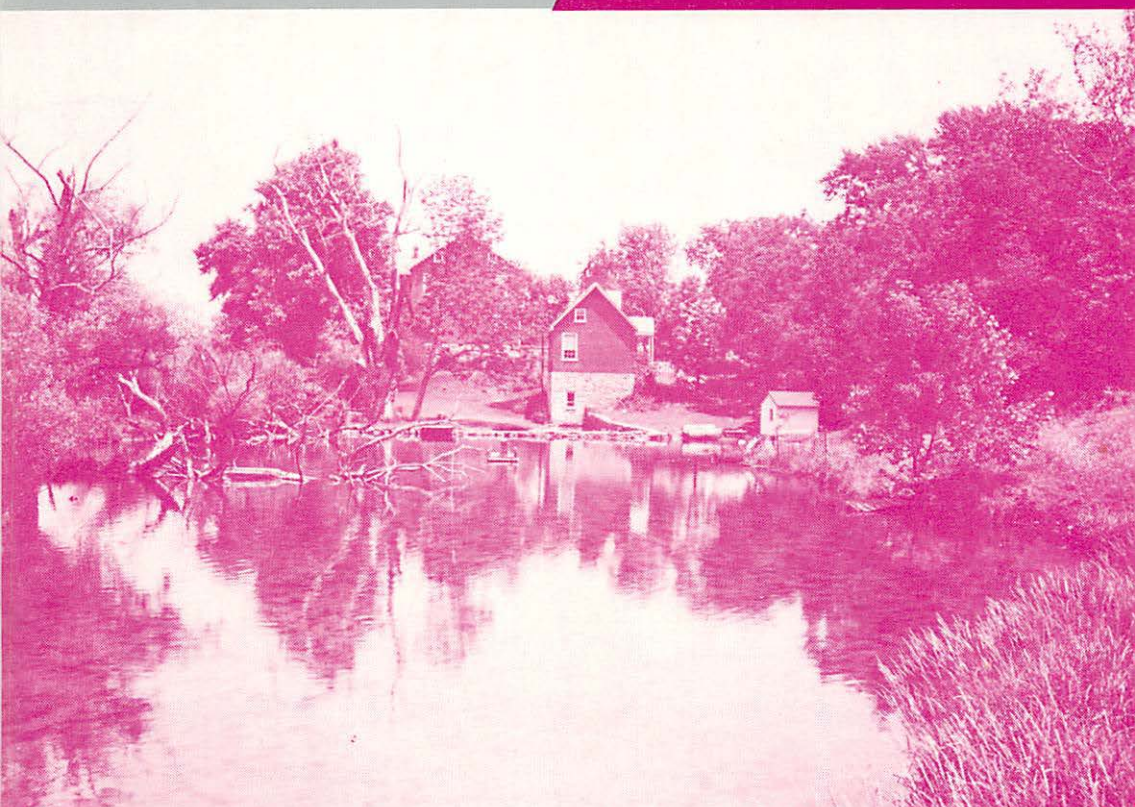


# **G E O L O G Y**

# **PENNSYLVANIA**



THE PENNSYLVANIA GEOLOGICAL SURVEY

VOL. 13/4

# COMMONWEALTH OF PENNSYLVANIA

Richard L. Thornburgh, Governor

## DEPARTMENT OF ENVIRONMENTAL RESOURCES

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### TOPOGRAPHIC AND GEOLOGICAL SURVEY

Arthur A. Socolow, State Geologist

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**ON THE COVER:** Big Spring in Washington Township, Franklin County; along Marsh Run, .55 miles north of Maryland line. Spring is along a fault contact in the Shadygrove limestone; measured flow is 2500 gpm.

**PENNSYLVANIA GEOLOGY** is published bimonthly by the Topographic and Geologic Survey, Pennsylvania Dept. of Environmental Resources, Harrisburg, Pennsylvania, 17120.

Editor, Arthur A. Socolow; Associate Editor, Donald M. Hoskins.

Articles may be reprinted from this magazine if credit is given to the Topographic and Geologic Survey.

**August 1982**

FROM THE DESK  
OF THE  
STATE GEOLOGIST...



## TWO DIFFERENT ANSWERS AREN'T ALL BAD

Science is generally considered synonymous with accuracy. Scientists are expected to provide answers that can be relied upon. The public expects it. To say "It is a scientific fact" is the ultimate truth!—or is it?

In the current issue of the journal *American Scientist* is an article entitled "Late Cretaceous Extinctions" which purports to prove that the well reknowned event in geologic history when so many vertebrate and invertebrate life forms went into extinction was really a product of gradual process, rather than a sudden catastrophic event. Yet earlier this year, other highly respected geoscientists at the AAAS meeting in Washington gave several convincing talks, one "proving" that the extinction event was due to the impact of a large meteor, and another "proving" that the extinction phenomenon was due to massive volcanic eruptions which affected the atmosphere and the ocean water quality. All of these scientists are capable, respected researchers, each dealing with the same starting set of known facts.

There are many, many other examples of scientists who arrive at differing conclusions. Some issues of unsolved scientific diversity includes the origin of our moon and our solar system, the origin of life itself, the degree to which living organisms can tolerate low-level radiation, etc.

Sometimes scientific divergence moves from the labs and campuses into the courtroom where both sides of a case may call in scientists as expert witnesses, and with the same set of facts the scientists present opposing conclusions. In so doing neither of the scientific witnesses is either lying nor incompetent.

Differing scientific conclusions are a tribute to the very creative and democratic strength of the scientific process in the ability not to be dogmatic, but rather the freedom to assess and to reassess data and evidence, and the willingness to accept new interpretations and new conclusions brought about by new evidence or newly inspired interpretations.

So if you find two geologists who have arrived at differing conclusions, don't despair. They may not both be right, or they may both be partially right. But they are practitioners of the process of hypothesizing, researching and data collecting, analysis and interpretation, followed by conclusions. The strength of science and scientists is that they are not inflexible or dogmatic, that they reflect the almost unending creative capabilities of the human mind.

*Arthur G. Socolow*

# Reorganization Effect On Geologic Survey

Just as we are going to press with this issue, it has been formally announced that effective August 9th our Division of Oil and Gas Regulation in Pittsburgh will become a separate bureau and will be transferred to a newly created Office of Environmental Energy Management within the Deputate for Environmental Protection headed by Deputy Secretary William B. Middendorf. Other bureaus under the Office of Environmental Energy Management will be Deep Mine Safety, Mining and Reclamation, and Radiation Protection.

Within the Deputate for Environmental Protection there is also being created an Office of Environmental Management, under which will operate the Bureaus of Air Quality Control, Community Environmental Control, Solid Waste Management, Water Quality Management, and Laboratories.

The Division of Oil and Gas Geology in Pittsburgh will remain as a division of our Bureau of Topographic and Geologic Survey. Our Survey continues as a bureau within the Deputate of Resources Management.

## Measuring the nation - past and present

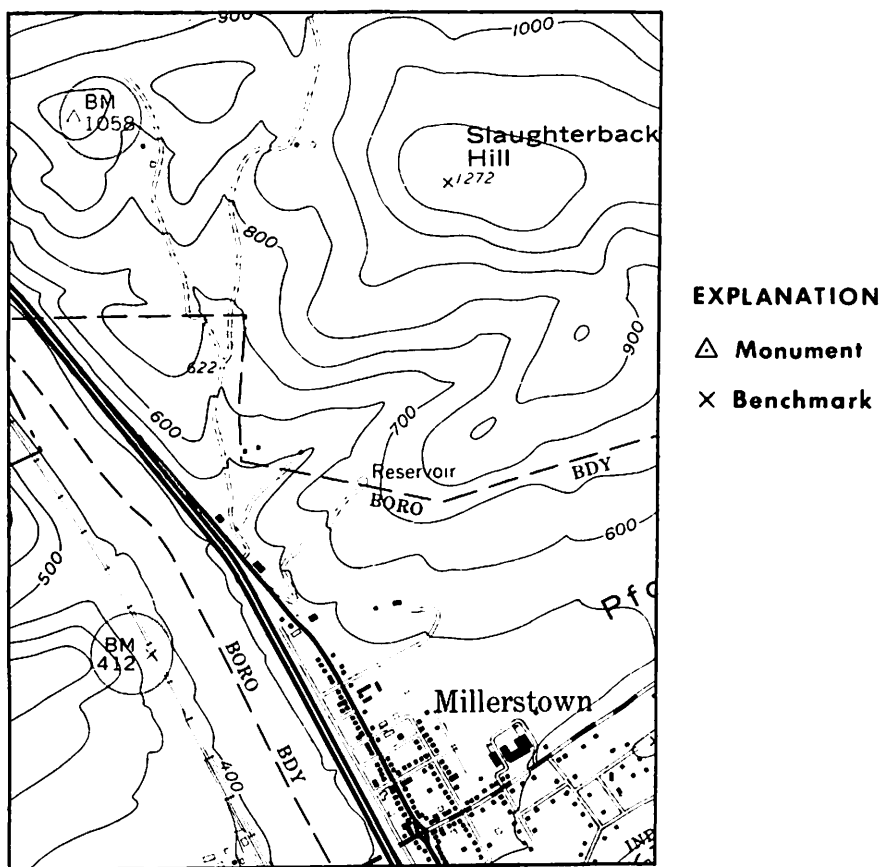
Some experts know the highest and lowest elevations in the 48 conterminous United States and the highest and lowest elevations in Pennsylvania, but how many people know how these elevations were established? How many people know how a surveyor can say a monument near Millerstown, Pennsylvania, is located precisely at latitude  $40^{\circ}37'04.6130''\text{N}$  and  $77^{\circ}10'00.6663''\text{W}$  longitude and is at elevation 1057.848 feet?

The horizontal position (the latitude and longitude) of a point and altitude above sea level (elevation) are some of the most significant information depicted by a map. This information locates the site in relation to all other places in the United States, and is called "geodetic control data".

The data for a horizontal control point consist of the latitude and longitude of the control mark, and a description of the mark. The data for a vertical control point consist of the elevation of the mark and a description of its location.

The entire country is covered with a network of geodetic control points. The control points are indicated by bronze markers or tablets which have been set in the ground. The horizontal control markers are called monuments, and the vertical markers are called bench marks. The markers may be found in varied places: the tops of remote mountains, and sidewalks of large cities. The monument northwest of Millerstown is also a bench mark. A bench mark at elevation 412 feet is due west of Millerstown.

Geodetic control data are the basis for U.S.G.S. topographic maps. Every map includes horizontal markers and vertical bench marks that exist in the area covered by the map.



Portion of the Millerstown, Pa., topographic map showing monuments and bench marks

The Department of the Treasury was assigned the task of making a survey of the entire coast of the United States in 1807. A world renowned Swiss scientist, Ferdinand Rudolph Hassler, directed the field work. Hassler's work produced the first systematic approach to surveying the country and establishing a geodetic system that could be extended nationwide. A network of horizontal control data points was developed and came to be known as the North American datum 1927.

A similar study of elevations was undertaken at about the same time and is known as the National Geodetic Vertical Datum 1929. It is still in use, as is the North American Datum 1927.

Because of natural and man induced ground movements, as well as the disruption of certain monuments, the National Geodetic Survey has decided to redefine and readjust the network to produce the North American Datum 1983. The latitude and longitude of almost all points in the United States will change slightly to reflect the correct position in relation to the entire world. A similar readjustment is planned for the vertical network and will be completed by the end of the decade.

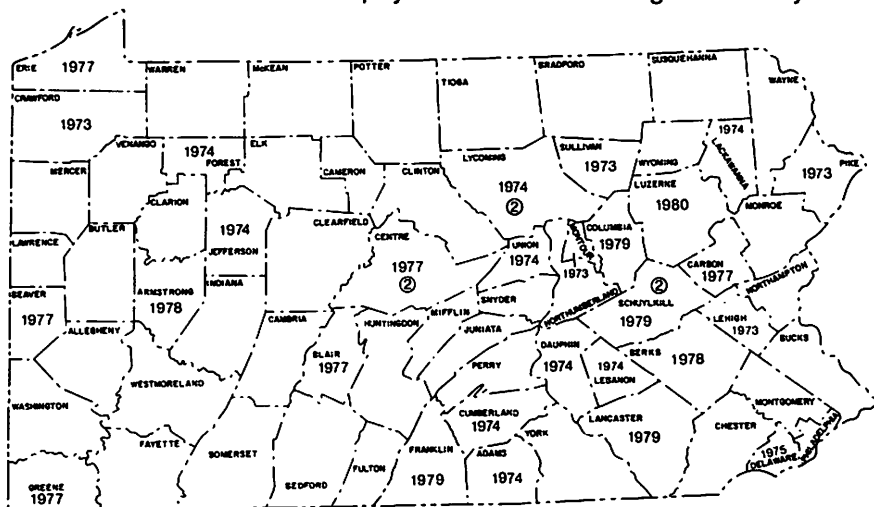
Geodetic Survey Control Lists are published by two agencies, the U.S. Geological Survey and the National Geodetic Survey. The National Geodetic Survey horizontal and vertical control data are published separately by 30-minute quadrangles. The price is determined by the number of sheets per booklet. These products may be ordered from: The Director, National Geodetic Survey, NGS Information Center C185, Rockville, Maryland 20852.

U.S.G.S. vertical control lists contain the descriptions, location, and elevation of bench marks. The horizontal control lists contain the description, geodetic and/or geographic position of transit traverse, triangulation, and electronic traverse stations. Both types of lists are assembled in 15-minute quadrangle units. To order, the area must be identified and the type of list desired. Orders may be placed directly with: Eastern Mapping Center-NCIC, U.S. Geological Survey, 536 National Center, Reston, Virginia 22092.

The Pennsylvania Geological Survey maintains a collection of the U.S. Geological Survey geodetic control lists for public use in its Library in Room 916 of the Executive House, Second and Chestnut Sts., Harrisburg.

Detailed information on this subject may be found in a pamphlet entitled "Measuring the Nation" available from the National Cartographic Information Center at the address listed above.

During the past year new county topographic maps have been published by the U.S. Geologic Survey. The maps are at a scale of 1:50,000 (approximately 400 feet to the inch). These maps are multi-colored, following the standard colors of topographic maps, with the addition of political boundaries for county, township and boroughs outlined in orange. These county maps are of widespread use to all who are concerned with county and regional planning, engineering, agriculture, and recreational projects. These maps may be obtained for \$3.25 each (\$6.50 for Centre, Lycoming, and Schuylkill) by writing to Distribution Section, U.S. Geological Survey, 1200 S. Eads Street, Arlington, Virginia 22202. Prepayment is required and check should be made payable to "U.S. Geological Survey".



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# GEOLOGICAL RESEARCH

## IN PENNSYLVANIA

1982

### INTRODUCTION

With this issue of "Pennsylvania Geology", you celebrate with us a 25th anniversary. Twenty-seven years ago we began reporting to you on the geological research activity in Pennsylvania. The first report was issued in May, 1956 as "Newsletter No. 1" and contained information on 80 separate projects. Reports were issued in all subsequent years except in 1961 and in 1972, the year of the Hurricane Agnes Flood which destroyed the Bureau offices.

In this, our silver anniversary report on geologic research, we list 89 projects. As the number of reports on research activities has grown greatly over the past quarter century plus, we have had to exercise editorial prerogative in reducing or omitting the description of some activities that were clearly not research in the classic sense of geological work that would be published, or otherwise distributed to fellow workers through normal scholarly methods. The three most active research areas over the past year were Economic Geology, Hydrology and Paleontology. When we started, the three most popular research areas were Stratigraphy, Sedimentary Petrology and Areal Geology. Mineralogy and Igneous and Metamorphic Petrology were least favored in 1956 as in 1982. That's hard rocks for you — consistently hard!

If you wish more information on a project described herein, *please write directly to the author*. Most of these projects will not be published by the Pennsylvania Geological survey inasmuch as most are not survey sponsored projects.

The ACD is the anticipated completion date, which is when the author expects to complete his or her project; additional time may elapse before the report is published or distributed.

Happy twenty-fifth anniversary reading to you!

AREAL

GEOLOGY

1956 1957 1958 1959 1960

1962 1963 1964 1965 1966

1967 1968 1969 1970 1971

1973 1974 1975 1976 1977

1978 1979 1980 1981 1982



T. M. BERG and W. D. SEVON, Pa. Geol. Survey, and ROBIN ABEL, The Pa. State Univ. Lithologic Map of Pennsylvania. This 1:500,000 map will show 18 rock units. It is a derivative map from the 1980 State Geologic Map. ACD: Late 1982.

W. R. BRICE, BRENDA HOCKENSMITH, and THOMAS MOUREY, Univ. of Pitt. at Johnstown. Loyalhanna Limestone Outcrops—Laurel Ridge, Johnstown, Pa. [Laurel Ridge, NE of Conemaugh Gap]. Loyalhanna Limestone has been found 3 km from mapped positions. The outcrops appear to be erosional windows cut through the Mauch Chunk. ACD: Aug. 1982.

J. D. INNERS, Pa. Geol. Survey. Geology and Mineral Resources of the Allenwood and Milton Quads., Union and Northumberland Cos., Pa. ACD: 1983.

P. T. LYTTLE, Project Chief, U.S. Geol. Survey. Newark 2° Quad. Reconnaissance mapping of the Piedmont portion of the quadrangle, including the Piedmont-Triassic border, will be completed in FY 1982. Areas to be mapped during FY 1982 are located on the north side of Chester Valley and between Phoenixville and Bridgeport in Pa. ACD: Sept. 1984.

S. T. PEES, Samuel T. Pees & Associates, J. C. PALMQUIST, Lawrence Univ., and J. P. VALDES, Samuel T. Pees & Associates. Application of Remote Sensing to the Geology of Northwest Pa. An illustrated lecture (35 mm slides) showing lineaments and other features detected on specially prepared landsat images, return beam vidi-con, synthetic aperture radar, VHA U-2 infrared photos and conventional flight photos. ACD: Apr. 1982.

H. A. POHN, T. L. PURDY, A. R. TAYLOR, U.S. Geol. Survey, G. W. COLTON, Ala. Geol. Survey, and G. H. CROWL, Ohio Wesleyan Univ. Geologic Map of the Jersey Shore Quad., Lycoming and Clinton Cos., Pa. The bedrock geologic map has been submitted for review to the U.S. Geol. Survey. The surficial geologic map is completed. ACD: Sept. 1982.

W. D. SEVON and T. M. BERG, Pa. Geol. Survey, L. D. SCHULTZ, Weston Geophysical Corp., and G. H. CROWL, Ohio Wesleyan Univ. Geology and Mineral Resources of Pike Co., Pa. ACD: Fall, 1982.

J. H. WAY, Pa. Geol. Survey. Geology and Mineral Resources of the Washingtonville and Millville Quads., Columbia, Montour, and Northumberland Cos., Pa. Geologic mapping of bedrock and surficial deposits, sampling materials with possible economic potential, and describing environmental and engineering characteristics of all geologic units within the area. ACD: 1982.

## ECONOMIC

## GEOLOGY

1956	1957	1958	1959	1960
1962	1963	1964	1965	1966
1967	1968	1969	1970	1971
1973	1974	1975	1976	1977
1978	1979	1980	1981	1982

K. D. ABEL, C. D. LAUGHREY, and J. A. HARPER, Pa. Geol. Survey. Oil and Gas Geology of Southwestern Pa.

S. W. BERKHEISER, JR., Pa. Geol. Survey. Reconnaissance Study of High-Purity Silica Deposits in Pa. A reconnaissance study of sedimentary, metamorphic, and igneous sources of high-purity (+ 97%) silica has been initiated to characterize their chemical and physical properties.

S. W. BERKHEISER, JR., Pa. Geol. Survey. Reconnaissance Survey of Bedded(?) Barite Showings in Western Berks Co., Pa. [Frystown area]. This reconnaissance study will attempt to identify the mineral resource potential of apparent bedded barite showings occurring in allochthonous Ordovician Martinsburg (Hamburg Sequence) rocks. Emphasis is placed on mapping lithologic associations and reconnaissance geochemistry. ACD: July 1982.

S. W. BERKHEISER, JR., Pa. Geol. Survey. Reconnaissance Survey of Potential Carbonate "Whiting" Sources in Pa. [SE Pa.]. Nineteen samples from fourteen sources ranging in age from Precambrian to Triassic, were analyzed for brightness, whiteness, and chemical characteristics. Potential economic resources have been identified in three formations of southeastern Pa. ACD: 1982.

C. B. CECIL, R. W. STANTON, F. T. DULONG, L. F. RUPPERT, S. NEUZIL, and T. MOORE, U.S. Geol. Survey. Geology of Contaminants in Coal (USGS/EPA Interagency Agreement) [western Pa.]. This is a study of geologic factors that control coal quality in the Upper Freeport coal bed. Phase I (completed) was a detailed investigation of the Upper Freeport coal reserves near Homer City, PA. Phase II (in progress) assesses the relationship between coal quality and washability in coal preparation. Phase III is a regional investigation of coal quality variation in the Upper Freeport of western Pa. ACD: Dec. 1984.

A. D. GLOVER, C. H. DODGE, J. R. SHAULIS, and V. W. SKEMA, Pa. Geol. Survey. Coal Resources of Western Pa. Data for coal-bearing

strata in Greene, Washington, and Allegheny Counties have been entered into the National Coal Resources Data System (NCRDS) computer. Information for Fayette, Westmoreland, Butler, and Cambria Counties is currently being assembled and prepared for entry into the system. This will result in computer-generated geologic and resource maps for western Pa.

E. M. HOPKINS, Univ. of Pitt. at Bradford. Correlation of Photo-Lineaments (Landsat) with Oil and Gas Production in North-Central and Western Pa. Lineaments coincide with many oil-producing trends in Pa. Those parallel to fold axes indicate brittle deformation during folding. Others trending at high angles to fold axes delineate various types of transverse faults. Exploration rationale will be investigated. ACD: Oct. 1982.

C. D. LAUGHREY, Pa. Geol. Survey. Reservoir Geology of the Athens and Geneva Gas Fields, Crawford Co., Pa. This study consists of four parts: (1) mapping the external form and trend of the reservoirs; (2) petrographic determination of composition and texture; (3) diagenetic history of the reservoir rocks and its relation to porosity and permeability; and (4) reservoir engineering parameters. ACD: June 1982.

S. T. PEES, Samuel T. Pees & Associates, and J. C. PALMQUIST, Lawrence Univ. and Samuel T. Pees & Associates. Petroleum Geology of the Medina Group in a 350 Sq. Mi. Model Area in Crawford and Mercer Cos., Pa. Illustrated text plus 14 maps, scale 1:62,500. Structure, isopachs, sand bar build-ups, channels, remote sensed data, IPF contours, cross sections, correlation diagram, fields, pools, prospective areas, pipelines, detailed geology and reservoir data. ACD: April 1982.

A. T. SMITH and A. W. ROSE, The Pa. State Univ. Geologic and Geochemical Controls on the Formation of Cu-U Red-Bed Occurrences in the Upper Devonian Catskill Formation of Pa. Regional and local stratigraphic controls have been examined. Geochemical constraints determined by fluid inclusion, isotope (C-O) and fluid flow due to compaction have been proposed. An early diagenetic model is being developed. ACD: Oct. 1982.

R. C. SMITH, II, and J. H. BARNES, Pa. Geol. Survey. Geologic and Mineralogic Interpretation of Gamma-Ray Reconnaissance Data for the Reading Prong, Easton, Pa. [portions of Berks, Bucks, Lehigh, and Northampton Cos.]. The composition and mineralogy of 60 host rocks have been determined. Gamma-ray spectrometer and magnetometer data have been obtained at the more interesting areas of uranium mineralization. ACD: 1983.

R. C. SMITH, II, Pa. Geol. Survey, and D.T. HOFF, Wm. Penn Memorial Museum. Copper-Uranium Occurrences in the Catskill Formation, Picture Rocks and Sonestown Quads., Pa. Geologic and mineralogic studies of 50 small Cu-U bearing lenses have been completed. Quantitative analyses for U, Cu, As, and Pb as well as semi-quantitative data for several others have been interpreted. Mineralogic data for some rare minerals are included. ACD: 1982.

R. W. STINGELIN, Resource Technologies Corp. Defining the Anthracite Resources of Northeastern Pa. (U.S. Dept. of Energy Contract #DE-AC01-80ET 14375). Remaining coal resource estimates are established for the Northern, Western Middle, Eastern Middle, and Southern Anthracite fields. Recoverable resources (reserves) are also estimated using conventional surface mining, underground mining, and deep open pit mining techniques. An atlas of minability using reduced U.S.G.S. quadrangle maps is included in the report. ACD: Aug. 1982.

## ENGINEERING

1956 1957 1958 1959 1960

1962 1963 1964 1965 1966

1967 1968 1969 1970 1971

## GEOLOGY

1973 1974 1975 1976 1977

1978 1979 1980 1981 1982

W. B. FERGUSSON, Villanova Univ., ALBERT DEPMAN, Consultant, and EDWARD DOHENY, Drexel Univ. Engineering and Environmental Geology of Philadelphia, Pa. ACD: Summer 1982.

J. V. HAMEL, Hamel Geotechnical Consultants, and H. M. FAUSOLD and C. E. STEVENSON, U.S. Army Corps of Engineers, Pbg. District. Bank Instability on the Monongahela River, Pa. [six sites along Monongahela River, 92 to 103 km]. Bank instability is being investigated at six sites along the Monongahela River 92 to 103 km upstream from Pbg. ACD: June 1983.

## ENVIRON- MENTAL GEOLOGY

1956 1957 1958 1959 1960

1962 1963 1964 1965 1966

1967 1968 1969 1970 1971

1973 1974 1975 1976 1977

1978 1979 1980 1981 1982

T. W. GARDNER and R. L. SLINGERLAND, The Pa. State Univ., and DONALD STUMP, U.S. Geol. Survey. Morphologic Changes of Streams with Strip-Mined Basins [Big Sandy Creek, Fayette Co.]. Baseline survey of channel hydraulic geometry has been completed. Water quality and hydrologic data are presently being taken to define the pre-mining condition. ACD: 1985.

T. W. GARDNER and K. C. N. TOUYSINHTHIPHONEXAY, The Pa. State Univ. The effect of Strip Mining on Stream Morphology. ACD: May 1982.

J. P. WILSHUSEN and H. L. DELANO, Pa. Geol. Survey. Landslide Risk Assessment, Williamsport 1° x 2° Map [north-central Pa.]. A regional landslide risk assessment map classifying landslides and landslide potential with correlation to geology, slope, and soils. Will include a text with reduced 7½-minute maps. ACD: June 30, 1983.

1956 1957 1958 1959 1960

1962 1963 1964 1965 1966

1967 1968 1969 1970 1971

1973 1974 1975 1976 1977

1978 1979 1980 1981 1982

GENERAL

GEOLOGY

J. P. FAWLEY, Westminster Coll. Mapping of Harlansburg Cave. Mapping the longest cave in Pa. ACD: May 1982.

L. B. PLATT and HERMINIO MUNIZ, Bryn Mawr Coll. Geology of Little Mountain and Surrounding Area, North of Fredricksburg, Pa. Mapping shows Upper Ordovician and/or Silurian resting on shales of the Great Valley. Work is in progress to determine the nature of the contacts. ACD: May 1982.

R. E. SHERIDAN, Univ. of Del. Comparison of Iapetus Passive Margin with Modern Atlantic Analogs [SE Pa., York and Lancaster Cos.]. Field relationships between the Cambro-Ordovician carbonate bank, carbonate fans, and ophiolitic sequences suggest an excellent comparison to modern Atlantic margins. ACD: 1984.

C. A. SHUMAN and JOSEPH GERENCHER, JR., Moravian Coll. A Multi-Variate Statistical Analysis of Selected Physical and Chemical Variables from Coals Sampled Over a Five County Region of Western Pa. [Cambria, Indiana, Armstrong, Butler, and Lawrence Cos.]. ACD: May 15, 1982.

J. P. WILSHUSEN, Pa. Geol. Survey. Geology of the Appalachian Trail in Pa. [SE Pa.]. A description of geologic characteristics of each physiographic province crossed by the trail with detailed, illustrated geologic accounts at points of interest along the route. Sketch maps, geologic cross sections, and descriptions are keyed to a geologic map of the trail. ACD: Nov. 1982.

GEO-

MORPHOLOGY

1956 1957 1958 1959 1960

1962 1963 1964 1965 1966

1967 1968 1969 1970 1971

1973 1974 1975 1976 1977

1978 1979 1980 1981 1982

T. W. GARDNER, The Pa. State Univ. Evolution and Erosion of Pleistocene Alluvial Fans in Central Pa. ACD: 1983.

KEN LAURIE, Univ. of Ill. at Urbana. Geomorphic Analysis of Paraglaciatio on the Wisconsinan Glacial Border in North-Central Pa. [Elk Grove and Red Rock quads.]. Sedimentologic data attest to a period of widespread and rapid mass wasting during the close of the last episode of glaciation. Corresponds to paraglacial deposits reported by Church and Ryder (1972) in British Columbia and Baffin Island. ACD: Sept. 1982.

NOEL POTTER, JR., Dickinson Coll. Distribution and Origin of Gravels and Colluvium in Cumberland and Franklin Cos. Continuation of mapping of thick gravels along the flanks of South and Blue Mountains, and their relations to residuum weathered from underlying carbonates and to alluvial terraces along Conodoguinet, Yellow Breeches, and Conococheague Creeks. ACD: Continuing.

G. H. THOMPSON, JR., Elizabethtown Coll. Incised River Meander Cutoffs in the Central Appalachian Region. Cutoffs attributed to intensified lateral stream activity during Pleistocene periglacial climate regimes.

E. L. WHITE and W. B. WHITE, The Pa. State Univ. Quantitative Geomorphology of the Appalachian Karst. A systematic description and measurement of surface and underground karst landforms from Pa. to Ala. and their interpretation in terms of dissolution chemistry and Pleistocene climates. ACD: 1990?

W. B. WHITE, The Pa. State Univ. Survey of Pa. Caves. The object is to compile a complete set of descriptions and maps of all caves known in Pa. ACD: 1984.

1956 1957 1958 1959 1960

1962 1963 1964 1965 1966

1967 1968 1969 1970 1971

1973 1974 1975 1976 1977

1978 1979 1980 1981 1982

## GEOPHYSICS

D. D. BRAUN, Bloomsburg State Coll., and J. D. INNERS, Pa. Geol. Survey. Geophysical Investigations of the Ten Mile Run Valley and Orangeville "Umlaufberg," Columbia Co., Pa.

W. H. DIMENT, Project Chief, U.S. Geol. Survey. Seismotectonics of Northeastern U.S. Existing geological and geophysical information that is relevant to the problem of earthquake distribution and cause in the northeastern U.S. will be integrated during FY 1982. A terrain corrected Bouguer gravity anomaly map of Pa. will be completed. ACD: Sept. 1983.

L. J. LaFOUNTAIN, D'Appolonia Geophysical Corp. Various Geophysical Surveys for Oil and Gas [Fayette, Somerset, and Westmoreland Cos.]. High-resolution and conventional surveys to explore for oil- and gas-bearing structures in western Pa. ACD: Ongoing.

F. E. SENFTLE, Project Chief, U.S. Geol. Survey. Magnetic Properties of Coal. Using samples from Pa., Ky., R.I., Ill., and Ohio, the study of change in the magnetic properties of pyrite as a function of temperature and oxidizing atmosphere will continue in FY 1982. Some measurements are also planned for illite in coal. The basic studies of chemical oxidation of anthracite will be continued in terms of charge transfer, pH, and chemical environment. A field study of the electrolytic oxidation of coal is tentatively planned in Pa., with the idea of solution mining of coal, if time and funding permit. ACD: Sept. 1982.

1956 1957 1958 1959 1960

1962 1963 1964 1965 1966

1967 1968 1969 1970 1971

1973 1974 1975 1976 1977

1978 1979 1980 1981 1982

## GLACIAL

## GEOLOGY

D. D. BRAUN, Bloomsburg State Coll. Wisconsinan Deglaciation Sequence of North Central Pa. Reconnaissance mapping of the distribution of surficial deposits, with detailed mapping of selected



areas to determine ice recessional positions between the terminal moraine and the New York State line. ACD: Continuing.

JAMES COTTER and E. B. EVENSON, Lehigh Univ., LES SIRKIN, Adelphi Univ., BOB STUCKENRATH, Smithsonian Inst., and W. D. SEVON, Pa. Geol. Survey. Deglaciation Chronology of NE Pa. and NW N.J. This project has attempted to determine the timing of the Late Wisconsinan (Woodfordian) deglaciation. A radiocarbon date of 18,570 from the base of a post-glacially formed lake has been obtained. Other dates and palynologic evidence suggest this date may accurately represent the age of deglaciation. ACD: June 1983.

J. C. RIDGE, Lehigh Univ., CARL KOTEFF, U.S. Geol. Survey, W. D. SEVON, Pa. Geol. Survey, and E. B. EVENSON, Lehigh Univ. The Surficial Geology of the Great Valley in Northampton Co., Pa., and Warren Co., N.J. Mapping according to the sequence concept has resulted in the recognition of numerous ice-marginal positions and episodes of substantial stillstands during the Woodfordian deglaciation. ACD: Dec. 1982.

## HYDROLOGY

1956	1957	1958	1959	1960
1962	1963	1964	1965	1966
1967	1968	1969	1970	1971
1973	1974	1975	1976	1977
1978	1979	1980	1981	1982

W. J. HERB and D. E. BROWN, U.S. Geol. Survey. Research Modeling in Coal Areas [Clearfield and Westmoreland Cos.]. A U.S. Geol. Survey precipitation-runoff model will be calibrated for two basins in coal areas. The model's utility in predicting hydrologic consequences of mining will ultimately be tested. Sites are presently being instrumented. ACD: Sept. 1984.

J. R. HOLLOWELL and P. B. BALLARON, Susquehanna River Basin Comm. Special Ground-Water Study of the Susquehanna River Basin. Final report by the Commission staff and summary of the findings and conclusions from 13 ground-water research projects. The projects, partially funded by the Water Resources Council, were conducted in Pa., N.Y., and Md. by participating water resource agencies. ACD: Dec. 1982.

THOMAS McELROY, Pa. Geol. Survey. The Groundwater Resources of Fayette Co., Pa. The project will provide a description and in-

ventory of groundwater resources in Fayette County. Particular emphasis is being put on the impact of coal mining on groundwater quality. Field work is completed. ACD: June 1982.

G. N. PAULACHOK, U.S. Geol. Survey. Hydrologic Investigations of the Ground-Water Resources in the Commonwealth of Pa. Objectives are to determine the quantity, quality, and availability of ground water in areas where needed information is not available or where major changes in the hydrologic system have occurred since the last study. Project will begin in Delaware County. ACD: Sept. 1984.

G. N. PAULACHOK, U.S. Geol. Survey. Water Resources of the Oley Valley, Berks Co., Pa. Objectives are to evaluate the water resources of the Oley Valley to provide basic hydrologic data on which future management decisions may be based. Stream gaging stations, observation wells, and rain gage network has been established. Water table map is in preparation. ACD: Mar. 1983.

D. W. ROYER, Pa. Geol. Survey. Summary Groundwater Resources of Lebanon Co. ACD: June 1982.

R. A. SLOTO, U.S. Geol. Survey. Impact of Urbanization on the Quality and Quantity of Ground and Surface Water in Eastern Chester Co., Pa. ACD: Sept. 1985.

L. E. TAYLOR, Pa. Geol. Survey, and WILLIAM WERKHEISER and M. L. KRIZ, Susquehanna River Basin Comm. Groundwater Resources of the Central and Upper Susquehanna River Basin, Pa. ACD: Oct. 1982.

L. E. TAYLOR, Pa. Geol. Survey, and WILLIAM WERKHEISER and M. L. KRIZ, Susquehanna River Basin Comm. Groundwater Resources of the Lower Susquehanna River Basin, Pa. ACD: Sept. 1982.

L. E. TAYLOR, Pa. Geol. Survey, and WILLIAM WERKHEISER and M. L. KRIZ, Susquehanna River Basin Comm. Groundwater Resources of the West Branch and Western Part of the Upper Susquehanna River Basin, Pa. ACD: Aug. 1982.

D. W. WILLIAMS, J. D. STONER, and others, U.S. Geol. Survey, and C. H. DODGE, Pa. Geol. Survey. The Effect of Coal Development on the Water Resources of Greene Co., Pa. Most data collection is complete with the exception of selected streamflow quantity and quality measurements and ground-water level observations. Data analysis and preliminary ground-water modeling indicate that hydrologic effects of mining may be local in extent. ACD: Sept. 1982.

C. R. WOOD, G. N. PAULACHOK, and R. A. SLOTO, U.S. Geol. Survey. Appraisal of the Ground-Water Resources of the Philadelphia Area, Pa. Objectives are to evaluate the quantity and quality of water available in aquifers underlying Philadelphia and to develop a predictive two-dimensional digital computer model of ground-water flow. Water-table map and basic data report have been completed. ACD: Sept. 1982.

<b>IGNEOUS AND METAMORPHIC PETROLOGY</b>	1956	1957	1958	1959	1960
	1962	1963	1964	1965	1966
	1967	1968	1969	1970	1971
	1973	1974	1975	1976	1977
	1978	1979	1980	1981	1982

F. H. ROBERTS, LAWRENCE MARK, and PAUL FARREL, Delaware County Christian Sch. Structural Geology and Petrology of High Grade Metamorphic Rocks between Lima and Marcus Hook, Pa. Objective is to investigate the mapped boundary between the Wisahickon Formation and the Precambrian rocks. The relationship between charnockitic and noritic rocks and apparently similar rocks northeast of Lenni is being studied. ACD: 1985?

<b>MINERALOGY</b>	1956	1957	1958	1959	1960
	1962	1963	1964	1965	1966
	1967	1968	1969	1970	1971
	1973	1974	1975	1976	1977
	1978	1979	1980	1981	1982

W. B. WHITE, The Pa. State Univ. Mineralogy of Caves. Description, trace element geochemistry, and depositional mechanism of secondary minerals from limestone caves.

<b>PALEONTOLOGY</b>	1956	1957	1958	1959	1960
	1962	1963	1964	1965	1966
	1967	1968	1969	1970	1971
	1973	1974	1975	1976	1977
	1978	1979	1980	1981	1982

P. S. BOYER, Fairleigh Dickinson Univ. Scolecodonts from the Devonian Oriskany Group, Monroe Co., Pa. Scolecodonts from the Oriskany Group have been isolated from acid residues. Descriptions will compare these with other Devonian scolecodonts from Ohio, Ky., and Mich. ACD: Summer 1983.

E. B. EVENSON, Lehigh Univ., JOHN GUILDAY, Carnegie Inst., BOB STUCKENRATH, Smithsonian Inst., and JIM COTTER, KATHY VANDERWAL, DAVE CUNDALL, and JOHN GATEWOOD, Lehigh Univ. The Paleo-Ecology of a Pleistocene Sinkhole, Hanover, PA. Radiocarbon dates, faunal assemblages, and pollen analysis have been utilized to determine the age and history of a post-Illinoian sinkhole. Radiocarbon ages of 41,800 and 37,800 years B.P. serve as minimum dates for this deposit. ACD: Dec. 1982.

J. A. HARPER, Pa. Geol. Survey. Fossils of the Pittsburgh Area—A Guide to Collecting in the Tri-State Region. A general fossil hunting guide to southwestern Pa. with limited references to Ohio, W.Va., and Md. Will list localities and known fossil species that can be found. ACD: Dec. 1982.

D. M. HOSKINS, J. D. INNERS, and J. A. HARPER, Pa. Geol. Survey. Fossil Collecting in Pa. Complete revision of General Geology Report 40. ACD: 1982.

W. F. KLOSE, II, Paleontological Research Inst. Contributions to the Pennsylvanian Age Flora and Fauna of the Anthracite and Semi-Anthracite Coal Fields of NE Pa. Collection of Pennsylvanian age flora and fauna with deposition of prepared specimens in the William Penn Memorial Museum, Harrisburg. ACD: Ongoing.

W. F. KLOSE, II, Paleontological Research Inst. Fossil Flora and Fauna of the Ross Anthracite at the Larksville Mine Fire Excavation, Luzerne Co. ACD: July 1, 1984.

W. F. KOCH, II, Waynesburg Coll. Biostratigraphy, Brachiopod Community Paleocology, and Depositional Topography of the Upper Middle Devonian Hamilton Group in the Appalachian Basin [NY, PA, MD, VA, WV, OH, Ontario, TN, KY]. ACD: 1983-84.

G. R. MCGHEE, JR., Rutgers Univ., and R. G. SUTTON, Univ. of Rochester. Late Devonian Marine Ecology and Zoogeography [along the Allegheny Front across the entire state, and in NW Pa.]. The project concerns the marine ecology and zoogeographical distribution patterns of marine animals which existed during the Late Devonian, and the response of those animals to the collapse of the ecosystem which occurred during the end of the Frasnian Epoch. ACD: Open ended.

W. A. OLIVER, Project Chief, U.S. Geol. Survey. Upper Silurian/Lower Devonian Biostratigraphic Framework of the Central Appalachians. Fieldwork in Pa., N.J., and SE N.Y. will be underway in FY 1982 in order to supplement earlier collections. A report on Manlius-Coeymans ostracodes identified during this fieldwork will be prepared. Analysis and description of stromatoporoid-facies corals is also planned. A report on the ecological aspects of Devonian corals of N.Y. will be in preparation. Analysis of worldwide Devonian rugose corals will be completed, and a report documenting the results of this study will be prepared. ACD: Sept. 1985.

W. A. OLIVER, JR., and J. M. BERDAN, U.S. Geol. Survey. Uppermost Silurian-Lower Devonian Coral/Ostracode Biostratigraphy in the Central Appalachians [Appalachians from N.Y. to Va.]. Pennsylvania part of project is a study of the systematics and distribution (stratigraphic and geographic) of corals and ostracodes in the Keyser, Decker, and Helderberg Limestones. ACD: 1984.

ALFRED TRAVERSE and N. G. JOHNSON, The Pa. State Univ., and P. K. STROTHER, Harvard Univ. Palynological-Paleobotanical Study of Primitive Land Plants in the Tuscarora Formation and Other Lower Silurian Rocks of Pa. [central and eastern Pa.]. Investigation of mostly microscopic, but some megascopic, plant remains in the lower Silurian rocks of Pa. is a continuing project of our laboratory. Studying remains of these pre-vascular embryophytic plants is important to understanding the early evolution of the land flora. ACD: Continuing.

E. L. YOCHELSON, U.S. Geol. Survey, and J. D. INNERS and J. H. WAY, Pa. Geol. Survey. Styliolines in the Middle Devonian of Pa. The small pelagic styliolines may be useful for correlation. Anyone having specimens is asked to submit them to Yochelson for identification. Are there any early Upper Devonian occurrences in the state? ACD: 1983.

	1956	1957	1958	1959	1960
	1962	1963	1964	1965	1966
SEDIMENTOLOGY	1967	1968	1969	1970	1971
	1973	1974	1975	1976	1977
	1978	1979	1980	1981	1982

EDWARD COTTER, Bucknell Univ. Sedimentology of the Tuscarora Formation [central Pa.]. ACD: Summer 1982.

A. L. GUBER and TED SHUSTER, The Pa. State Univ. Facies Analysis of the Rose Hill and Mifflintown Formations [central and western Pa.]. A geochemical, paleontological, and sedimentological approach is being used to define facies sequences, prepare facies maps, and develop facies models for the Mifflintown and Rose Hill Formations. ACD: 1984?

S. W. NEWSOM, Univ. of Delaware. A Paleogeographic Model for Middle Ordovician Lithofacies in Central Pa. [Centre, Huntingdon, Blair, and Mifflin Cos.]. Carbonates and shales of Middle Ordovician age are currently being examined, with emphasis on sedimentation processes that document the change from a carbonate to a siliciclastic depositional regime across central Pa. ACD: Dec. 1982.

D. L. WOODROW, Hobart and William Smith Coll., Shoreline Facies of the Catskill Delta in Northern and Central Pa. ACD: 1984.

D. L. WOODROW, Hobart and William Smith Coll. and DAVID DINELEY, Univ. of Bristol, England. Fishing Along the Catskill Shore: Taxonomy and Environments [north-central Pa.]. ACD: 1984.

1956 1957 1958 1959 1960

1962 1963 1964 1965 1966

1967 1968 1969 1970 1971

1973 1974 1975 1976 1977

1978 1979 1980 1981 1982

## STRATIGRAPHY

W. R. BRICE and K. M. JONES, Univ. of Pitt. at Johnstown, Mauch Chunk Marine Limestone Correlation—Clark Run—Conemaugh Gap [small stream and roadcut—Route 403 near Cramer, Pa.]. A small marine limestone in the Mauch Chunk crops out along Rte. 403 near Cramer, PA, and in Clark Run. The project will produce a detailed measured section and correlations with other Mauch Chunk sections. ACD: Aug. 1982.

W. R. BRICE, TIMOTHY PERRY, and PATRICK CRAFT, Univ. of Pitt. at Johnstown. Allegheny Group Measured Section—Rte. 56, Johnstown, PA. [Rte. 56 bypass]. Roadcuts on Rte. 56 in Johnstown, PA have exposed a good section of the Allegheny Group. The project will produce three or four measured sections and correlations with other Allegheny sections. ACD: Dec. 1982.

A. D. GLOVER, C. H. DODGE, J. R. SHAULIS, and V. W. SKEMA, Pa. Geol. Survey. TASIC (Temporarily Available Stratigraphic Informa-

tion Collection). A continuing program for recording stratigraphic data on active coal and clay strip mines while exposures are available. The ongoing project is designed to provide data for future mapping and regional mineral resource evaluation.

R. W. GOODWIN and E. J. ANDERSON, Temple Univ. Punctuated Aggradational Cycles in Limestones of the Helderberg Group, Appalachian Basin. A sedimentologic and stratigraphic analysis of the Helderberg Group applying the hypothesis of Punctuated Aggradational Cycles (PACs). The ultimate goal is to correlate small-scale time-stratigraphic rock units (PACs) throughout the Helderberg Basin and interpret the paleogeography represented by each PAC.

M. K. McINERNEY, W.Va. Univ., and T. M. BERG, D. B. MacLACHLAN, and J. H. WAY, Pa. Geol. Survey. Stratigraphic Correlation Diagram for Pa. The correlation chart has been reviewed by about 35 geologists outside the Pa. Survey, and has also been reviewed internally. Final revisions are being made, and the diagram will be published as a General Geology Report. ACD: Late 1982.

S. T. PEES, Samuel T. Pees & Associates. Cambrian Hydrocarbon Prospects, Stratigraphy and Basement Tectonics, NW Pa. Structural map on top of crystalline basement and portrayal of anomalous features in the Cambrian column. Crawford, Mercer, and Venango Counties comprise the main region of interest. ACD: Dec. 1982.

## STRUCTURAL

1956 1957 1958 1959 1960

1962 1963 1964 1965 1966

1967 1968 1969 1970 1971

## GEOLOGY

1973 1974 1975 1976 1977

1978 1979 1980 1981 1982

ERIC ERSLEV, Lafayette Coll. Element Distribution and Morphology of Solution Cleavage in the Bossardville Limestone, Pa. [Bossardsville, Pa.]. Solution cleavage in the Bossardville Limestone has been studied using S.E.M. imaging and E.D.S. analysis. Preliminary results indicate that calcite dissolved from the selvages leaving a residue of illite, quartz, and pyrite. ACD: 1983.

RODGER FAILL, Pa. Geol. Survey. Tectonic Map of Pa. Delineation of anticlines, synclines, and faults; portrayal of igneous rocks; basement contours; structure contours on Onondaga limestone in Pla-



teau; delineation of tectonic phases and lithotectonic units; unconformities; major fracture orientations; metamorphic facies; radiometric dates, earthquake epicenters; geothermal gradient; cross sections; text. ACD: Dec. 1982.

P. GEISER, Univ. of Conn., and R. D. DALLMEYER, Univ. of Ga. Collaborative Structural and Geochronologic Investigation of Alleghenian Deformational Events in the Central and Northern Appalachian Foreland [Pocono Plateau, Pa. Valley and Ridge]. ACD: July 1, 1983.

R. P. NICKELSEN, Bucknell Univ. Strain Discontinuities in the Valley and Ridge Province, Pa. Studying regional variation in finite strain of the Bloomsburg Formation using deformed green spots; bed-parallel deformation zones, and ambient temperatures during the Alleghany Orogeny using fluid inclusions in structurally dated veins. ACD: 1983.

S. T. PEES, Samuel T. Pees & Associates, J. C. PALMQUIST, SCOTT CHASE, and others, Lawrence Univ., and ANTONIO SEGOVIA, Univ. of Md. Detailed Fracture Trace Study of Portions of NW Pa. [Crawford, Erie and Mercer Cos. in particular]. Fracture traces are picked from enlarged aerial photographs and depicted on specially prepared base maps, scale 1" = 1,000'. Fracture traces are normally less than one mile in length. Fractures may advantageously affect some hydrocarbon reservoir beds. ACD: June 1982.

H. A. POHN, Project Chief, U.S. Geol. Survey. Structural Studies of Allegheny Plateau Using Remote Sensing. Mapping along the Appalachian structural front in Pa. has been completed. During FY 1982 mapping of disturbed zones in the Valley and Ridge Province in Pa. will be completed. Disturbed-zone mapping will be extended during FY 1982 to include the Appalachian structural front and the Valley and Ridge in Md. and W. Va. ACD: Sept. 1984.

H. A. POHN and T. L. PURDY, U.S. Geol. Survey. The Structure of the Appalachian Structural Front in Pa. The detailed structure of the 50 quadrangles along the Appalachian structural front has been completed. Comparisons of structural style with styles exhibited on the Appalachian Plateau and Valley and Ridge provinces is being synthesized. ACD: Fall 1982.

S. N. WILLIAMS, Indiana Univ. of Pa. A Geological Study of a Portion of the St. Marys, Pa., 7.5' Quad. A geological map of the eastern portion of the quadrangle has been completed. Significant structural control of the area has been obtained and some problem areas have been looked at with some very positive results. ACD: Apr. 29, 1982.

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## SURVEY ANNOUNCEMENTS

### SWATARA STATE PARK GUIDE

The Pennsylvania Geological Survey has just released the Swatara State Park Guide, another addition to its park guide series. Park Guide 16, written by Denise W. Royer, discusses the general geology of the Swatara Park area as well as the formation of the Swatara Gap. Geologic features are discussed including a prominent disconformity adjacent to the park area and exfoliation weathering in the Mahantango Formation. The guide also describes two excellent fossil collecting sites and includes sketches of the specimens most commonly collected at each location. This park guide is available at the Swatara State Park office and the Pennsylvania Geological Survey's office in Harrisburg.

## MINERAL & GEM SHOW

"The Central Pennsylvania Rock & Mineral Club, Inc. will hold its 17th annual Gem, Mineral & Jewelry Show in the Tile Room of the Zembo Temple, 2801 N. Third Street, Harrisburg, Pennsylvania on September 11 and 12. Hours: 11th—10 a.m.-7 p.m.; 12th—10 a.m.-5 p.m.

Exhibits by club members will include mineral specimens, fossils, spheres, jewel trees, cabachons and faceted stones, and jewelry. Club members will give demonstrations of silversmithing and lapidary work. Dealers will have minerals, fossils, gemstones, jewelry, and supplies for sale. Ample free parking."



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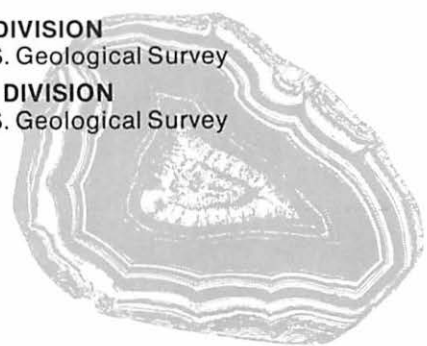

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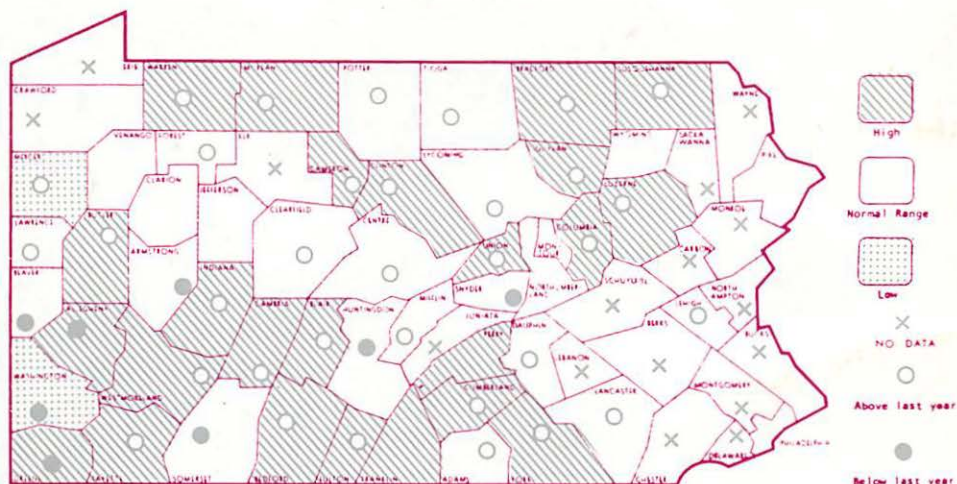
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