjusting process with the ability to induce changes in the spatial system. The changes that occur are disruptive or cohesive in nature. Since the relationship between the physical structure and the functional organization is reciprocal in nature it follows that a change in one component prompts a change in another. A realignment of the total spatial system may result.

Preliminary findings from analysis of 31 campuses in Indiana identify a number of disruptive and cohesive forces affecting the peculiar structure and interaction of the spatial system that is the bounded campus.

Temperature Percentiles for Anderson, Indiana. CHARLES W. MILLER, THOMAS R. HARBRON and THOMAS McLAUGHLIN, Department of Physics, Anderson College, Anderson, Indiana 46011.—Official records of the daily high and low temperatures have been kept for Anderson, Indiana, since June 1, 1895. This data was transferred to punch cards from the National Weather Service observing forms, and an IBM 1620 computer was used in constructing selected temperature percentiles from this data utilizing a Fourier Analysis of the daily percentile points. These percentiles can be utilized in statistical forecasting of temperature extremes for central Indiana. These percentiles also show some unexpected deviations from the seasonal temperature patterns.

NOTE

Resolving Parallel Problems in Geography Classification under the Dewey Decimal and Library of Congress Systems. ALFRED H. MEYER, Department of Geography, Valparaiso University, Valparaiso, Indiana 46383.—Scouting in the library for texts, journals, and reference materials of a distinctive geographic character, authored by professional geographers, and recognized as geography by publishers reminds one of the definition of geography as "The science of spatial distribution." Indeed, systematic geography materials are so widely distributed on various discontinuous sections of shelves, stacks, and multiple floors that it may take as much time to bring them together for reference readings or research as is spent in using them.

Both the Dewey Decimal and the Library of Congress classification systems have been reviewed for discrepancies and other deficiencies in classification and collocation of geographic materials. In 1944-45 a questionnaire was circulated to librarians to determine the Dewey Decimal classification status of selected books of distinctive geographic content and authorship. The data were graphically portrayed in a wheel chart to show 1) the discrepant and dispersed indexing and shelving, and 2) suggested solution of the mis-classification problem (1). Over 160 respondents (librarians and geographers), including several from abroad—England and Germany—acknowledged the long-overdue demands for a revision that properly places geography in its true classification perspective.

Now that the more "sophisticated" Library of Congress System has displaced the Dewey Decimal system in a growing number of li-

braries, a parallel problem of the Library of Congress was considered in light of the experiences with the Dewey Decimal system. Comparisons and differences were noted. The Library of Congress catalogues and collocates regional works (except the Arctic, Antarctic and Greenland) in History, while most of the works in systematic publications in geography are dispersed among subject-related classes. Representative examples were noted in each case; incongruities evaluated; and library classification professional sources were quoted relevant to problems and revisions. It is our plea that geographers cooperate with their local librarians and officials of the Library of Congress to utilize what has been called the "hospitality" expansion feature to effect a truly geographic section in the library.

We submit that proper unification will then also materially establish the proper unitary image of geography as a distinct professional field of learning and research.

Literature Cited

1. MEYER, ALFRED H. 1947. A geographic classification of geography material as based upon the Dewey Classification System. *Ann. Assoc. Amer. Geogr.* 37:209-222.

OTHER PAPER READ

A Test of the Centrality-Population Size Relationship within Central Indiana. NEIL V. WEBER and ROBERT R. DRUMMOND, Department of Geography and Geology, Indiana State University, Terre Haute, Indiana 47809.