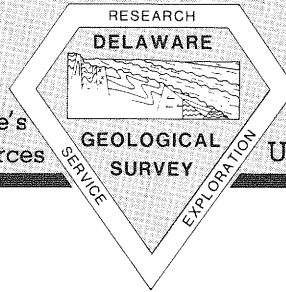


First State Geology

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



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DGS Building Dedicated

State and University officials joined together on September 7, 1989, to formally dedicate the new Delaware Geological Survey Building. An estimated 150 persons gathered for the ceremony and many more toured the building during the all-day celebration and open house. Tours featured not only the facilities, but exhibits demonstrating Delaware's geology, the accomplishments of the Survey, and its cooperative programs with related units.

Governor Michael N. Castle highlighted the addresses by commenting generously about the Survey's contributions to his office and the entire State. Dr. E. Arthur Trabant, President of the University of Delaware, emphasized the partnership of the State and the University represented by the Survey and thanked the Governor and General Assembly for their support.

State Representative Joseph R. Petrilli and State Senator Robert I. Marshall expressed good wishes on behalf of the Delaware General Assembly. Secretary of Administrative Services George E. Hale noted the cooperation achieved in completing the project on schedule and within budget. Dr. Kenneth N. Weaver, State Geologist of Maryland, conveyed the greetings of the Association of American State Geologists.

The formal words of dedication were graciously spoken by Mrs. Catharine B. Flickinger, Vice Chairman of the Board of Trustees of the University of Delaware.

State Geologist Robert R. Jordan presided during the ceremony, noting in his remarks "For the first time in Earth's four and a half billion-year history the Delaware Geological Survey has a proper home!" Attempts were made to acknowledge the many important contributors to



Governor Michael N. Castle and University of Delaware President E. Arthur Trabant cut the ribbon in front of the new Delaware Geological Survey Building. Participants in the ceremony, from left to right, are State Geologist Kenneth N. Weaver of Maryland, Senator James P. Neal, Representative Joseph R. Petrilli, President Trabant, State Geologist Robert R. Jordan, Vice Chairman of the Board of Trustees of the University of Delaware Catharine B. Flickinger, Governor Castle, Senator Robert I. Marshall, and Secretary of Administrative Services George E. Hale.

the conception, funding, and construction of the building. On behalf of the Survey, Jordan presented senior scientist John H. Talley with a special award in recognition of his outstanding service as project coordinator for the DGS.

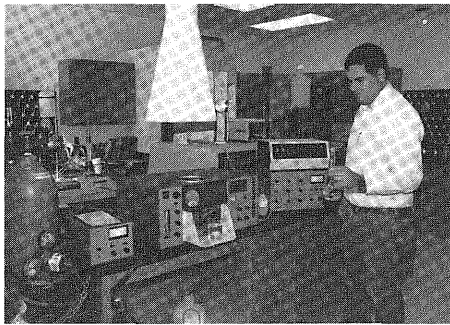
After several months of experience with the new facilities, staff and visitors alike report great satisfaction with the design of the new building. It is proving to be functional, efficient, and appropriate to the Survey's missions. A significant objective of the construction project was to improve access to the Survey and its resources. Increasing numbers of visitors indicate that this objective has been met. The striking design is identifiable and inviting and even casual visitors find the exhibits informative.

The Delaware Geological Survey building is properly dedicated and fully operational. We look forward to welcoming you to the revitalized Survey.

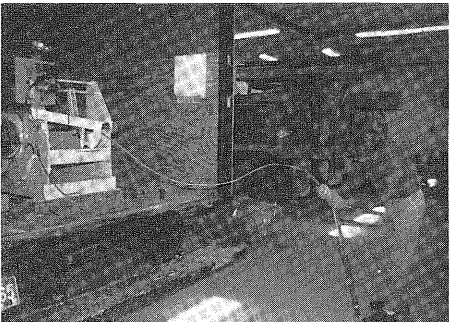
Photo Contest Winners

Winners of the photo contest held in conjunction with the dedication ceremonies for the new Delaware Geological Survey Building are Peter J. Dressel and Jennifer L. Edwards, Thomas E. Pickett, Kelvin W. Ramsey, and Louis P. Vlangas.

The winning photographs are on permanent display in the lobby on the ground floor of the DGS building.



Tom Smith analyzes a sample in the atomic absorption spectrophotometer in the analytical lab. The other two labs are the petrology/paleontology and geochemistry/hydrology laboratories.



The three-bay garage shelters the geophysical logging van (foreground) and the University drill rig. DGS field and drilling supplies and a shop are located here plus a 260-foot well used to calibrate the geophysical logging tools.

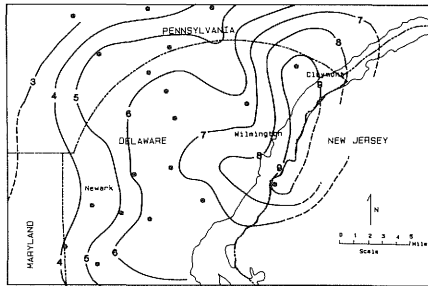
July Flooding: 100-Year Events Recorded

By John H. Talley

On July 5, 1989, intense thunderstorm activity associated with the remnants of tropical storm Allison dumped up to 9 inches of rain in northern New Castle County in about a 9-hour period. Rainfall recorded at the National Weather Service was a 100-year event; a 25-year event was recorded at Newark. The storm followed several months of above normal precipitation (4 to 6 inches) that created saturated soil conditions and high ground-water levels. Rainfall was concentrated in urbanized areas and rapidly ran off the ground, causing severe stream and street flooding and moderate to severe property damage to apartment buildings, homes, businesses, roads, and bridges. Three deaths were directly attributable to the storm and associated flooding.

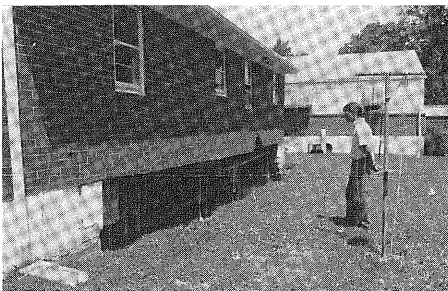
The majority of dwelling units and businesses affected are located on flood plains in areas mapped by the Federal Emergency Management Agency as special flood hazard areas inundated by

100-year floods. The most severe damage was concentrated in the Elsmere-Brack Ex areas (Little Mill Creek) and along Shellpot Creek and Stoney Run.



Map showing lines of equal precipitation in inches for the storm of July 5, 1989. Small dots indicate precipitation-recording stations.

Record high stream discharges were established on six water courses in the lower parts of drainage basins in northern New Castle County: Shellpot Creek, Little Mill Creek, Pike Creek, White Clay Creek, Christina River, and Doll Run. Four 100-year and one 46-year recurrence interval events were recorded.



Pressure from flood waters approximately three feet higher than land surface caused the collapse of the concrete basement wall foundation of this house.

Hydrology News

Eastern Sussex County Ground-Water Study

By A. Scott Andres

Even prior to completion, results of this project are being used by environmental and land use regulators. In August and again in October, Scott Andres, the principal investigator, was subpoenaed to testify at public hearings regarding the Department of Natural Resources and Environmental Control's (DNREC) septic system moratorium along Route 1. In another case, George, Miles, and Buhr, Inc., a Salisbury, Maryland, consulting firm hired by Sussex County, is using water quality information from the project to help in the determination of need for sewers along the Route 26 corridor between Ocean View and Dagsboro. Analyses of the data, to be published within the next 12 to 18 months, will have continuing

application to the issues mentioned above as well as others in the Inland Bays region.

Well-Head and Cockeyville Programs, Northern New Castle County

By Kenneth D. Woodruff

Areas in New Castle County that are especially sensitive to land use changes or to ground-water pollution are the targets of two separate studies now underway by DGS. The first study, the well-head program funded by the Water Resources Agency (WRA) for New Castle County, will examine the geology around the county's major well fields and propose well-head protection areas for two of those fields. A protection area is defined in the Safe Drinking Water Act as "...the surface and subsurface area surrounding a water well or well field, supplying a public water system, through which contaminants are reasonably likely to move toward and reach such water well or well field." The identification of well-head areas is mandated by the U.S. Environmental Protection Agency (EPA) for all public wells. The study will assess several possible methods for accomplishing this task and will eventually lead to the mapping of all well-head areas in the county.

Well-head areas were preliminarily identified for the county by the DGS about two years ago and are depicted on a set of three maps published in 1987 by the WRA entitled "Water Resources Protection Areas." The new study will test and document alternative methods for outlining such areas. Another phase of the project will refine the mapping of ground-water recharge areas, particularly in the southern part of the county. They were first mapped in 1976 by the DGS and were subsequently recognized in the New Castle County Septic Code. Recharge areas are subject to two-acre minimum lot size restrictions for homes with septic systems. A temporary staff member will be employed full-time on the project.

Areas underlain by the Cockeyville Formation are receiving special attention in the second study, the Cockeyville program. The formation is a marble (metamorphosed limestone) and underlies the Pleasant Hill and Hockessin-Yorklyn valleys in northern Delaware. It supplies ground water to domestic wells and to a number of high-yielding public wells. Increasing land development over the marble and adjacent lands has raised serious questions about the effects of those activities on both ground-water quality and quantity. The DGS is refining the existing geologic knowledge of the Cockeyville and is subcontracting a parallel hydrologic study to the Dover office of the U.S. Geological Survey's (USGS) Water

Resources Division. The study will include the installation of a stream gage on Little Mill Creek which will be used to measure the amount of water flowing through the valley. The station will be a key element in determining the local water budget. One objective of the study is to identify areas that might be contributing much of the recharge to the formation and thus should be protected from over-development. Personnel of both the DGS and the USGS are frequently in the area conducting geophysical studies or well tests. The project is funded by both WRA and DNREC. Artesian Water Company is contributing materials, equipment, and operational funds for the gaging station and is cooperating in other phases of the work.

Both the well-head and Cockeysville programs are expected to take two years to complete and will result in published reports.

Donna M. Organist to Chair Registration Board

The Delaware State Board of Registration of Geologists has elected Donna M. Organist of Newark as its new chairman. Mrs. Organist succeeds John H. Talley, who retired from the board. She had previously served a two-year term as a professional member of the board.

Governor Castle issued commissions appointing or reappointing all of the members of the registration board for two-year terms beginning October 1989. Arthur L. Hodges, Jr., of Camden-Wyoming is newly appointed to the board. Public members Bettina G. Heiman and Robert M. Eissner and professional member Robert R. Jordan were reappointed by the Governor.

Vivian F. Murphy continues as the board's administrative assistant, serving at its office in the Carvel State Office Building, Wilmington.

Geologic Mapping

The next DGS geologic maps will cover, from west to east, the Burrsville, Harrington, Milford, and Mispillion River quadrangles. Kelvin Ramsey is mapping the distribution of surface and near-surface deposits within the area of the Milford and Mispillion River quadrangles, including sediments along the shoreline and beneath Delaware Bay. The map area of the Mispillion River quadrangle will be the first to emphasize the coastal geology of the State and will be, in part, a product of the coastal geology program of the DGS. This new program responds to concerns regarding Delaware's coastal areas as discussed in Delaware's Environmental Legacy

Report. The Beaches 2000 Report to the Governor recommended that the DGS "be given the lead to monitor and research the status of the shoreline and the processes acting upon it."

DGS Colloquia

Every other Friday at 11:00 a.m., a staff member of the DGS leads a discussion of a research topic of interest. The colloquia have covered such widely divergent subjects as greensand, stratigraphic columns, fossil pollen, ground water, and fiber optics. Although the topics are primarily for the open discussion and benefit of the DGS staff, others are welcome to attend. The meetings are held in the conference room of the Delaware Geological Survey Building.

DGS/DNREC Joint Field Trips

During fall 1989, the Delaware Geological Survey (DGS) led three field trips for geologists working for the Delaware Department of Natural Resources and Environmental Control (DNREC). The purpose was to better acquaint the growing number of geoscientists in DNREC with the local geology and to encourage interaction between staff members of the two units.

On September 20, 1989, the group studied several outcrops in the Piedmont Province. The stratigraphic sequence in the Atlantic Coastal Plain Province of New Castle and Kent counties was surveyed on September 27. A third trip on November 15 was devoted to the youngest sedimentary rocks in the State, exposed in eastern Sussex County. Exposures of those rocks in western Sussex County will be visited at a later date. Over thirty people went on each trip.



DGS and DNREC geoscientists examine an outcrop of the Columbia Formation in a borrow pit near Milford, Sussex County.

Cartographic Corner

By W. S. Schenck

▪ The DGS/USGS FY 90 Joint Funded Agreement For Topographic Mapping.

Delaware is one year closer to having totally revised topographic map coverage for the state. Work began fall 1988. During the 4-year program all of Delaware's 57 1:24,000-scale maps will be totally revised. FY 89 funds provided for low level photography of the entire state, conversion of the map collars to the NAD83 Horizontal Datum, approval of conversion of coastal maps from metric to English units, and updating all of the 24K DLGs.

The DGS expects to have copies of the 1:15,000-scale photography by late February 1990. The field reconnaissance work has begun for the vertical and horizontal control that will be the base for the revision work being done. Publication of the first new maps is expected by late 1992, beginning with New Castle County.

- 100,000-scale Digital Line Graphs now available for Delaware. The boundary, transportation, and hydrography data layers have been collected for the Wilmington, Dover, Seaford, and Salisbury 100K quads covering the state. The hypsography layers are currently being worked on and should be out by March 1990. DLG data files are currently in demand by many digital cartographic users in Delaware. For more information, contact the USGS Earth Science Information Center at 1-800-USA-MAPS.

- Best times for DGSCIC map sales. Monday, Wednesday, and Friday from 1:00 to 4:00 P. M. are the best times for over-the-counter map sales. At those times more personnel will be available to serve your topographic map needs.
- DGSCIC to receive a new Aerial Photography Summary Record System (APSRs) CD-ROM. The USGS Earth Science Information Center (ESIC) has issued a new APSRS data base on CD-ROM with updates to 1988 and with new, faster retrieval software. This will enable the DGSCIC to perform searches for aerial photography over the conterminous United States. Criteria for searches include southeast quad corner, date, scale, imagery type, focal length, state, and county. If you need aerial photography in or outside of Delaware, call DGSCIC first.
- State ESIC offices are considered to be a "viable national network" by USGS. The state ESIC offices, through a five-member board of direction, are working with USGS as part of the USGS Earth Science Information Network. The state offices are the links by which this network reaches into every state from Alaska and Hawaii to Maine. If you have any earth science related questions call the DGSCIC at (302) 451-8262.

Publications

Recent DGS Publications Reports of Investigations

No. 45 Effects of Agricultural Practices and Septic-System Effluent on the Quality of Water in the Unconfined Aquifer in

Parts of Eastern Sussex County,
Delaware: J. M. Denver, 1989, 66 p.

No. 46 Shallow Subsurface Temperatures
at Selected Locations in Delaware: K.
D. Woodruff, 1989, 17 p.

Atlas Series

Frederica Quadrangle (FRE): N.

Spoljaric, editor, 1989, 13 p.

Millington Quadrangle (MNT): N.

Spoljaric, editor, 1989, 11 p.

Delaware City Quadrangle (DEC)

update: N. Spoljaric, editor, 1989, 2 p.

Information Series

No. 6 Delaware's State Boundaries: W. S.
Schenck, 1989.

Other Publications

DGS List of Publications, 1989: J. H.
Talley and D. C. Windish, 16 p.

Forthcoming DGS Publications

Ages of the Bethany, Beaverdam, and

Omar Formations of Southern DE:

J. J. Groot, K. W. Ramsey, J. F.

Wehmiller.

The Storm of July 5, 1989: Hydrologic
Conditions: J. H. Talley.

Newark East Quadrangle (NEE): N.
Spoljaric, editor.

Newark West Quadrangle (NEW): N.
Spoljaric, editor.

Other Publications by DGS Staff

R. N. Benson and J. H. Roberts, 1989,
Geologic Framework of the Offshore
Region Adjacent to Delaware: *Marine
Geology*, v. 90, p. 103-112.

R. R. Jordan, 1989, Groundwater - The
Crop Under the Fields: *Northeast
Agriculture*, v. 20, no. 8, p. 5.

, 1988, Report of Ad Hoc Committee on
Opportunities in Water Resources and
Waste Management: *American
Association of Petroleum Geologists
Bulletin*, v. 72, p. 1541.

T. E. Pickett and R. R. Jordan, 1989, State
Activities: Delaware: *The State
Geologists Journal*, v. 41, p. 12-13.

Staff Notes

Kelvin W. Ramsey has accepted a per-
manent position with the DGS as a
Research Associate III. His work as a
Coastal Plain stratigrapher will focus
on the Survey's coastal geology pro-
gram.

A. Scott Andres and **Robert R. Jordan**
chaired technical sessions of the 18th
Geochautauqua on Mineral Resource
Assessment, "Integrated Approach-
es," at the University of Delaware,
October 13-14.

Richard N. Benson represented
Delaware at the Outer Continental
Shelf Policy Committee meeting in
Seattle, WA, October 18-19.

Robert R. Jordan has been elected vice-
chairman-secretary for a one-year
term to the North American
Commission on Stratigraphic
Nomenclature and president-elect of
the Delaware Academy of Science.

Thomas E. Pickett was appointed associ-
ate treasurer of the History of Earth
Sciences Society, effective July 1, 1989.

Presentations

Robert R. Jordan delivered remarks on
behalf of the Association of American
State Geologists at the dedication of
the Maryland Geological Survey
Building in Baltimore, June 9.

Thomas E. Pickett, "Geology of the
Cockeysville Formation," at symposi-
um on history, geology, and preser-
vation of the Eastburn Complex
Natural Area, Delaware Nature
Society, Newark, September 26.

"Early Geologic Investigations in the
Atlantic Coastal Plain," at Indiana
University/Purdue University,
Indianapolis, October 16.

Kelvin W. Ramsey with Susan Conrad,
"Coastal Plain Gravel Composition: A
Potential record of the Geomorphic
Evolution of the Appalachians," at the
20th annual Binghamton Symposium

on Geomorphic Evolution of the
Appalachians, Dickinson College,
Carlisle, PA, October 20-22.

William S. Schenck, "Topographic Maps
and other Cartographic Information,"
to eighth grade classes at St. John the
Beloved School, September 27.

Externally Funded Projects

Richard N. Benson and **Johan J. Groot**,
from University of Texas at Austin
under the Continental Margins
Research Program of the U. S.
Minerals Management Service (MMS)
and the Association of American
State Geologists (AASG) for
"Stratigraphic Framework of Upper
Cenozoic Sediments and Potential
Nonenergy Mineral Resources of
Delaware and Offshore Regions."

Thomas E. Pickett with **John H. Talley**
from Delaware Department of Natural
Resources and Environmental Control
(DNREC) for "SEASIP - Southeast Area
Sand Inventory Project."

John H. Talley from DNREC for "Ground-
Water Monitoring of Coastal Aquifers
in Delaware."

Kenneth D. Woodruff with **John H.
Talley**, two projects funded by New
Castle County for "Resource Protection
Area Program" and "Hydrologic Study
of the Cockeysville Formation."

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

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