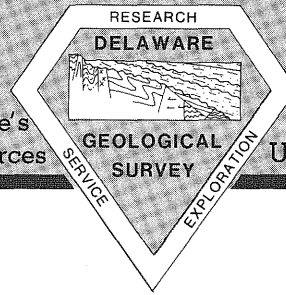


First State Geology

Current information about Delaware's geology, hydrology and mineral resources



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Winter 1988

Construction to Begin Soon on New DGS Building

In the same year that the Delaware Geological Survey is recognizing its 150th anniversary, it is preparing for the construction of the first facility specifically designed for its use. For Fiscal Year 1988 the Delaware General Assembly appropriated \$1.3 million for Phase One of the construction of the DGS building.

A prior appropriation was used to plan the new facility to be built on the University of Delaware campus. The architectural firm of Victorine and Samuel Homsey, Inc. was chosen to work with the DGS and University. As of this writing plans are complete. An apparent low bidder is available and a contract is being developed by the University in conjunction with the State Department of Administrative Services. We expect ground breaking early in January 1988. Provided that there is an appropriation for Phase Two in Fiscal Year 1989, the building should be finished by March 1989.

The new building will be adjacent to the northeast corner of Penny Hall. The demolition of the concrete-block part of the original one-story wing of Penny Hall will occur during Phase Two after most of the new building is built. The brick portion of the original wing will be renovated for continued use by the Department of Geology which will also occupy the space the DGS vacates in Penny Hall.

The new building (see photograph of model) will be two stories with a service facility in back for drilling and bore-hole logging equipment. The front, facing Russell parking lot, will feature prism bay windows that were inspired

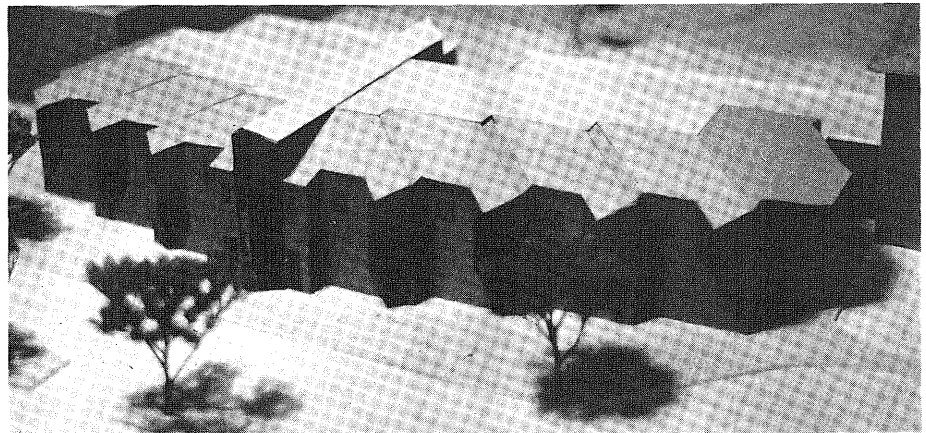
by crystal forms. A skylit entrance lobby is designed to house educational exhibits. A staircase leads to the second floor which is devoted to offices, laboratories, and a research library. On the first floor will be a sample library, a conference room, and other rooms housing geophysical data and publications.

The first Delaware Geological Survey facility was a horse-drawn wagon. The original survey was conducted in the field by James C. Booth, 1837-1841. He did spend several weeks in numerous places in the State, particularly the town of New Castle. His base during the winter, when he was writing his report, was his chemistry laboratory in Philadelphia.

There was no Delaware Geological Survey from 1841 until 1951, although Professor Frederick Chester of Delaware College, Newark, tried unsuccessfully to get recognition from the General Assembly as State Geologist in the mid-1880s.

In 1951, Dr. Johan Groot was appointed State Geologist and was provided an office in the white building at 231 South College Avenue that stands south of the University library. This was shared with the Geography Department. Soon afterwards, the University provided space in the basement of Robinson Hall that was shared with the Art Department. The DGS and later the Department of Geology grew, and in 1969 both units moved to Academy Street to renovated space in the Biochemical Research Foundation Building, renamed Penny Hall.

Soon after the move by the DGS and Department of Geology to Penny Hall the expanding programs of both outgrew the available space. The use of office trailers followed. For Fiscal Year 1986 the Delaware General Assembly appropriated funds to build a small building to replace the office trailers (see Summer 1986 issue of *First State Geology*). Originally, field equipment

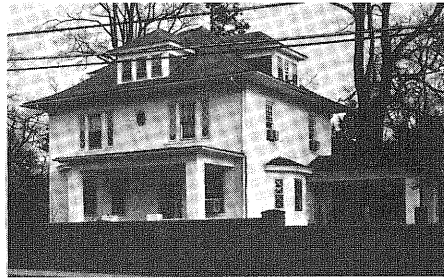


Photograph of architect's model of the proposed DGS facility. Penny Hall is to the right. The building fronts north. Photographs by Dorothy C. Windish.

was housed in several locations, finally residing at a single site on the University farm.

The new building will meet the technical requirements of a modern geological survey, provide improved public access, and greatly improve the functional efficiency of the DGS.

As part of landscaping plans for the new building we hope to create displays of boulders of native rock. We therefore welcome any gifts of large boulders that can be transported to the site. Sources of such contributions will be identified. Contact Thomas E. Pickett, Associate Director, if interested in making a donation.



First office of State Geologist Johan Groot in 1951 was in this house at 231 South College Avenue which was originally the University President's residence.



The basement of Robinson Hall housed the offices of the expanding Delaware Geological Survey and Department of Geology.

First State Geology is published by the Delaware Geological Survey, a State agency established by an Act of the Delaware General Assembly in 1951 and organized as a unit of the University of Delaware.

Robert R. Jordan,
State Geologist and Director
Richard N. Benson,
Editor, First State Geology

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New Legislation Covers DGS

The Delaware Geological Survey has been continued following a thorough performance review by the General Assembly in Fiscal Year 1987.

Under Delaware's "Sunset" Law, several agencies are selected for review each year and may be discontinued unless positive legislative action is taken to preserve their functions. The Joint Sunset Committee, chaired by Senator McDowell and Representative Amick, recommended S.B. 259 to codify established practice and clarify the responsibilities and duties of the Survey. That legislation was signed by Governor Castle on July 9, 1987.

The charges to the DGS and its basic organization as established in the founding statute of 1951 have been retained. The amendments require the State Geologist to comment on energy exploration activities in Delaware; designate the DGS as the State's point of contact for the U. S. Geological Survey, Bureau of Mines, and Minerals Management Service; establish the State Geologist as representative to the Delaware River Master; clarify publication policy; and add "...responsibility for matters relating to water quality, geologic hazards, seismicity and cartographic information."

State Geologist Robert R. Jordan said he is gratified by the consideration given to the Survey, the reaffirmation of its basic mission, and the modernization of its statute.

Delaware and Maryland Sign Boundary Agreement

Representatives of the states of Delaware and Maryland have signed agreements specifying the locations of 93 historic monuments originally set by Mason and Dixon. The restored and precisely surveyed monuments are accepted in the agreements as defining the correct boundary between the states. The action was taken at a meeting of the boundary commissioners of Delaware, Maryland, Pennsylvania, and New Jersey, hosted by the Delaware Geological Survey at the University of Delaware on August 26, 1987.



Penny Hall is the present facility occupied by the DGS and Geology Department.

Hydrology News

DGS Initiates Ground-Water Flow and Quality Study in Eastern Sussex County

A three-year research project designed to determine the rates and directions of vertical and horizontal ground-water flow in the Columbia aquifer in eastern Sussex County was recently begun. As part of the project, ground-water quality trends will also be investigated. The study is part of the Survey's ongoing intensive research effort in the rapidly developing Inland Bays area. Results will also be applicable to other parts of the State.

The Columbia aquifer is the most important aquifer in the area as it supplies water to most wells and provides for the fair-weather flow of fresh-water streams. Many previous studies have documented the presence of contaminants in deeper portions of the aquifer but did not explain how the contaminants originated or were transported. This investigation will focus on how ground water and ground-water borne contaminants flow from the shallow water table to deeper portions of the aquifer where most wells obtain water.

As part of the investigation, a number of test wells of different depths are being installed and will be used to measure water levels and to obtain water samples. Existing wells with known construction details will also be used as sampling points. The field work is expected to continue for at least the next two years.

Project goals and objectives and a progress report will be presented at a public meeting to be announced in the next few months. Persons wanting additional information should contact Scott Andres at the Survey office.

DGS-USGS Joint-Funded Program

DGS is continuing its long-term cooperative program with the Water Resources Division of the U. S. Geological Survey (USGS) for Fiscal Year 1988. This program draws upon the special capabilities and services that can be provided by the USGS to augment State programs. The Delaware office of the USGS is located in Dover and is under the direction of Gary N. Paulachok who was last assigned to the Trenton, New Jersey, office of the USGS and succeeds Arthur Hodges who retired in April 1987.

A major component of the cooperative program since its inception in the late 1950s is the stream-flow gaging network which consists of 13 continuous recording stations and 12 partial record stations. Some stations are equipped with telemarks so that remote reading of the flows can be obtained by DGS or USGS staff.

An investigation of pesticides in ground water is a new water quality effort beginning this fiscal year and is an outgrowth of previous cooperative water-quality studies. Judith Denver, hydrologist with the USGS in Dover, has been the chief investigator on the ground-water quality programs.

DGS funds allocated to cooperative studies in FY 1988 total about \$59,000. This amount is matched by the USGS which does the actual field investigations. In addition, the Department of Natural Resources and Environmental Control (DNREC) is contributing a total of \$30,000 to the cooperative program for two surface-water studies. One program will measure the low flows from surface streams to the Inland Bays and a related program will look at statistical methods of estimating low flows across the State from existing data. The New Castle County Water Resources Agency and the City of Wilmington also contribute to the operation of gaging stations in New Castle County.

"Rock"

By Robert R. Jordan

It may be surprising to realize how much confusion the term "rock" can generate. The notion that geologists have difficulty defining the word might be merely amusing if it were not for potentially serious consequences in practical applications. For example, the difference in cost between excavating "soil" and "rock" can be significant and produce conflict if parties to a contract should have different understandings of the words.

It is generally understood in both common usage and geologic jargon that rock is an aggregate of mineral matter. All would agree that the hard earth materials of the Delaware Piedmont qualify as rocks. However, confusion may arise about the terminology of the soft products from the weathering of those rocks and, especially, about the granular mineral matter of the Coastal Plain.

It is likely that most geologists and laypersons alike think of rocks as hard, indurated objects. This is, of course, not incorrect usage, but if the definition is restricted in this way, other terms such as saprolite, regolith, weathered rock, soft rock, overburden, or sediment would have to be rigorously applied to describe the exceptions. Instead, it is our contention that the general term "rock" can be properly and most usefully applied when considered inclusive of both hard and soft earth materials. The soft rocks possess all of the properties of the hard ones except that their component particles do not happen to be rigidly connected. Inasmuch as cementation is reversible and there is gradation between hard and soft, a distinction based on rigidity is artificial and can be misleading.

The use of "rock" to include unconsolidated earth materials is of particular interest in Delaware because 94 percent of our State lies in the Atlantic Coastal Plain where very old material can be shoveled and because the rest is in the Appalachian Piedmont with its mantle of weathered matter. If we dig beneath the surface of this State, are we moving rock, or soil, or sediment? What is it that ground water and waste fluids move through? The distinctions can be important, especially for regulated activities.

The Delaware Geological Survey includes unconsolidated materials in its usage of the term "rock" and recommends that practice to others. Our intention is not to be proprietary but to clarify our terminology and present our information in the simplest manner consistent with the natural condition of this area. In so doing we continue to respect the agricultural definition of "soil" as the surficial zone in which there is biological activity and the common engineering usage of that term for "soft" earth materials.

In our practice, then, "rock" may be understood as a general, generic term. Where appropriate it may be qualified as hard or soft, indurated or unconsolidated, red or gray, barren or fossiliferous, and so on. All fields find benefits and disadvantages in adopting common words for technical use or coining unambiguous new words that are also unfamiliar. By stating our preferred practice we hope to relieve some of the burden of jargon and promote awareness of the potential for confusion with even our most basic subject matter: "rock."

Delaware Geologists Registration Act Amended

In accordance with the recommendations of the Joint Sunset Committee, the Delaware Geologists Registration Act was amended by the Delaware General Assembly in June 1987. Changes include: addition of two public members to the Board of Registration of Geologists; establishment of specific complaint, hearing, and appeal procedures; simplification of the requirements for licensure; and removal of the exemption from licensing for employees of the State. With respect to requirements for licensure, the experience requirement has been reduced from 10 to 5 years of experience in geologic work satisfactory to the Board, a minimum of 3 years of which must be in a position of responsible charge.

Copies of the new Act are available upon request from the Delaware State Board of Registration of Geologists, Carvel State Office Building, 820 French Street, Wilmington, Delaware, 19801; phone 302-571-3288.

Cartographic Corner

By W. S. Schenck
Coordinator, DGSCIC

- The Middletown, DE, Marcus Hook, PA-NJ-DE, and Sharptown, DE-MD USGS 7.5-minute quadrangles have been photo-revised as of 1986 and are now available.
- The Wilmington, Dover, and Seaford 1:100,000-scale quads have been authorized by the U. S. Geological Survey to be published in a topographic format. The Wilmington and Dover quads are due to be printed and released in March 1988. The Seaford quad will be updated and revised before it is set in its new format and is expected to be released sometime in July or August 1988. At that time, there will be 1:100,000-scale topographic coverage available for the entire State.
- The Earth Observation Satellite Company (EOSAT) has announced plans to launch LANDSAT 6. The satellite is tentatively scheduled for a Titan II launch sometime in mid-1991. Funds have also been allocated to perform a market analysis for LANDSAT 7 to ensure market compatibility between the U.S. and other countries' space imaging systems.

- The Delaware State Boundary Commission (DSBC) has allocated funds for work along the Delaware-Pennsylvania boundary. For years there have been no formal written descriptions for the 44 boundary monuments which mark the boundary between the two states. The DSBC has contracted the services of Roger Nathan to write formal descriptions for those monuments. Once written, the DGSCIC BOUNDARY data base will have complete location and condition information for all of Delaware's 179 boundary monuments.

For further information on these items, please contact the Delaware Geological Survey Cartographic Information Center (DGSCIC) at 302-451-8262.

Publications

Recent DGS Publications

Special Publications

No. 15 Delaware Geological Survey Laboratory Procedures Manual: M. G. Kramer, editor, 1987, 106 p. Availability limited.

List of Publications, 1987: J. H. Talley and D. C. Windish.

Other Publications by DGS Staff

T. E. Pickett, 1987, *The Latitudes of Art and Science*, book review of *Art and Cartography* by David Woodward, ed.: *The Scientist*, V. 1, No. 18, p. 22.

T. E. Pickett, 1987, *Reconciling Science and Theology*, book review of *Nathaniel Southgate Shaler and the Culture of American Science* by David N. Livingstone: *The Scientist*, V. 1, No. 27, p. 22.

Forthcoming Publications

Hydrologic Map Series No. 7
Geohydrology of the Southern Coastal Area, Delaware, Sheet 2, Geohydrology of the Columbia Aquifer: J. H. Talley

Staff Notes

Congratulations on promotions of **A. Scott Andres** to Associate Scientist, **Roland E. Bounds** to Senior Research Technician I, **William S. Schenck** to Research Associate III, and **Dorothy C. Windish** to Senior Secretary.

Richard N. Benson, Senior Scientist, received a \$33,250 contract under the Continental Margins Program Cooperative Agreement between the U. S. Department of Interior's Minerals

Management Service and the Association of American State Geologists, for "Geologic Framework and Hydrocarbon Potential Offshore Delaware Bay." He also presented a paper titled "Geologic Framework of the Offshore Region Adjacent to Delaware" at the First Symposium on Continental Margin Research sponsored by the U. S. Minerals Management Service and the Association of American State Geologists at the University of Texas, Austin, November 8-10.

Robert R. Jordan, State Geologist and Director, has been reappointed as Chairman of the Committee on Opportunities in Water Resources and Waste Management of the American Association of Petroleum Geologists (AAPG), appointed to a three-year term on the Distinguished Lecturers Committee of that organization, and at the AAPG annual meeting March 21, 1988, will be a recipient of the AAPG Distinguished Service Award. He was also an invited participant in the Geological Society of America's Penrose Conference "Geological Decisions for the 21st Century" where he presented a talk on "The Policital Decision-Making Process."

Jordan represented the State of Delaware at the meeting of the Outer Continental Shelf Policy Committee of the Department of the Interior at Corpus Christi, Texas, November 4-5, where he chaired the nominating committee for the election of officers of that body.

Jordan and **John H. Talley**, Senior Scientist, have been reappointed by Governor Castle to the Delaware State Board of Registration of Geologists for two-year terms. Talley was elected Chairman of the Board at its December meeting.

Thomas E. Pickett, Associate Director, as Secretary-Treasurer of the Atlantic Coastal Plain Geological Association, organized a geologic field conference on October 9-11 on the Geology and Geomorphology of the York-James Peninsula, Virginia. Also, he served as Alternate Commissioner at the 42nd meeting of the North American Commission on Stratigraphic Nomenclature held October 27 in Phoenix, Arizona.

William S. Schenck, Research Associate III, presented a talk on BITNET telecommunications network and how it might link National Cartographic Information Center State Affiliates, at the Northeast NCIC Affiliate meeting, October 9 in Storrs, Connecticut. He was reelected Director-at-Large at the annual meeting of the North American Cartographic Information Society held October 23-27 in Atlanta, Georgia.