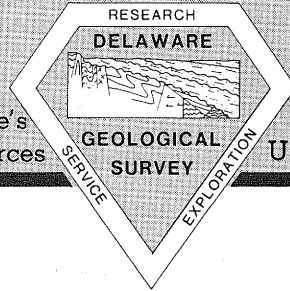


First State Geology

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



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Quebec Earthquake Felt in Delaware

By Kenneth D. Woodruff

At about 6:45 p.m. on November 25, one of the largest earthquakes to occur in eastern North America in several decades jolted eastern Canada and the northeastern United States and it was felt in Delaware. According to the Canadian Geological Survey, the quake registered a magnitude 6 and was centered about 90 miles north of

Quebec. The DGS seismic network recorded the event, but because of the strong amplitude of the P & S waves, it was difficult to define some of the earthquake characteristics that can be deduced from such data. The network is normally designed to record much smaller local earthquakes.

The earthquake occurred in an area that had no apparent history of seismicity. The cause and frequency of large earthquakes in eastern North America are largely unknown, even though some of the largest tremors in the United States have occurred

in the eastern half of the nation. Many researchers in the U. S. are cooperating with Canadian seismologists in aftershock studies and in helping to define the source characteristics of the event. These studies will probably last for some time, and it is possible that small aftershocks will continue for several years. Research into the cause of such earthquakes helps define the potential for large, damaging events elsewhere in eastern North America.

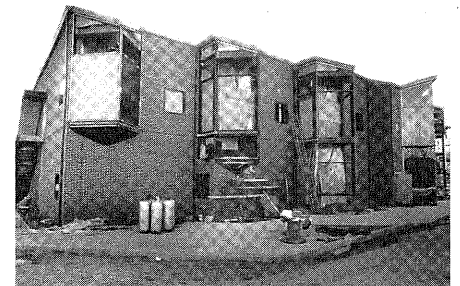
Plans for DGS Building Dedication



Framework in place for main entrance area. Photograph by John H. Talley.

The DGS has begun planning for dedication events after the new Delaware Geological Survey Building is completed. The building is enclosed and work on the interior is proceeding. The glass for the prism windows on the north-facing front is currently being installed (see photographs). Although construction is about on schedule, the completion date is not firm at this time. The dedication date has not yet been set, although early June is a possibility.

In addition to the formal dedication ceremony, we plan a symposium on the significance of geology in our modern society. A fall field trip and seminar series are also in the planning stages. Any suggestions or comments about the building dedication would be welcome.



Glass installation for prism windows west of main entrance. Photograph by Robert Cohen.

Publication Traces Early Years of Delaware Geological Survey

The establishment of the Delaware Geological Survey and its development from 1951-1969 have been recorded in DGS Special Publication No. 17 by John J. Groot, Delaware's State Geologist during that period. "The Delaware Geological

Survey: The Formative Years—1951-1969" is both a contribution to the history of science and an explanation of the background of the organization for those who use its resources today. The publication discusses the recognition of the need for geologic information in a period of dynamic growth within Delaware and the responses of the State and the University of Delaware through the evolution of the Survey.

A number of distinguished Delawareans from government, academe, business, and agriculture joined in the creation of the Survey by state law in 1951. It was

conceived as, and remains, a natural resources research and service unit of the State, organized at the University. In the report, Dr. Groot traces the difficulties of starting a unit with broad responsibilities from scratch with very limited resources. The early Survey grew, however, as it demonstrated that science could be applied beneficially to water supply, mineral resources, environmental protection, and public policy. Equipment and staff were acquired as new responsibilities were added. The history of the Survey is entwined with the evolution of other units

of the State and U. S. governments and the University.

The history is illustrated with photographs from the period and contains Dr. Groot's observations on his eighteen years as the Survey's director. The publication should be helpful to Delawareans' understanding of the resources available to them through the Survey.

New Book on History Of Nation's State Geological Surveys

The Association of American State Geologists has recently released a book "The State Geological Surveys: A History," edited by Arthur Socolow, retired Pennsylvania State Geologist. The 500-page book is a collection of individual histories, each written by a state survey staff member from each state. As the surveys themselves have many differences, the chapters show wide diversity in length and items covered. The book contains a wealth of interesting information and photographs of the surveys as they see themselves from the early 19th century to the present.

The book is available for \$20 from Dr. Ernest Mancini, Alabama Geological Survey, P. O. Drawer O, University Station, Tuscaloosa, Alabama, 35486.

Earth Science Teacher of the Year

The Eastern Section of the National Association of Geology Teachers (NAGT) each year selects an outstanding earth science teacher in the section. They also recognize a winner for each state.

Anyone wishing to nominate an outstanding secondary school earth science teacher may contact T. E. Pickett, Delaware Geological Survey, University of Delaware, Newark, DE 19716 for nomination forms. Nominations need to be received by NAGT by February 15, 1989.

Guide to Cretaceous Fossils from C & D Canal

A new DGS Special Publication (No. 18) entitled "Cretaceous fossils from the Chesapeake and Delaware Canal — A Guide for Students and Collectors," is now available. It was written by Edward Lauginiger of Wilmington, a biology teacher

at Academy Park High School in Sharon Hill, Pennsylvania, and a recognized expert collector of fossils from the Chesapeake and Delaware Canal.

The report is significant in that it presents in one single source an up-to-date guide for casual or student collectors who wish to identify their fossils. It is not designed as an encyclopedia on the subject but focuses on the fossils most likely to be found. The publication will also be of interest to professional paleontologists. The 57-page report contains numerous illustrations and nine plates of photographs of fossils.

Hydrology News

By A. Scott Andres

Eastern Sussex County Ground-Water Study

Analyses of water samples obtained during the summer and fall of 1988 from nearly 160 domestic and monitoring wells producing from the near-surface Columbia aquifer indicate that ground-water quality in eastern Sussex County is generally good. However, there are areas where water does not meet the U. S. EPA secondary drinking water standards for nitrate and/or iron. Iron problems occur as a result of natural conditions. Nitrate problems, on the other hand, are the result of man's activities. Unacceptable nitrate concentrations have been found at depths as great as 70 feet below the water table in areas without significant ground-water pumping, demonstrating that natural ground-water flow will transport nitrate from land surface to depths where many wells obtain water. The new data have implications for the future use of water from the Columbia aquifer, the largest single underground reservoir in Delaware.

Amateur Earth Scientists in Delaware

By Roland E. Bounds

In order to foster interest in earth science in Delaware, the Delaware Mineralogical Society, Inc., was formed in the early 1960s. Though the group's major interest is in the collection, identification, and discussion of minerals, the programming and field trips cover most major aspects of the earth science field. Meetings have covered such widely diverse topics as "Radon and Radium in Groundwater" by L. DeWayne Cecil of the U. S. Geological Survey; "Raiders of the Lost Sharks," a video production on collecting fossils in New Jersey by Edward Lauginiger, a local earth science teacher; and periodic auctions of members' duplicate

specimens. Field trips have regularly visited Herkimer, New York, to collect quartz crystals called "Herkimer Diamonds;" the Texasgulf Phosphate Mine at Aurora, North Carolina, to collect fossils; and, closer to home, Brandywine Springs Park to collect the State mineral, sillimanite.

The Delaware Mineralogical Society (DMS) played a major role in having sillimanite named the State mineral. It was chosen over several other mineral species because of its atypical occurrence in Delaware. Most commonly, sillimanite is found as microscopic fibers within the surrounding rock. At some localities within Delaware, it occurs in nearly pure boulders weighing up to several hundred pounds. The oddity of the locality is somewhat underscored by the appearance of a sillimanite specimen from Delaware in the display collection of the American Museum of Natural History in New York City, another recent DMS field trip site. Sillimanite is also one of the few minerals from Delaware found in many out-of-state collections.

Meetings of the DMS are held on the second Monday of the month, September through June, at the Concord Presbyterian Church in Wilmington. Meetings start at 7:30 pm. The major event for the club is the annual Gem and Mineral Show at the Brandywine Terrace in Claymont. The show features exhibits, door prizes, and selected dealers of minerals, fossils, jewelry, and lapidary supplies. The next show is March 11 and 12, 1989. Anyone with an interest in the earth sciences is encouraged to attend.

DGS and USGS Sign Joint Funded Agreement for New Mapping Program in Delaware

By W. S. Schenck

The Delaware General Assembly appropriated funds for DGS to begin a program to update USGS 7.5-minute topographic maps of Delaware. This was necessary because these maps will serve as the base for most of the Geographic Information System (GIS) activity beginning in Delaware. Older map information, particularly elevation data, needs revision. The program will also involve the creation of digital products for each map, which will expedite the entry of the base data into many of the GIS systems that are still in their infancy.

Fiscal year 1989 funds will enable the initiation of a Joint Funded Agreement based on a multi-year revision and digital data production program encompassing all of the 7.5-minute maps in the State of Delaware; contracting for low-altitude photography for the entire State; and completion of the following quads as Digital

Line Graphs (DLGs): Lewes, Cape Henlopen, Fairmount, Rehoboth Beach, Frankford, Bethany Beach, Selbyville, and Assawoman Bay. These will be done first to answer the demand for the availability of digital base map data in the Inland Bays area.

The northern and southern complete revision projects will be started ahead of the central portion of the State. Coordination meetings between the DGS and the USGS will take place according to the status of the projects throughout the rest of FY 1989.

DGSCIC CARTOGRAPHIC Data Base Updated

By Anne V. Hiller

The updating process is nearly complete for the Delaware Geological Survey Cartographic Information Center's (DGSCIC) CARTOGRAPHIC data base. The data base, established in 1984, lists maps and aerial photographs of Delaware held by public and private agencies in the State. The updating began during January 1988. All agencies with holdings listed in the CARTOGRAPHIC data base were contacted to determine if they had received or produced any new cartographic products during the last four years.

The CARTOGRAPHIC data base, stored on the University of Delaware's IBM mainframe computer, contains searchable listings of maps and aerial photography of Delaware either held by or available from federal, state, county, local, and private agencies throughout the State. The cartographic products listed are indexed by agency, date, scale, topographic quadrangle coverage, county, city, and map or photo type. Any product can be found by searching with one or a combination of these descriptive terms. Each product listing provides a short description of the map or photograph, the name of the contact person with the address and phone number of the agency where the product is held, and any comments concerning the availability of the maps or photographs to others, in addition to the indexing statements listed above.

The CARTOGRAPHIC data base is useful to anyone who needs maps or aerial photographs covering any part of Delaware. Uses for these cartographic products range from general interest to technical. The general public, planners, surveyors, environmental professionals, historians, and others have requested and received information from the data base. When someone requests information he or she receives a computer printout that describes the product or products that meet the specifications set up by that person.

The updating process has resulted in a

more complete and more accurate data base. It currently contains more than 1,900 records. The time span covered has expanded to range from the early seventeenth century to the present. Also, the contact person for each agency has been checked and changes made where necessary.

Please contact either William S. Schenck or Anne V. Hiller if you are interested in having a search run on the DGSCIC CARTOGRAPHIC data base to locate either maps or aerial photography covering any part of Delaware. Requests can be sent to DGSCIC, Delaware Geological Survey, University of Delaware, Newark, Delaware 19716, or call (302) 451-8262 to discuss any cartographic requirements.

Meeting of Region's State Geological Surveys

Representatives of the geological surveys of Delaware, Pennsylvania, Maryland, and New Jersey met on November 16, 1988, at Nolde State Park, south of Reading, Pennsylvania. The meeting, planned for several months, was the result of a discussion among associate directors who agreed that our proximity warranted airing of items of common interest and closer coordination of activities.

Items informally discussed at the workshop were stratigraphic and aquifer nomenclature, geologic mapping, ground-water studies, and geographic information systems.

The meeting provided a means for the staff members of the four state surveys to become better acquainted. There may be joint or coordinated studies in the future in recognition of the fact that geology does not stop at the state lines.

Cartographic Corner

By W. S. Schenck, Coordinator, DGS
Cartographic Information Center

- Side Looking Airborne Radar (SLAR) is available for Delaware. Black and white photo mosaics as well as individual strips are available from the EROS Data Center in Sioux Falls, South Dakota. The imagery was collected earlier this summer and has just been released.
- National Aerial Photography Program (NAPP) photography has been contracted by the U. S. Geological Survey (USGS) to complete photo coverage of Delaware in March and April of 1989. Poor weather conditions during 1988 prevented complete coverage with acceptable photography at that time. The NAPP photography will be done at a scale of 1:40,000 and will be available in quarter quad coverage.

- The USGS has three coordinated readers to aid researchers in reading the three coordinate systems depicted on USGS topographic maps. The systems are latitude/longitude, state plane, and Universal Transverse Mercator (UTM). Each reader is printed on acetate and in scales of 1:24,000, 1:25,000, 1:62,500, and 1:250,000.
- The DGSCIC has been chosen as a site for the testing of a CD-ROM disk data base of the Aerial Photography Summary Record System (APRS). The USGS has transferred the entire United States APRS data base to a compact disk and contracted with DATAWARE, Inc., to write the retrieval software. The DGSCIC was one of several sites chosen to test this new information retrieval system. If successful, the USGS may consider placing more of their mainframe data bases onto CD-ROMs.

Publications

Recent DGS Publications

Delaware Geological Survey List of Publications, July 1988: J. H. Talley and D. C. Windish, 1988.

Bulletins

No. 18 Clay and clay-size mineral composition of the Cretaceous-Tertiary section, Test Well Je32-04, Central Delaware: N. Spoljaric, 1988, 28 p., 2 pls.

Special Publications

- No. 16 Generalized geologic map of Delaware (Post Card): T. E. Pickett and W. S. Schenck, 1988.
- No. 17 The Delaware Geological Survey: The formative years, 1951-1969: J. J. Groot, 1988, 28 p.
- No. 18 Cretaceous fossils from the Chesapeake and Delaware Canal: A guide for students and collectors: E. M. Lauginiger, 1988, 57 p., 9 pls.

Hydrologic Map Series

No. 6 Geohydrology of the Chesapeake and Delaware Canal area, Delaware, Sheet 2, Thickness of confining unit beneath the water-table aquifer: K. D. Woodruff, 1988, scale 1:24,000, with discussion.

Atlas Series

- Bombay Hook Quadrangle (BBH): N. Spoljaric, editor, 1988.
- Little Creek Quadrangle (LTC): N. Spoljaric, editor, 1988.
- Smyrna Quadrangle (SMY): N. Spoljaric, editor, 1988.
- Clayton Quadrangle (CLA): N. Spoljaric, editor, 1988.

Forthcoming DGS Publications

- Ground-water levels in Delaware, January 1978-December 1987: J. H. Talley.
- Dover Quadrangle (DOV) Atlas: N. Spoljaric, editor.
- Kenton Quadrangle (KEN) Atlas: N. Spoljaric, editor.

Other Publications By DGS Staff

- R. N. Benson, 1988, Seismic reflection profile across southern Delaware and Eastern Shore Maryland: basement thrusts, synrift rocks, postrift faults: Abstracts with Programs, Geological Society of America, v. 20, no. 7, p. A235.
- _____ and R. G. Doyle, 1988, Early Mesozoic rift basins and the development of the United States middle Atlantic continental margin, in W. Manspeizer (ed.), Triassic-Jurassic rifting: Elsevier, The Netherlands, p. 99-127.
- _____ and J. H. Roberts, 1988, Geologic framework of the offshore region adjacent to Delaware, in M. D. Hunt, D. C. Ratcliff, S. Doenges, and C. Condon (eds.), Proceedings of the First Symposium on Studies Related to Continental margins—A Summary of Year-One and Year-Two Activities: Minerals Management Service, U. S. Department of Interior and Continental Margins Committee, Association of American State Geologists, p. 196-208.
- R. R. Jordan, 1988, Annual 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, 1988, Delaware, in A. Socolow (ed.), The state geological surveys—a history: Association of American State Geologists, p. 70-72.

Staff Notes

Richard N. Benson, Senior Scientist, was a participant invited by a committee of the Association of American State Geologists to evaluate geologic information used in the U. S. Geological Survey and Minerals Management Service assessment of the nation's undiscovered oil and gas resources for the Gulf Coast and Eastern U. S. region, in New Orleans, LA, October 18-19.

Robert R. Jordan, State Geologist and Director, has been reappointed to the North American Commission on Stratigraphic Nomenclature for a three-year term. He will serve as a Commissioner for the American Association of Petroleum Geologists. He served as a past Chairman of the Commission. Also, Jordan was elected Editor, American Institute of Professional Geologists, beginning January 1, 1989. He is also a candidate for Secretary of the American Association of Petroleum Geologists.

William S. Schenck, Research Associate III, has been re-elected to a two-year term as chair/coordinator of State Affiliate Board and as Northeast regional representative, National Cartographic Information Center State Affiliates. On October 20, Schenck gave a presentation on maps and other cartographic information to the Stanton Middle School 6th grade classes.

Papers Presented

Richard N. Benson, "Seismic reflection profile across southern Delaware and Eastern Shore, Maryland: basement thrusts, synrift rocks, postrift faults," at 100th annual meeting of the Geological Society of America, Denver, CO, November 2, 1988.

Robert R. Jordan, "Do We Teach Geology?," at meeting of Eastern Section, National Association of Geology Teachers, West Chester University, West Chester, PA, May 21, 1988. Also, "Water Resources of Northern Delaware," Torch Club of Delaware, November 9, 1988, University of Delaware, Newark.

William S. Schenck, "We are a National Network," and "Long and Short Term Goals for the NCIC State Affiliate Program" at the 2nd National Meeting of the National Cartographic Information Center State Affiliates, Denver, CO, October 9-10, 1988. Also, "The Services of the Delaware Geological Survey Cartographic Information Center," West Chester University Chapter of Sigma Gamma Epsilon, West Chester, PA, September 26, 1988; October 21 seminar at the College of Marine Studies, Newark Campus, University.

John H. Talley, "Good Irrigation Well Construction: Getting the Water You Need" and

Kenneth D. Woodruff, "Delaware's Water Resources: Do We Have Enough for Irrigation?" at the Delaware Extension Irrigation Conference sponsored by the University of Delaware Cooperative Extension Service, November 29, 1988, Delaware Technical and Community College, Georgetown, Delaware.

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