PENNSYLVANIA GEOLOGY

THE PENNSYLVANIA GEOLOGICAL SURVEY
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COMMONWEALTH OF PENNSYLVANIA
Milton J. Shapp, Governor

DEPARTMENT OF ENVIRONMENTAL RESOURCES
Maurice K. Goddard, Secretary

TOPOGRAPHIC AND GEOLOGICAL SURVEY
Arthur A. Socolow, State Geologist

CONTENTS

ON THE COVER: Iron furnace at Greenwood Furnace State Park, Huntingdon County. Minerals have played a large role in Pennsylvania's bicentennial history. Photo by Mark Silverman.

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AUGUST 1975

FROM THE DESK
OF THE
STATE GEOLOGIST...

WHY PENNSYLVANIA FOR URANIUM PROSPECTING

In the early and mid-1950s a considerable number of individuals and small companies searched through many parts of Pennsylvania for significant uranium occurrences. That interest was a spillover of the western uranium prospecting boom which had located so many major occurrences in Colorado and Utah. In 1957 the Pennsylvania Geological Survey undertook a study of known and potential uranium resources in Pennsylvania; the results were published as Bulletin M43, Uranium in Pennsylvania, by John McCauley. Of the 43 Pennsylvania occurrences reported at that time, only one was (for a short time) in commercial production as a source of uranium ore; at each occurrence either the ore grade was below economic limits or the indicated quantity of ore was inadequate. Yet today, in 1975, many major uranium producing companies, as well as the U.S. Geological Survey and the federal Energy Resources Development Administration, have geologists engaged in comprehensive exploration for uranium resources in Pennsylvania.

What has changed since 1957 to cause the present surge in Pennsylvania uranium prospecting? Basically, it is due to a recalculation of the nation's future need for uranium and a resulting sharp escalation in the price. In the 1960s the United States felt that its known uranium resources were adequate to fulfill its nuclear power plant needs. It was thought that by 1975 breeder reactors would begin to take over, thus reducing the need for uranium fuel. But the breeder reactor development has fallen far behind schedule and so conventional nuclear generating plants will have to continue to serve and be fueled through the 1980s. Thus, the realization that more uranium resources must be found resulted in a sharp rise in the price for the ore. Just a few years ago, uranium oxide was down to less than $7 a pound; today there are reports of as much as $30 a pound being contracted for 1980 delivery. It is small wonder then that those small, low grade uranium occurrences of Pennsylvania are being given serious attention by major uranium mining companies. New, sophisticated techniques are being utilized in prospecting for additional hidden, deep-seated uranium occurrences. Bold new theories of ore localization are being tested.

Need and price have stimulated uranium prospecting in Pennsylvania. The Pennsylvania Survey's earlier data are serving as a valuable starting base for the new exploration. It would not be at all surprising in the near future to hear of significant new discoveries in Pennsylvania.

Arthur A. Socolow

GEOLOGICAL RESEARCH IN PENNSYLVANIA 1975

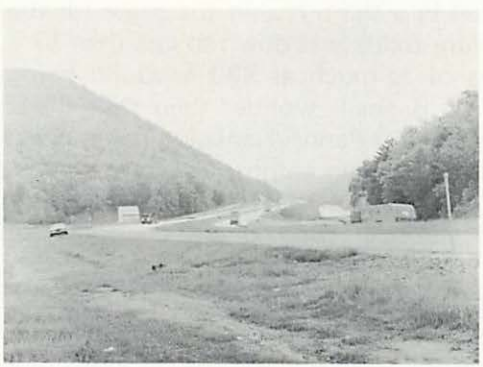
INTRODUCTION

This publication is the eighteenth annual report on Geological Research and Publications in Pennsylvania. This is an attempt to list all current geologic research in Pennsylvania and includes persons and projects other than those of the Pennsylvania Geological Survey. Because of the extensive response and large number of projects reported to us, we have had to exercise editorial license to reduce the description of the research projects to fit our available space. We have also attempted to determine an anticipated completion date (ACD) for each project. The anticipated completion date is the estimate of the date when the author will complete his report; additional time for publication should be projected.

The listings are grouped into major categories of research to facilitate your search for information on a particular subject. Publications in press are listed by author.

As with all compilations, there may be omissions; this is unintentional. Additional copies of this report may be obtained by writing to the Bureau of Topographic and Geologic Survey, Department of Environmental Resources, Harrisburg, Pennsylvania 17120.

RESEARCH IN PROGRESS



AREAL GEOLOGY

T. M. BERG, W. D. SEVON, Pa. Geol. Survey, and M. F. BUCEK, The Pa. State Univ. Geology and Mineral Resources of the Pocono Pines-Mt. Pocono Quads., Monroe Co., Pa. ACD: May 1975.

A. A. DRAKE, JR., U.S. Geol. Survey. Allentown Quad. and Vicinity [eastern Pa.]. Project temporarily recessed.

J. B. EPSTEIN, U.S. Geol. Survey, W. D. SEVON, Pa. Geol. Survey, J. D. GLAESER, City Coll. of the City Univ. of N.Y., G. G. CONNALLY, SUNY at Buffalo, and A. G. EPSTEIN, U.S. Geol. Survey. Wind Gap Area, Pa. Mapping in Saylorsburg, Wind Gap, and Kunkletown Quads. ACD: 1976.

R. T. FAILL, Pa. Geol. Survey. Geology and Mineral Resources of the Montoursville South and Muncy Quads., Lycoming, Union, and Northumberland Cos. ACD: 1976.

R. T. FAILL and R. B. WELLS, Pa. Geol. Survey. Geology and Mineral Resources of Cogan Station and Salladasburg Quads., Lycoming Co., Pa. ACD: 1975.

R. T. FAILL and R. B. WELLS, Pa. Geol. Survey. Geology and Mineral Resources of Williamsport and Linden Quads., Lycoming Co., Pa. ACD: 1975.

A. D. GLOVER, Pa. Geol. Survey, and W. A. BRAGONIER, R & P Coal Co. Geology and Mineral Resources of the DuBois 15' Quad., Jefferson and Clearfield Cos., Pa. ACD: May 1975.

A. D. GLOVER, J. H. WAY, JR., and R. T. FAILL, Pa. Geol. Survey. Geology and Mineral Resources of the Altoona 15' Quad., Blair and Cambria Cos., Pa. ACD: 1976.

D. M. HOSKINS, Pa. Geol. Survey. Geology and Mineral Resources of the Millersburg Quad., Dauphin, Northumberland, and Snyder Cos., Pa. ACD: 1975.

J. D. INNERS and R. B. WELLS, Pa. Geol. Survey. Geology and Mineral Resources of the Bloomsburg-Berwick Area. ACD: 1980.

M. T. LUKERT and A. N. WARD, Edinboro and Slippery Rock State Colleges. Geology and Engineering Geology of Oil City Quad. ACD: 1976. Part of N.S.F. project on Environmental Geology applied to Rural-Urban needs.

S. I. ROOT, Pa. Geol. Survey. Geology and Mineral Resources of the Mechanicsburg and Carlisle 7½′ Quads., Cumberland Co., Pa. ACD: 1976.

S. P. SCHWEINFURTH, U.S. Geol. Survey. Geology of the Claysville-Avella Area [Washington Co., Pa.]. In preparation: Geologic map of the Avella quad. and part of the Steubenville East quad.

W. D. SEVON, Pa. Geol. Survey. Surficial Geology of the Linden and and Williamsport Quad., Lycoming Co., Pa. ACD: 1975.

W. D. SEVON, Pa. Geol. Survey. Surficial Geology of the Salladasburg and Cogan Station Quads., Lycoming Co., Pa. ACD: 1975.

W. D. SEVON and T. M. BERG, Pa. Geol. Survey. Geology and Mineral Resources of the Skytop Quad., Monroe Co., Pa. ACD: 1975.

W. D. SEVON and T. M. BERG, Pa. Geol. Survey, and L. D. SCHULTZ, Gilbert Associates, Inc. Geology, Mineral Resources, and Environmental Characteristics of Pike Co., Pa. ACD: 1976.

R. B. WELLS, Pa. Geol. Survey. Geology and Mineral Resources of Montoursville North and Huntersville Quads., Lycoming Co., Pa. ACD: Dec. 1975.

G. H. WOOD, JR., U.S. Geol. Survey. Geology of the Southern and Eastern Middle Anthracite Fields, Pa. Project objectives are to map the complete geology of 25 quads. in the Southern and Eastern Middle Anthracite fields.

D. A. YOUNG, Univ. of N.C. at Wilmington. Geology of the Baltimore Gneiss near Philadelphia. ACD: 1978.

ECONOMIC GEOLOGY

P. C. BAZAKAS, The Pa. State Univ. at Ogontz. Lineament Analysis of Southeastern Pa. and N.J. in Relation to Location of Ore Deposits. An attempt is being made to relate lineaments on ERTS and Skylab imagery to ore deposits. ACD: June 1975.

M. J. BERGIN, U.S. Geol. Survey. Northern Anthracite Field. Work includes compilation of maps on anthracite-bearing rocks in the Kingston, Pittston, and Wilkes-Barre West quads. and field checking to complete compilation of the maps.

J. L. CRAFT, Pa. Geol. Survey. Sand and gravel resources of the upper Allegheny River, ACD: 1976.

J. M. DENNISON, Univ. of N.C. Occurrence of Oil and Gas in Appalachian Basin Related to Paleozoic Eustatic Sea-Level Changes. ACD: 1975.

J. M. DENNISON, Univ. of N.C. Nonmarine Stratigraphic Summary of Paleozoic Strata of Pa., N.Y., N.J., and Ohio and Emphasis on Factors Related to Uranium Potential. Compilation and evaluation being done on contract with ERDA. ACD: July 1975.

WALLACE deWITT, JR., L. D. HARRIS, R. L. MILLER, W. J. PERRY, JR. and L. G. WALLACE, U.S. Geol. Survey. Appalachian Basin Oil and Gas Potential. Purpose of the project is to make a regional synthesis of the basin, to study the occurrence of oil and gas in relation to stratigraphic units, their depositional and environmental history, and to the tectonic framework of the Appalachian basin. ACD: 1980.

W. E. EDMUNDS and M. A. SHOLES, Pa. Geol. Survey. Economic Geology of the Allegheny Group Coals, Brownsville-Connellsville 15' Quads., southwestern Pa. ACD: 1976.

W. E. EDMUNDS and M. A. SHOLES, Pa. Geol. Survey. Economic Geology of the Allegheny Group Coals, Freeport-Elders Ridge 15' Quads., western Pa.

R. B. FINKELMAN and HARRY KLEMIC, U.S. Geol. Survey. [No title given]. Identification of the primary uranium-bearing phase or phases in the uraniferous sandstone from Carbon Co., Pa. ACD: June 1975.

R. I. GRAUCH, U.S. Geol. Survey. Uranium Veins in the Eastern United States. Work plans are to compile maps showing nonsedimentary uranium occurrences in the eastern states. A detailed study of geologic mapping, a ground radiometric survey, and sampling of the known nonsedimentary uranium occurrence near Easton is planned.

J. C. GRIFFITHS, W. D. MENZIE, and M. LABOVITZ, The Pa. State Univ. Unit Regional Value of Natural Resources [U.S.A. in particular, S. Africa, Rhodesia]. Investigation aimed at evaluating unit regional value of earth's crust in terms of mineral resources (developed and potential). ACD: 1978.

ARTHUR JACOB, U.S. Geol. Survey. Basin Analysis of Uranium-Bearing Paleozoic Rocks in Eastern United States. Project includes field reconnaissance, detailed field and laboratory studies, literature review, and compilation of a map on uranium occurrences in the Appalachian basin.

W. S. LYTLE and LAJOS BALOGH, Pa. Geol. Survey. Oil and Gas Fields Map of Pa. The 1963 map (Pa. Geol. Survey Map 3) will be updated as of June 1975. ACD: 1975.

W. S. LYTLE, Pa. Geol. Survey, and petroleum engineers with oil companies in Pa. Updating of Mineral Resource Rept. 32, Crude Oil Reserves of Pa. ACD: 1975.

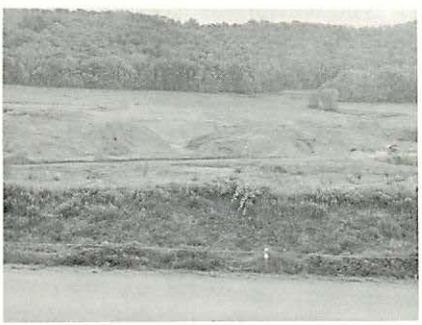
B. J. O'NEILL, JR., and Field Division, Pa. Geol. Survey. Investigations for High-Calcium Limestone for Use in Stack-Gas-Removal Systems. Objectives are threefold: (1) to sample and analyze limestone units where information is lacking, incomplete, or widely scattered; (2) to map any newly discovered high-calcium limestone unit that has a potential for commercial extraction; and (3) to synthesize the data into a publication which can be used as a guide to exploration targets. ACD: 1975.

B. J. O'NEILL, JR., Pa. Geol. Survey, and K. J. LILES, U.S.B.M. Properties and Uses of Pa. Shales and Clays—Greater Pittsburgh Region. A continuation of the series of programmed studies to evaluate the economic potential of shale-clay raw materials for ceramic and non-ceramic uses.

W. S. SILVERMAN, Univ. of Toledo. Determination of Mineralization Controls by Geochemical Analysis of Soils along Fracture Zones in the Northern Shenandoah Valley. A low-grade base metal geochemical soil anomaly has been found 20 mi. south of the Pa. State Line in W. Va. The sulfide mineralization found displays all the characteristics of the commercial "Appalachian Low Temperature Zinc Deposits." It is hoped that the data obtained can be applied up strike into Pa., finding economic targets. ACD: May 1975.

R. C. SMITH, II, Pa. Geol. Survey. Zinc-Lead Occurrences in Pa. Following location and description of sphalerite and/or galena occurrences, the samples collected are being prepared for analysis. Pure mineral separates will be analyzed for trace elements. These data are to be interpreted for economic byproduct, pathfinder, genetic, and environmental implications. ACD: 1976.

W. R. WAGNER and W. S. LYTLE, Pa. Geol. Survey. Revised Surface Structure Map of Greater Pittsburgh Area and Its Relation to Oil and Gas Fields. ACD: 1975.



ENGINEERING GEOLOGY

W. E. DAVIES, R. J. HACKMAN, VICTOR SEIDERS, and A. B. OLSON, U.S. Geol. Survey. Mined Land Reclamation—Safe Mine Waste Disposal [Appalachians]. The project involves preparation of a series of 1:250,000 scale maps indicating susceptibility to, and incidence of, slope failure. The maps will be based on photo-interpretation and field studies. ACD for Canton, Clarksburg, and Cumberland sheets is 1976-77. ACD for project is 1978.

A. J. DEPMAN, J. R. HARRIS, and R. G. LAZOR, U.S. Army Engineer Dist., Phila. Foundation Report Covering Geologic Structure—Blue Marsh Lake Project, Berks Co., Pa. Site geology and intimate geologic structures are defined as they affect the design and stability of a 100-ft.-high earth and rock fill dam. ACD: Mar. 1976.

N. K. FLINT, Univ. of Pgh., and W. R. ADAMS, JR., Allegheny Co. Planning Comm. Geologic Study of the Causes of Landsliding in Allegheny Co., Pa. ACD: 1976.

W. W. PARKER, S. R. MICHALSKI and J. P. NAIRN, GAI Consultants, Inc. Site Delineation of Coal Refuse Disposal Areas [central and northwestern Pa.]. The North-Central, Broad Top, Georges Creek, North Fringe and West Fringe of Main Bituminous Coal Fields are being investigated and mapped relative to the occurrence of coal waste disposal areas or related facilities that may pose a hazard or potential hazard to lives and/or property. ACD: May 1975.

F. E. SENFTLE, U.S. Geol. Survey. Uranium Disequilibrium Studies. Outcrop studies are underway at Penn Haven Junction to test a truck-mounted gamma-ray spectrometer for the distribution of uranium series isotopes.

C. E. TURNER, U.S. Geol. Survey. Basin Analysis as Related to Uranium Potential in Triassic Sedimentary Rocks, Eastern United States. Fieldwork is to begin in the Triassic Newark-Gettysburg basin of Pa. This includes examining, sampling, and describing known uranium occurrences and relating them to the sedimentary framework.

J. P. WILSHUSEN, Pa. Geol. Survey. Educational Series 9, Geologic Hazards in Pa. A descriptive report with some illustrations and maps to depict and locate areas of potential geologic hazards. ACD: July 1975.

ENVIRONMENTAL GEOLOGY

R. P. BRIGGS, U.S. Geol. Survey. Elements B and E through J of USGS-Appalachian Regional Commission Project: Water Resources Division, Topographic Division, and Geographic Applications Program Elements. Topographic, slope, and photo-image maps of the Monongahela River Basin; land-use change and slope maps of Allegheny Co.; and slope and land-use maps of Lycoming Co. are scheduled for completion by June 1975.

R. P. BRIGGS, U.S. Geol. Survey. Greater Pittsburgh Regional Studies. Distribute a wide variety of environmental interpretive and derivative maps, charts, and reports. Continue preparation of maps of Greater Pittsburgh region oil and gas fields, and mined-out areas, and Armstrong Co.'s overdip-slope map.

KENT BUSHNELL, Slippery Rock State Coll./U.S. Geol. Survey, and JOHN PEAK, Slippery Rock State Coll. Maps of the Pittsburgh and Upper Freeport Coal Beds, Outcrop, Overburden Mining Activity and Related Surface Subsidence, Allegheny, Washington and Westmoreland Cos., Pa. ACD: June 1975.

J. L. CRAFT, Pa. Geol. Survey. Environmental Geology related to Rural-Urban needs, Oil City Quadrangle. A N.S.F. funded project under RANN. To prepare basic geologic and interpretive maps and user-group manuals demonstrating use of geologic data in local land use decisions. ACD: 1976.

J. L. CRAFT, Pa. Geol. Survey. Overburden Thickness above the upper Freeport coal, Greater Pittsburgh Urban area. ACD: 1976.

J. R. EBY and R. R. PARIZEK, The Pa. State Univ. Geology and Ground Water Resources of the Potter Township Area, Centre Co., Pa. The project involves detailed geologic mapping and a study of the ground-water resources of Potter Township and vicinity, and will result in several maps useful to the planner. ACD: July 1975.

J. B. EPSTEIN, U.S. Geol. Survey. National Environmental Overview Program. This program is to summarize many of the characteristics and geographic distribution of earth materials and nature and extent of geologic processes in the U.S. Maps and reports will provide a geologic data base useful to the understanding of environmental problems on a national scale. Maps at a scale of 1:7,500,000 are to be published.

JACOB FREEDMAN and STEVEN SYLVESTER, Franklin and Marshall Coll. Analyses of Hair Samples for Excesses or Deficiencies of Trace Elements in Muscular Dystrophic Patients. Hair samples of healthy persons and muscular dystrophic patients analyzed so far indicate that there are differences in quantities and ratios of trace elements between the two experimental groups. ACD: Sept. 1975.

W. R. GOUGH, Moody & Assoc./The Pa. State Univ., and R. R. PARIZEK, The Pa. State Univ. The Geology and Water Resources of the Milesburg-Sayers Dam Area, Centre Co., Pa. ACD: Sept. 1975.

MOODY AND ASSOCIATES, INC. COWAMP-DER Comprehensive Water Quality Management Planning Study [34 counties in western, south-central and southeastern Pa.]. Basic inventories of existing published and unpublished data concerning geology, mineral resources, soils, ground-water availability and use, ground-water quality and land waste disposal sites have been completed during the initial year of the project for each study area. ACD: 1977.

G. H. MYER, Temple Univ. Heavy Metal Contamination of Tinicum Marsh, Phila., Pa. Diagenetic mineralogy and trace metal distribution in tidal marsh sediments over the last 50 years from approximately 20 cm cores.

J. M. WARD, B. C. ROTH, W. J. SCHETTIG, E. P. DUKE, P. A. BILZI, CHARLES WALTON, J. L. BUTLER, R. J. McELHINNY, Gwin, Dobson & Foreman, Inc. Toby Creek Mine Drainage Pollution Abatement Project SL-191 [Clarion Co.]. ACD: Dec. 1975.

J. M. WARD, B. C. ROTH, W. J. SCHETTIG, E. P. DUKE, P. A. BILZI, CHARLES WALTON, J. L. BUTLER, R. J. McELHINNY, Gwin, Dobson & Foreman, Inc. Deer Creek Mine Drainage Pollution Abatement Project SL-193 [Clarion Co.]. ACD: Dec. 1975.

GENERAL GEOLOGY

ALAN BILZI and E. J. CIOLKOSZ, The Pa. State Univ. The Genesis of Four Soils Developed in Recent Alluvium in Central Pa. Four soil profiles developed in recent alluvium were sampled for study. Radiocarbon dates will be studied and an attempt made to relate chronological age to pedological age. ACD: 1976.

E. J. CIOLKOSZ, R. P. MATELSKI, R. L. CUNNINGHAM, G. W. PETERSEN, and ROGER PENNOCK, JR., The Pa. State Univ. Classification and Genesis of Soils Developed in Floodplain and Terraces in the Jersey Shore and Muncy Areas of Pa. Eighteen soil profiles developed in terraces and floodplains at various elevations on the Susquehanna River were sampled for characterization analyses. Data will be evaluated in relation to the genesis and classification of these soils. ACD: 1975.

E. J. CIOLKOSZ, R. P. MATELSKI, R. L. CUNNINGHAM, G. W. PETERSEN and ROGER PENNOCK, JR., The Pa. State Univ. Characteristics and Genesis of Pa. Mine Soils. Twenty-two soil profiles developed in strip-mine material in western Pa. have been sampled for characterization analyses. In the summer of 1975 six additional profiles will be sampled in eastern Pa. These data will be interpreted in relation to soil genesis, soil classification, and possible land-use alternatives. ACD: 1976.

DONALD HOFF and EMILY GIFFIN, Pa. Historical and Museum Comm. Hall of Pa. Geology. Research to produce geological exhibits for the William Penn Mem. Museum, Harrisburg, Pa. ACD: Spring 1976.

S. KHOURY, J. WALLACH, J. TILLMAN, D. TRUESDELL, P. MULLER, B. ARCHER, J. FISCHER, T. GATES, Dames & Moore. Supplementary Geological Investigation [southern Lancaster Co.]. Stratigraphic, structural, and geophysical study as it pertains to nuclear power plant siting. Results of findings have led to changes in stratigraphic nomenclature and revision of structural and geophysical interpretations.

GEOCHEMISTRY

C. W. POTH, U.S. Geol. Survey. Ground-Water Quality in Pa. Between 4000 and 5000 U.S.G.S. analyses of water from about 2600 wells and springs have been computerized and will be used to give a statewide picture of ground-water quality. ACD: 1975.

A. W. ROSE, M. L. KEITH, N. H. SUHR, R. L. SCHMIERMUND, J. G. CROCK, The Pa. State Univ. Uranium Reconnaissance in Northeastern Pa. Using Geochemical Exploration. Techniques for reconnaissance detection of uranium deposits using stream sediments and waters are being tested at known occurrences. ACD: Sept. 1976.

H. A. TOURTELOT, U.S. Geol. Survey. Regional Geochemistry, Pittsburgh. This study of pollution in the Greater Pittsburgh region focuses on the naturally and technologically induced variations of chemical compositions of surficial materials and plants.

GEOMORPHOLOGY

W. B. WHITE, The Pa. State Univ. Caves of Pa. The object is to compile a complete catalog of the known caves of Pa. including description, map, and some geological interpretation. Data collection progresses on the caves of the Valley and Ridge. ACD: May 1975 (1st vol.)

W. B. WHITE and E. L. WHITE, The Pa. State Univ. Geomorphology of Appalachian Carbonate Terrains. This is a systematic investigation of the landforms and processes of all karst areas in the Appalachian Highlands from Pa. to Ala. We are devising quantitative measures of landforms, preparing detailed descriptions of selected areas or drainage basins, and attempting to relate structure, stratigraphy, and basin variables quantitatively to karst development. ACD: 1984.

GEOPHYSICS

JEFF DUNLEAVY and J. R. SUMNER, Lehigh Univ. Geophysical Investigation of the Triassic Basins. Gravity and magnetic data, combined with physical property measurements (density and magnetizations for the significant rock units), are being modelled to determine the structural framework, with special concentration over fans along northern margins of the basin. ACD: July 1975.

G. W. FISHER, Johns Hopkins Univ., M. W. HIGGINS and ISIDORE ZIETZ, U.S. Geol. Survey. Geologic Interpretation of Aeromagnetic Maps of Northeastern Appalachian Piedmont. We have been using aeromagnetic maps at a scale of 1:250,000 compiled by the U.S. Geol. Survey as a basis for regional, stratigraphic and structural interpretations of the Northeastern Piedmont. ACD: 1975.

ROBERT FLEMING and J. R. SUMNER, Lehigh Univ. Interpretation of Geophysical Anomalies over the Arcuate Appalachians. Gravity surveys over the southwestern end of the Scranton Gravity High resolve a separate high centered over New Bloomfield and connected to the main body of the gravity high by a saddle (9 mgal. relief between saddle and high). There is an associated magnetic anomaly. The preferred interpretation is a basalt sheet of Precambrian age. ACD: June 1975.

B. F. HOWELL, JR., The Pa. State Univ. Relative Seismic Hazard in the U.S. ACD: 1977.

J. C. HOWER, Ohio State Univ. Paleomagnetism of Ordovician Diabase of Lebanon Co. ACD: Fall, 1975.

P. M. LAVIN, F. J. SHAUB and DANIEL NEGRI, The Pa. State Univ. Gravity and Magnetic Studies in Pa. Current efforts are directed toward determining the structure of the Triassic Basin and the depth to basement in western Pa. ACD: 1977.

S. I. ROOT, Pa. Geol. Survey. Gravity Studies in the Gettysburg Basin of Pa. ACD: 1976.

S. I. ROOT, Pa. Geol. Survey. Magnetometer Study of the Triassic Dikes in Cumberland Co. ACD: 1976.

C. K. SCHORNBERGER, Millersville State Coll. Seismicity of Eastern Pa. A Sprengnether high-gain seismograph with a vertical short-period seismometer has been installed on the Millersville State Coll. campus. Operated in conjunction with similar instruments elsewhere in the state, this seismic system will detect and locate small earthquakes or explosions in eastern Pa. or adjacent regions.

K. W. VOLK, P. M. LAVIN, and A. W. ROSE, The Pa. State Univ. Paleomagnetism of Mesozoic Intrusives in Southeastern Pa. The paleomagnetism of diabase bodies is being used to determine the detailed late-stage tectonic history of the Triassic Basin in Pa. ACD: 1976.

ROB VAN der VOO and R. B. FRENCH, Univ. of Mich. Paleomagnetic Investigation of Paleozoic Rocks [Bedford-Lewistown, Pa.]. Samples from the Ordovocian Juniata Formation and the Silurian Clinton Formation are investigated paleomagnetically, in order to determine their directions of remanent magnetization. These directions and the corresponding paleomagnetic pole positions will be used for paleogeographic and plate tectonic analyses. ACD: 1976.

GLACIAL GEOLOGY

M. F. BUCEK, The Pa. State Univ. Pleistocene History of Williamsport and Muncy Area. ACD: 1975.

W. F. CHAPMAN, Slippery Rock State College. Glacial geology and economic resources of the Oil City Quadrangle. Part of N.S.F. project on Environmental Geology applied to Rural-Urban Areas. ACD: 1976.

D. R. COATES, SUNY at Binghamton. Quaternary Stratigraphy of N.Y. and Pa. This paper is largely a review of already published information but includes some new information and directions to be taken to solve some of the problems and correlations. ACD: June 1975.

R. G. CRAIG, The Pa. State Univ. Comparison of Patterns of ERTS-MSS and Glacial Drift [northwestern Pa.]. ACD: June 1975.

G. H. CROWL, Ohio Wesleyan Univ., W. D. SEVON and T. M. BERG, Pa. Geol. Survey, and G. G. CONNALLY, SUNY at Buffalo. The Late Wisconsinan Glacial Border in Eastern Pa. The Late Wisconsinan glacial border is now mapped from the Delaware River (Bangor quad.) to Rose Valley Lake north of Williamsport.

HYDROLOGY

E. S. BAIR and R. R. PARIZEK, The Pa. State Univ. Edgely Well Field Thermal Survey Study [Bristol, Bucks Co.]. The principal objective is to locate the zones of highest permeability in a discontinuous sand and gravel aquifer found beneath the floodplain of the Delaware River. ACD: Oct. 1975.

A. E. BECHER, U.S. Geol. Survey, and S. I. ROOT, Pa. Geol. Survey. Urban and Rural Ground-Water Hydrology in the Northern Part of the Cumberland Valley, Pa. ACD: 1976.

R. M. FOOSE, Amherst Coll. Ground Water Storage, Porosity, and Permeability in the Limestone Rocks of the Hershey Valley, Pa. Continuous hydrographs on six wells document the static water level in the limestones of the Valley.

D. J. GROWITZ, U.S. Geol. Survey. The Effect of Ground-Water Conditions on Local Flooding in the Kingston Area, Pa. ACD: Jan. 1975.

D. J. GROWITZ and R. R. BOLAM, U.S. Geol. Survey. Coal Mine Discharges in the Anthracite Fields of Pa. One main objective of the study is to gather hydrologic data for all significant sources of mine drainage during a high and low flow period. These data and other data will be used to evaluate mine drainage as a function of physiography, mining methods, time, and refuse disposal practices. In addition, the probable impact of future anthracite mining on the environment and methods of reducing any such impact will be examined. ACD: Aug. 1977.

J. H. GUSWA and R. R. PARIZEK, The Pa. State Univ. A Digital Model of the Aquifer System in the Coastal Plain Area of Southeastern Pa. The Coastal Plain area of southeastern Pa. was modeled as a multi-layered aquifer system. Simulation results support previous statements that large quantities of ground water are available to the area. ACD: Summer, 1975.

E. D. HESS, Pa. Geol. Survey. Pa. Water Well Inventory. Identification of lithologic units, positioning of wells by coordinates, and analysis of rock units as potential aquifers.

L. J. McGREEVY and R. A. SLOTO, U.S. Geol. Survey. Ground-Water Resources of Chester Co., Pa. ACD: July 1976.

E. T. SHUSTER, Pa. Geol. Survey. Hydrogeology of the DuBois Area, Jefferson and Clearfield Cos. ACD: 1976.

J. B. URBAN, U.S. Dept. of Agric., H. B. PIONKE, Research Leader, W. J. GBUREK, Research Hydraulic Engineer, A. S. ROGOWSKI, Soil Scientist, W. R. HEALD, Soil Scientist, and R. R. PARIZEK, The Pa. State Univ. Predicting Storm Runoff, Water Yield, and Water Movement in an Agricultural Watershed [North Atlantic Area]. Objective is to develop concepts and then to develop and test predictive models of water, sediment and chemical origin and transport on a watershed basis. The study areas consist of selected problem areas on land uses in the northeastern U.S. including a research watershed in central Pa.

R. K. WADDELL, JR. and R. R. PARIZEK, The Pa. State Univ. Acid and Iron Pollution Abatement. During the construction of I-80, placement of pyrite-containing fill material in a ground-water discharge area caused the production of acidic water analagous to acid mine drainage. This project includes measurement of pretreatment water chemistry, treatment by the spreading of flue dust and sawdust, seeding and mulching, and post-treatment monitoring of chemical charges. ACD: Summer 1976.

E. L. WHITE, The Pa. State Univ. Surface-Water Hydrology of Appalachian Carbonate Terrains, Centre, Mifflin, and Lehigh Cos. The object of this study is to find the relationships between surface flow in basins from 2 to 200 sq. mi. and the geologic and karst properties of each basin. ACD: June 1975.

E. L. WHITE and W. B. WHITE, The Pa. State Univ. Analysis of Limestone Spring Hydrographs [central Pa.]. Limestone springs draining open conduit aquifers are flashy; they respond rapidly to storm events. The characteristic response time (for discharge to fall to 1/e of its initial value) ranges from days to years and can be used to distinguish conduit, mixed, and fracture (diffuse) aquifers. ACD: Dec. 1975.

IGNEOUS AND METAMORPHIC PETROLOGY

A. A. DRAKE, JR., and R. I. TILLING, U.S. Geol. Survey. Petrochemistry of the Precambrian Rocks of the Reading Prong [eastern Pa., northern N.J., southern N.Y.]. Project temporarily recessed.

J. R. HUNTSMAN and W. A. CRAWFORD, Bryn Mawr Coll. Crystalline Rocks of the Wagontown 7½′ Quad. [Chester Co.]. Mapping has revealed at least two different groups of gneisses within this area—granulite gneisses associated with the anorthosite body, and banded gneisses in the southern half of the quad. ACD: 1975.

G. H. MYER and R. C. JOHNSON, Temple Univ. Metamorphic Petrology of Sillimanite Nodules, Wissahickon Schist, Phila., Pa.

MINERALOGY

A. M. ALPER, R. W. WOLFE and S. T. BULJAN, GTE Sylvania. Phosphors, Tungsten Ores and Ceramics (Cordierite and Spodumene and Silicon Nitride).

J. H. BARNES, D. M. LAPHAM, Pa. Geol. Survey, and W. F. DOWNEY, JR., Juniata Coll. Mineralogy Associated with Burning Anthracite Deposits. A report on minerals forming from sublimation of gases produced by subsurface fires in anthracite mines and culm banks in Luzerne, Schuylkill, and northern Dauphin Cos. ACD: 1975.

R. B. FINKELMAN and M. E. MROSE, U.S. Geol. Survey. Description of the first natural occurrence of SeO_2. The new mineral was found on burning culm banks in the anthracite coal region. ACD: Aug. 1975.

A. R. GEYER, R. C. SMITH, II, and J. H. BARNES, Pa. Geol. Survey. Mineral Collecting in Pa. (4th ed.). This is a complete revision of the 1969 edition of Gen. Geology Rept. 33. ACD: Fall 1975.

PALEONTOLOGY

T. M. BERG, Pa. Geol. Survey, and R. E. THOMS, Portland State Univ. Burrow Structures of *Archanodon* (Devonian) Compared with *Margaritifera* (Holocene). Thoms plans aquarium studies on *Margaritifera,* while Berg continues the search for occurrences of *Archanodon* burrows which now includes localities in Pa., N.Y., and N.J.

BRUCE CORNET and ALFRED TRAVERSE, The Pa. State Univ. Palynology, Chronology, and Paleoecology of the Newark Group Basins in the Eastern U.S. At least 260 species of palynomorphs, including many new species, have so far been recovered from Newark Group Basins. The work includes investigation of several productive sections in the Gettysburg Basin of Pa. At least five types of microspore assemblages, each spanning a different time interval, have been recognized in these basins. ACD: 1976.

KEITH MADDEN, Stockton Coll., and H. G. RICHARDS, Acad. of Natural Sciences, Phila. Study of Pa. Plants from Vicinity of Saint Clair, Pa. Study of Pennsylvanian plants to be exhibited at Stockton Coll.

W. A. OLIVER, JR., U.S. Geol. Survey. Rugose Corals of the Keyser Limestone] Pa., Md., Va., W.Va.]. Systematics and biostratigraphy; field and laboratory work are in progress and comparisons with N.Y. sequence are being made. ACD: 1980.

B. R. WILSON and ALFRED TRAVERSE, The Pa. State Univ. Palynology of Some Carboniferous Rocks of the Allegheny Plateau, Western Pa. Allegheny Plateau rock units under palynostratigraphic investigation include those generally designated Pocono Formation and uppermost Catskill Formation. To date, the Pocono has been shown to be restricted to the Tournaisian Stage (Kinderhook–Osage), and to have a lower boundary which is transitional with the Devonian System.

SEDIMENTOLOGY

J. R. BEERBOWER, SUNY at Binghamton. Upper Devonian Terrestrial Habitats as Key to Tetrapod Evolution. Investigation of sedimentary and paleopedologic features of Catskill alluvial and deltaic deposits, particularly those with associated vertebrate and plant remains. Reconnaissance has revealed new fish localities and indicates they occur in overbank (levee and crevasse-splay) deposits. ACD: 1977 or 1978.

W. E. EDMUNDS, A. G. GLOVER, V. W. SKEMA, M. A. SHOLES, T. M. BERG, J. D. INNERS, Pa. Geol. Survey. TASIC. This project (Temporarily Available Stratigraphic Information Collection) is a continuing program involved with the recovery of stratigraphic data from active coal and clay strip mines and construction sites while exposures are available. The long-term project is designed to provide data for future mapping and regional mineral resource evaluation.

R. P. ENGELDER and J. C. GRIFFITHS, The Pa. State Univ. Petrology and Petrography of Chickies Quartzite [southeastern Pa.]. The Chickies quartzite possesses considerable variation in friability. Isolation of the factors which accompany this variation is the main objective of this study. However, preliminary investigation indicates that this rock unit is an arkose rather than a quartzite. ACD: 1976.

J. S. LYNN and W. D. MARTIN, Miami Univ. The Heavy Mineral Barite of the Dunkard Group (Upper Pennsylvanian) [southwest Pa., southeast Ohio, northern W. Va.]. This thesis study is to determine the origin of barite in the quartz sandstones of the Dunkard Group. ACD: Aug. 1975.

J. B. ROEN, U.S. Geol. Survey. Geology of the Sandstone above the Pittsburgh Coal Bed, Northern Appalachian Basin, Md., Ohio, Pa., and W. Va. A study of the stratigraphy, geometry, petrology and current structures of sandstone in the lower member of the Pittsburgh Fm.

R. G. WALKER, McMaster Univ., and J. C. HARMS, Marathon Oil Co. Sedimentology of Catskill Delta [south-central Pa.].

STRATIGRAPHY

PING-FAN CHEN, W. Va. Geol. Survey. Lower Paleozoic Stratigraphy, Tectonics, Paleogeography, and Oil Possibilities in Central Appalachians. A comprehensive study based on surface and subsurface information. ACD: 1975–76.

J. M. DENNISON, Univ. of N.C. Purcell Limestone and Its Equivalents in Appalachian Basin. Purcell limestone has been traced in outcrop south to near Roanoke, Va. and north in outcrop and subsurface to N.Y. where it passes into Cherry Valley limestone (Middle Devonian). Detailed sampling in progress aims to establish contemporaneity in addition to already established physical continuity. ACD: 1976.

R. T. FAILL, D. M. HOSKINS, and R. B. WELLS, Pa. Geol. Survey. Middle Devonian Stratigraphy in Central Pennsylvania: A Revision. Recognition of upward-coarsening cyclic sequences within the Middle Devonian Mahantango Fm. has produced a greater understanding of the sedimentology of this unit, and a consequent revision of stratigraphic nomenclature to reflect the lateral facies changes. ACD: 1975.

W. E. NUNAN, Univ. of N.C. Stratigraphy and Sedimentology—Loudoun and Weverton Formations [northern Va., Md., and southern Pa.]. ACD: Aug. 1975.

STRUCTURAL GEOLOGY

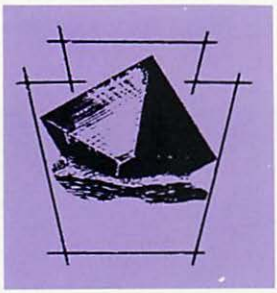
J. M. DENNISON, Univ. of N.C. Peridotites in Appalachian Basin Related to Keel-Line Fracture System. Work has just begun extending from Tenn. to N.Y. Fracture system could promote circulation of deep fluids. Has potential interest for geothermal power considerations. ACD: 1977.

R. T. FAILL, Pa. Geol. Survey. Fossil Deformation in the Valley and Ridge Province, Central Pa. Fossils throughout the province exhibit angular and shape distortions caused by a penetrative deformation. Crinoid columns have been collected and measured to evaluate this deformation. ACD: 1976.

PETER GEISER, Univ. of Conn. Dynamic and Kinematic Analysis of Pre-Folding Cleavage, Valley and Ridge Province. The foreland fold and thrust belt of central Pa. contains a pre-finite amplitude folding cleavage. The cleavage is a solution phenomena occurring in rocks ranging in age from Cambrian to Mississippian. It is presently hypothesized that the cleavage is associated with the emplacement of major thrust packages. ACD: 1978.

S. I. ROOT, Pa. Geol. Survey. Polyphase Deformation of the Martinsburg Formation, Harrisburg Area. ACD: 1976.

S. I. ROOT, Pa. Geol. Survey. Structural Geology of the Triassic Rocks in the Gettysburg Basin of Pa. ACD: 1976.



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REPORTS PUBLISHED

AMENTA, R. V., 1974, Multiple deformation and metamorphism from structural analyses in the Eastern Pennsylvanian Piedmont. Geol. Soc. America Bull., v. 85, no. 10, p. 1647-1660.

ANNE, M. L. (coordinator), 1974, Friends of mineralogy: Pennsylvania Mineral Collecting Symposium. Mineral Rec., v. 5, no. 1, p. 6-9.

BEERS, W. F., CIOLKOSZ, E. J., and KARDOS, L. T., 1974, Soil as a medium for the renovation of acid mine drainage water. Fifth Symposium on Coal Mine Drainage Research, National Coal Assoc., Washington, D.C., p. 160-171.

BLOYD, R. M., 1974, Summary appraisals of the nation's groundwater resources—Ohio Region. U.S. Geol. Survey Prof. Paper 813A.

BOLLES, WILLIAM and GEYER, A. R., 1975, Interstate 80—geologic guide. Pa. Dept. of Education.

BUCEK, M. F. and PARIZEK, R. R., 1975, Illinoian, Altonian, and Woodfordian glaciation of the West Branch, Susquehanna River, Lycoming County, Pennsylvania. Geol. Soc. America Abs. with Programs, v. 7, no. 1, p. 33-34.

CALVERT, W. L., 1974, Sub-Trenton structure of Ohio, with views on isopach maps and stratigraphic section as basis for structural myths in Ohio, Illinois, New York, Pennsylvania, West Virginia, and Michigan. Am. Assoc. Petroleum Geologists Bull., v. 58, no. 6, p. 957-972.

CARUCCIO, F. T., 1974, Predicting the chemical quality of acid mine drainage [abs.]. Eos, v. 55, no. 4, p. 251.

CIOLKOSZ, E. J., 1974, Mine soil sampling in Pennsylvania. Soil Survey Horizons, v. 15, no. 4, p. 18-20.

CIOLKOSZ, E. J., PETERSEN, G. W., CUNNINGHAM, R. L., MATELSKI, R. P., and PENNOCK, R., JR., 1974, Characteristics, interpretations and uses of Pennsylvania soils developed from cherty limestone materials. The Pa. State Univ. Agric. Exp. Sta. Prog. Rept. 341.

CIOLKOSZ, E. J. and PLETCHER, R. M., 1974, Laboratory procedures of The Pennsylvania State University Soil Characterization Laboratory. The Pa. State Univ. Agronomy Series No. 36.

CLENDENING, J. A., 1974, Palynological evidence for a Pennsylvanian age assignment of the Dunkard group in the Appalachian basin: Part II. W. Va. Geol. Survey, Coal Geology Bull. No. 3.

COOPER, F. D., 1975, The mineral industry of Pennsylvania in 1972. Pa. Geol. Survey, 4th ser., Inf. Circ. 78.

CLOOS, ERNST, 1974, Mining Cambrian limestone at Thomasville, Pa. [abs.]. Geol. Soc. America Abs. with Programs, v. 6, no. 1, p. 12–13.
COAL AGE, 1975, Pressure flushing speeds backfilling of abandoned underground mines. Coal Age, v. 80, no. 1, p. 68–70.
COATES, D. R., 1974, Reappraisal of the glaciated Appalachian plateau, *in* Coates, D. R., ed., Glacial geomorphology. Publications in Geomorphology, Binghamton, N.Y., p. 205–243.
COATES, D. R. and KIRKLAND, J. T., 1974, Application of glacial models for large-scale terrain derangements, *in* Mahaney, W. C., ed., Quarternary environments. Geographical Monograph no. 5, York University, Canada, p. 99–136.
CROWL, G. H., 1975, The style of the Late Wisconsinan glacial border in northeast Pennsylvania [abs.]. Geol. Soc. America Abs. with Programs, v. 7, no. 1, p. 42.
CUNNINGHAM, R. L., CIOLKOSZ, E. J., MATELSKI, R. P., PETERSEN, G. W., and PENNOCK, R., JR., 1974, Characteristics, interpretations and uses of Pennsylvania soils developed from colluvium. The Pa. State Univ. Agric. Exp. Sta. Prog. Rept. 344.
DENNISON, J. M., 1974, Appalachian energy resources for the future. Proc. W. Va. Acad. Sci., v. 45, p. 235–296.
deWITT, WALLACE, JR., 1974, Petroleum potential of Appalachian basin [abs.]. Am. Assoc. Petroleum Geologists Bull., v. 58, no. 9, p. 1692.
———————, 1975, Oil and gas data from the Upper Paleozoic rocks in the Appalachian basin. U.S. Geol. Survey Misc. Inv. Map I-917A.
deWITT, WALLACE, JR., PERRY, W. J., JR., and WALLACE, L. G., 1975, Oil and gas data from Devonian and Mississippian rocks in the Appalachian basin. U.S. Geol. Survey Misc. Inv. Map I-917B.
DEWINDT, J. T., 1974, Acanthodian scales from the Bloomsburg Formation (? Middle and Upper Silurian) of central Pennsylvania. Jour. Paleontology, v. 48, no. 3, p. 594–595.
ENGMAN, E. T., 1974, Partial area hydrology and its application to water resources. Water Resources Bull., v. 10, no. 3, p. 512–521.
EPSTEIN, A. G., EPSTEIN, J. B., and HARRIS, L. D., 1974, Incipient metamorphism, structural anomalies, and oil and gas potential in the Appalachian Basin determined from conodont color [abs.]. Geol. Soc. America Abs. with Programs, v. 6, no. 7, p. 723–724.
EPSTEIN, J. B., 1974, Map showing slate quarries and dumps in the Stroudsburg quadrangle, Pa.-N.J., with a description of their environmental significance. U.S. Geol. Survey Misc. Field Studies Map MF-578.

———————, 1974, Metamorphic origin of slaty cleavage in eastern Pennsylvania [abs.]. Geol. Soc. America Abs. with Programs, v. 6, no. 7, p. 724.
EPSTEIN, J. B., SEVON, W. D., and GLAESER, J. D., 1974, Geology and mineral resources of the Lehighton and Palmerton 7½-minute quadrangles, Pennsylvania. Pa. Geol. Survey, 4th ser., Atlas 195cd.
EVENSON, E. B., MYERS, P. B., and SEVON, W. D., 1975, Vadose-zone gypsum cementation of Wisconsinan kame delta gravels in eastern Pennsylvania [abs.]. Geol. Soc. America Abs. with Programs, v. 7, no. 1, p. 55.
FAILL, R. T. and WELLS, R. B., 1974, Geology and mineral resources of the Millerstown quadrangle, Perry, Juniata, and Snyder Counties, Pennsylvania. Pa. Geol. Survey, 4th ser., Atlas 136.
FINKELMAN, R. B., LARSON, R. R., and DWORNIK, E. J., 1974, Naturally occurring vapor-liquid-solid (VLS) whisker growth of germanium sulfide. Jour. Crystal Growth, v. 22, p. 159–160.
FLEMING, R. S. and SUMNER, J. R., 1975, Interpretation of geophysical anomalies over the arcuate Appalachians [abs.]. Geol. Soc. America, Abs. with Programs, v. 7, no. 1, p. 58.
GBUREK, W. J. and BROYAN, J. G., 1974, A natural non-point phosphate input to small streams, *in* Processing and management of agricultural wastes. Proc. 1974 Cornell Agric. Waste Management Conf., p. 39–50.
GOMEZ, MANUEL, DONAVEN, D. J., and KENT, B. H., 1974, Distribution of sulfur and ash in part of the Pittsburgh seam and probable mode of deposition. U.S. Bur. Mines Rept. of Inv. 7827.
HOSKINS, D. M., 1974, New fossil collecting localities in Lycoming County. Pa. Geology, v. 5, no. 5, p. 11–12.
HOWELL, B. F., JR., 1974, Seismic regionalization in North America based on Average Regional Seismic Hazard Index. Bull. Seis. Soc. America, v. 64, p. 1509–28.
INNERS, J. D., 1975, Middle Devonian fossils at Shadle, Snyder County, Pennsylvania. Pa. Geology, v. 6, no. 1, p. 7–10.
KENT, B. H., 1974, Isopach maps (1:62,500) of overburden on the Pittsburgh coal bed in southwestern Pennsylvania and northern West Virginia, 8 p., 5 pl. (covering fourteen 15-minute quadrangles). Pa. Geol. Survey, 4th ser., Open File Rept., Pbg. office; W. Va. Survey Open File Rept., Morgantown office.
LAPHAM, D. M. and GRAY, CARLYLE, 1973, Geology and origin of the Triassic magnetite deposit and diabase at Cornwall, Pennsylvania. Pa. Geol. Survey, 4th ser., Min. Resource Rept. 56.
LOVE, G. E. W., 1975, Some engineering geologic problems of reservoir siting in Pennsylvanian sedimentary terrains. Geol. Soc. America Abs. with Programs, v. 7, no. 1, p. 90.

LYTLE, W. S., 1974, Oil and gas developments in Pennsylvania in 1973. Pa. Geol. Survey, 4th ser., Prog. Rept. 187.
———————, 1974, Pennsylvania oil and gas developments in 1973. Am. Assoc. Petroleum Geologist Bull., v. 58, p. 1641–1643, 1651–1655, 1660.
———————, 1974, Pennsylvania oil and gas developments in 1973. International Oil Scouts Assoc., v. 44, Pt. I and II.
McNEAL, J. M. and ROSE, A. W., 1974, The geochemistry of mercury in sedimentary rocks and soils in Pennsylvania. Geochim. et Cosmochim. Acta, v. 38, p. 1759–1784.
MILLER, J. T. and THOMPSON, D. R., 1974, Seepage and mine barrier width. Fifth Symposium on Coal Mine Drainage Research, p. 103–127.
MILLER, R. L., 1975, Oil and gas data from the Upper and Middle Ordovician rocks in the Appalachian basin. U.S. Geol. Survey Misc. Inc. Map I-917C.
O'NEILL, B. J., JR., 1974, An industrial mineral conflict in northwestern Pa. [abs.]. Geol. Soc. America Abs. with Programs, v. 6, no. 1, p. 60–61.
———————, 1974, Greater Pittsburgh region construction aggregates. Pa. Geol. Survey, 4th ser., Mineral Resource Rept. 67.
———————, 1975, Potential high-calcium limestone resources in the Mount Joy area, Lancaster County, Pennsylvania. Pa. Geol. Survey, 4th ser., Inf. Circ. 76.
PARMELE, L. H. and JACOBY, E. L., JR., 1975, Estimating evapotranspiration under nonhomogeneous field conditions. U.S. Dept. of Agriculture, ARS-NE-51.
PARMELE, L. H. and McGUINNESS, J. L., 1974, Comparisons of measured and estimated daily potential evapotranspiration in a humid region. Jour. Hydrology, v. 22, p. 239–251.
RANNEY, R. W., CIOLKOSZ, E. J., PETERSEN, G. W., MATELSKI, R. P., JOHNSON, L. J., and CUNNINGHAM, R. L., 1974, The pH base-saturation relationships in B and C horizons of Pennsylvania soils. Soil Sci., v. 118, p. 247–253.
RITTER, J. R., 1974, The effects of the Hurricane Agnes flood on channel geometry and sediment discharge of selected streams in the Susquehanna River Basin, Pennsylvania. U.S. Geol. Survey Jour. Research, v. 2, no. 6, p. 753–761.
ROSE, A. W. and SMITH, R. C., II, 1974, Assimilation of mantle and crust in the origin of Triassic diabase magma of eastern U.S. [abs.]. Eos, v. 55, p. 460.
SCHOOLER, E. E., 1974, Pleistocene beach ridges of northwestern Pennsylvania. Pa. Geol. Survey, 4th ser., Gen. Geology Rept. 64.

SEVON, W. D., 1975, Sandstone saprolite, roundstone diamicton and the Harrisburg peneplain in eastern Pennsylvania [abs.]. Geol. Soc. America Abs. with Programs, v. 7, no. 1, p. 118.

SHOLES, M. A. and SKEMA, V. W., 1974, Bituminous coal resources in southwestern Pennsylvania. Pa. Geol. Survey, 4th ser., Mineral Resource Rept. 68.

SIDDIQUI, S. H. and PARIZEK, R. R., 1974, An application of parametric statistical tests to well-yield data from carbonates of central Pennsylvania. Jour. Hydrology, v. 21, no. 1, p. 1–14.

SMITH, R. C., II, 1974, Interesting minerals from Pennsylvania's zinc-lead occurrences. Pa. Geology, v. 5, no. 3, p. 8–9.

———————, 1974, Uranium in the Hardyston Formation. Pa. Geology, v. 5, no. 3, p. 11–12.

———————, 1974, Fetid barite from Berks County, Pa. Pa. Geology, v. 5, no. 6, p. 4–7.

———————, 1974, Zinc and lead occurrences in Bedford, Blair, and Huntingdon Counties. Pa. Geol. Survey, 4th ser., Open File Rept. 16.

———————, 1974–1975. Clues to mineral occurrences from the geological literature: (1) Uranium at Mapleton, Huntingdon County, (2) Barium and manganese east of Emigsville, York County, (3) Tin at Zerbe, Schuylkill County, (4) Copper in the Bloomsburg Formation, (5) Chamosite in the Silurian and Devonian. FM Region 3 newsletters.

STOUT, W. L. and CIOLKOSZ, E. J., 1974, VAMA stabilization of Fragipan material. Soil Sci., v. 118, p. 405–411.

TILLMAN, J. E., KHOURY, S. G., WALLACH, J. L., and ARCHER, B., 1975, A simplified classification of the Glenarm and Wissahickon in southeastern Pennsylvania. Geol. Soc. America Abs. with Programs, v. 7, no. 1, p. 125.

WALKER, R. G. and HARMS, J. C., 1975, Upper Devonian shorelines of weak tidal activity, *in* Ginsburg, R. N., ed., Tidal deposits. N.Y., Springer Verlag.

WHITE, W. B., 1974, The Appalachian karst: an overview. Proc. 5th Internatl. Congr. Speleol. Stuttgart, 1969, v. 1, paper M-13.

WOOD, G. H., JR., 1974, Geologic map of the Nesquehoning quadrangle, Schuylkill and Carbon Counties, Pennsylvania. U.S. Geol. Survey Geol. Quad. Map GQ-1132.

———————, 1974, Geologic map of the Tamaqua quadrangle, Carbon and Schuylkill Counties, Pennsylvania. U.S. Geol. Survey Geol. Quad. Map GQ-1133.

PUBLICATIONS IN PRESS

BERG, T. M., 1975, Geology and mineral resources of the Brodheadsville quadrangle, Monroe County, Pennsylvania. Pa. Geol. Survey, 4th ser., Atlas 205a.

BERG, T. M. and GLOVER, A. D., Geology and mineral resources of the northern half of the Penfield 15-minute quadrangle, Pennsylvania. Pa. Geol. Survey, 4th ser., Atlas 74ab.

CIOLKOSZ, E. J., PETERSEN, G. W., MATELSKI, R. P. and CUNNINGHAM, R. L., 1975, Soils developed from colluvium in the Ridge and Valley area of Pennsylvania. Proceedings of the 1973 International Geobotany Conf., Univ. Tenn. Press.

CLENDENING, J. A., Palynological evidence for a Pennsylvanian age assignment of the Dunkard group in the Appalachian basin: Part I, *in* Age of the Dunkard. W. Va. Geol. Survey, I. C. White Mem. Proc. Vol.

CORTIS, S. E., ALEXANDER, T. B., EDMUNDS, W. E., and CRAFT, J. L., 1975, Greater Pittsburgh Region maps of mined-out areas and thickness of rock over the Pittsburgh coal. Pa. Geol. Survey, 4th ser., Map 45.

DENNISON, J. M., 1975, Appalachian Queenston delta related to eustatic sea-level drop accompanying Late Ordovician glaciation centered in Africa. Proceedings volume for Ordovician Systems Symposium, Paleontological Assoc.

EPSTEIN, A. G., EPSTEIN, J. B., and HARRIS, L. D., 1975, Conodont color alteration—an index to diagenesis of organic matter [abs.]. Am. Assoc. Petroleum Geologists.

FAILL, R. T., Structural analysis of the Valley and Ridge province. Pa. Geol. Survey, 4th ser., Gen. Geology Rept.

FREEDMAN, JACOB, ed., Trace element geochemistry in health and disease. Geol. Soc. America Special Paper 155.

GLASS, G. B., EDMUNDS, W. E., INNERS, J. D., and SHOLES, M. A., Geology and mineral resources of the Ramey and Houtzdale 7½-minute quadrangles. Pa. Geol. Survey, 4th ser., Atlas 85cd.

HARRIS, L. D., 1975, Oil and gas data from the Lower Ordovician and Cambrian rocks of the Appalachian basin. U.S. Geol. Survey Misc. Inv. Map I-917D.

HASSON, K. O. and DENNISON, J. M., 1975, The Pokejoy Member, a new subdivision of the Mahantango Formation (Middle Devonian) in West Virginia, Maryland, and Pennsylvania. Proc. W. Va. Acad. Science.

HEYMAN, LOUIS, Middle Devonian to Ordovician (Queenston) subsurface stratigraphy. Pa. Geol. Survey, 4th ser., Prog. Rept. 185.

HOLLOWELL, J. R. and KOESTER, H. E., 1975, Ground-water resources of Lackawanna County, Pennsylvania. Pa. Geol. Survey, 4th ser., Water Resource Rept. 41.

HOWELL, B. F., JR. and SCHULTZ, T. R., Attenuation of seismic hazard with distance in North America. Bull. Seis. Soc. America.

JACOBEEN, F. H., JR. and KANES, W. H., Structure of the Broad Top synclinorium and the contiguous Wills Mountain anticlinorium and the Allegheny frontal zone. Am. Assoc. Petroleum Geologists.

JOHNSON, R. C., MYER, G. H., and ADAMS, J. K., 1975, Sillimanite nodules in the Wissahickon schist, Philadelphia, Pennsylvania. Jour. of the Pa. Acad. of Sciences.

LAPHAM, D. M., 1975, Interpretation of K-Ar and Rb-Sr isotopic dates from a Precambrian basement core, Erie County, Pennsylvania. Pa. Geol. Survey, 4th ser., Inf. Circ. 79.

LYTLE, W. S., 1975, Oil and gas developments in Pennsylvania in 1974. Pa. Geol. Survey, 4th ser., Prog. Rept. 188.

LYTLE, W. S. and BALOGH, LAJOS, 1975, Greater Pittsburgh Region oil and gas fields map. Pa. Geol. Survey, 4th ser., Map 44.

MacLACHLAN, D. B., BUCKWALTER, T. V., and McLAUGHLIN, D. B., 1975, Geology and mineral resources of the Sinking Spring quadrangle, Berks and Lancaster Counties, Pennsylvania. Pa. Geol. Survey, 4th ser., Atlas 177d.

McGLADE, W. G., Environmental geology of the Harrisburg area. Pa. Geol. Survey, 4th ser., Environ. Geology Rept. 4.

MYER, G. H. and ADAMS, J. K., 1975, The Hellam conglomerate in eastern Pennsylvania. Pa. Acad. Sci. Proc., 51st Ann. Mtg.

NEWPORT, T. G., Summary ground-water resources of Luzerne County, Pennsylvania. Pa. Geol. Survey, 4th ser., Water Resource Rept. 40.

O'NEILL, B. J., JR., 1975, The distribution of limestones containing at least 90 percent $CaCO_3$ in Pennsylvania. Pa. Geol. Survey, 4th ser., Inf. Circ. 80.

PENNSYLVANIA GEOLOGICAL SURVEY, 1975, Base map of Pennsylvania, 2d ed., scale 1:250,000. Pa. Geol. Survey, 4th ser., Map 41.

RANNEY, R. W., CIOLKOSZ, E. J., CUNNINGHAM, R. L., PETERSEN, G. W., and MATELSKI, R. P., 1975, Fragipans in Pennsylvania soils: Properties of bleached prism face materials. Proc. Soil Sci. Soc. America.

REICH, J. R., JR., compiler, 1975, Caves of southeastern Pennsylvania. Pa. Geol. Survey, 4th ser., Gen. Geology Rept. 65.

SCHINER, G. R. and KIMMEL, G. E., Water resources of northern Mercer County, Pennsylvania. Pa. Geol. Survey, 4th ser., Water Resource Rept. 33.
SCHWEINFURTH, S. P., 1975, Geologic map of the West Middletown quadrangle and part of the Bethany quadrangle, Pennsylvania. U.S. Geol. Survey Misc. Inv. Map I-871.
SEVON, W. D., 1975, Geology and mineral resources of the Christmans and Pohopoco Mountain quadrangles, Carbon and Monroe Counties, Pennsylvania. Pa. Geol. Survey, 4th ser., Atlas 195ab.
———————, 1975, Geology and mineral resources of the Hickory Run and Blakeslee quadrangles, Carbon and Monroe Counties, Pennsylvania. Pa. Geol. Survey, Atlas 194cd.
———————, 1975, Geology and mineral resources of the Tobyhanna and Buck Hill Falls quadrangles. Monroe County, Pennsylvania. Pa. Geol. Survey, 4th ser., Atlas 204ab.
SKEMA, V. W. and others, 1975, Analyses and measured sections of Pennsylvania bituminous coals, Part II. Pa. Geol. Survey, 4th ser., Min. Resource Rept. 69.
SMITH, R. C., II, ROSE, A. W., and LANNING, R. M., 1975, Geology and geochemistry of Triassic diabase in Pennsylvania. Geol. Soc. America Bull., v. 86.
TESMER, I. H., Geology of Cattaraugus County, New York. Buffalo Soc. of Natural Sciences, v. 27.
UNITED STATES GEOLOGICAL SURVEY and PENNSYLVANIA GEOLOGICAL SURVEY, 1975, The ground-water program for Pennsylvania, 2d ed. Pa. Geol. Survey, 4th ser., Inf. Circ. 7.
WAGNER, W. R., 1974, Growth faults in the Cambrian and Lower Ordovician rocks of western Pennsylvania. Am. Assoc. Petroleum Geologists Bull.
WAGNER, W. R., CRAFT, J. L., HEYMAN, LOUIS, and HARPER, J. A., 1975, Greater Pittsburgh Region geologic map and cross sections. Pa. Geol. Survey, 4th ser., Map 42.
WAGNER, W. R., HEYMAN, LOUIS, CRAFT, J. L., EDMUNDS, W. E., and HARPER, J. A., 1975, Greater Pittsburgh Region structure contour maps. Pa. Geol. Survey, 4th ser., Map 43.
WHITE, W. B. and WHITE, E. L., Base level control of underground drainage in the Potomac River basin. Proc. 4th Karst Conference, Morgantown, West Virginia, May 1974. W. Va. Geol. Survey.
WOOD, G. H., JR., 1974, Geology of anthracite in the south half of the Delano quadrangle, Schuylkill County, Pennsylvania. U.S. Geol. Survey Misc. Inv. Map I-737.
———————, 1974, Geology of anthracite in the Tamaqua quadrangle, Carbon and Schuylkill Counties, Pennsylvania. U.S. Geol. Survey Misc. Inv. Map I-809.

SURVEY ANNOUNCEMENTS

CORRECTION #1

Information Circular 76, "Potential High Calcium Limestones in the Mt. Joy area. . . ", listed in Vol. 6/3 p. 9 as selling for $1.50 actually will cost $1.95 plus 6% sales tax for Pa. residents.

CORRECTION #2

The April 1975 issue of "Pennsylvania Geology," page 8, listed the wrong address from which to order two new U.S.G.S. maps. The correct address is Branch of Distribution, U.S. Geological Survey, 1200 S. Eads St. Arlington, Va. 22202.

U.S.G.S. OPEN FILE ON URANIUM IN PENNSYLVANIA

The Pennsylvania Survey is pleased to announce an open file map by H. Klemic and M. Cooper of the U. S. Geological Survey on "Airborne radioactivity of parts of Carbon, Schuylkill, and Monroe counties, Pennsylvania." In addition to U.S.G.S. depositories, the Pennsylvania Survey has a hand-colored copy of Open File 75-91 for examination at its Executive House offices.

Despite a lack of correction of the radioactivity readings for elevation and detector lag, the map data appear useful for reconnaissance purposes. A brief examination of the data shows that the recorded radioactivity occurs over bedrock where there is little or no surficial cover; thick surficial cover of soil or glacial sediments may mask radioactive anomalies of the bedrock.

Although the known Mount Pisgah uranium occurrences did not show up very well on the U.S.G.S. radioactive maps, several other general areas of interest appear on the maps. However, they may represent many things other than mineable uranium orebodies.

STRATIGRAPHIC SECTIONS OF WESTERN MIDDLE ANTHRACITE FIELD ON OPEN FILE

The Pennsylvania Survey has received from Dr. Richard Bergenback, of the University of Tennessee at Chattanooga, a copy of a report on stratigraphy of Pennsylvania Period rocks in the Western Middle Anthracite Field. This report consists of a 7-page text and 4

plates containing described sections of the rocks in the lower part of the Pottsville and upper part of the Mauch Chunk Formations prepared while Dr. Bergenback was a member of the U.S.G.S. mapping team in the anthracite fields in 1950.

Microfilm copies are available free upon request to the Pennsylvania Geological Survey, P. O. Box 2357, Harrisburg, Pa. 17120, or the report may be inspected in the offices of the Survey, 914 Executive House, Second and Chestnut Streets.

LAND USE STUDY OF PENNSYLVANIA UNDER WAY

Detailed land use maps of the entire Commonwealth of Pennsylvania are being prepared by the U.S. Geological Survey under an agreement between the federal agency and the Pennsylvania Department of Environmental Resources. In announcing the signing of the project agreement, Environmental Resources Secretary Dr. Maurice Goddard noted that Pennsylvania will be one of the first states in the country to have complete land use map coverage under the sophisticated new system devised by the U.S. Geological Survey.

Utilizing the latest available photo imagery from high altitude reconnaissance planes and from satellites, the U.S. Geological Survey's electronic scanning equipment will delineate and map 36 separate land use categories. Land use can be detected and classified for areas as small as 10 acres. The final scale of the maps in preparation will be 1:250,000 or approximately one inch on the map equal to four miles on the ground.

One of the most important aspects of the U.S. Geological Survey mapping system is that the map data will be digitized so that it can be stored in a computer, reproduced, evaluated and analyzed in various ways, and readily updated as newer land use data becomes available in future years. Changes in land use will be identifiable, both as to type and quantity. With the land use data being digitized, it will be possible to feed into the system and print overlays of other mappable data, such as political and natural boundaries, and distribution of natural resources. Once completed, the land use maps and data bank will not only indicate present land uses, but will become a valuable aid for anyone involved in comprehensive land use planning.

The U. S. Geological Survey Land Use Data Analysis program (LUDA) was introduced and demonstrated last year at the annual meeting of the American Association of State Geologists. Impressed with the potential benefits that the U.S.G.S. system might provide for the Commonwealth, Pennsylvania State Geologist Arthur Socolow helped to establish liaison between the U.S.G.S. and DER's Bureau of Environmental Master Planning and the Bureau of Systems Analysis. The result is the DER-sponsored land use mapping herein described. The U. S. Geological Survey aims to complete the land use mapping project late in 1976.

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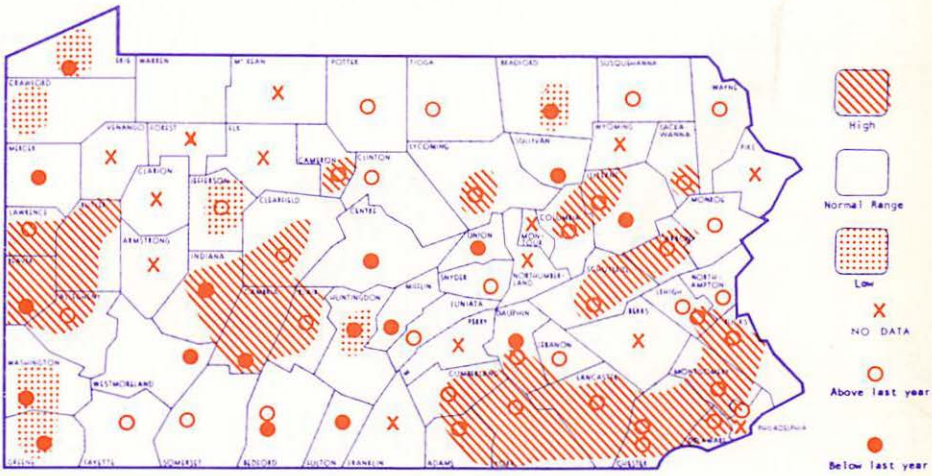
JULY 1975

GROUND-WATER LEVELS



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