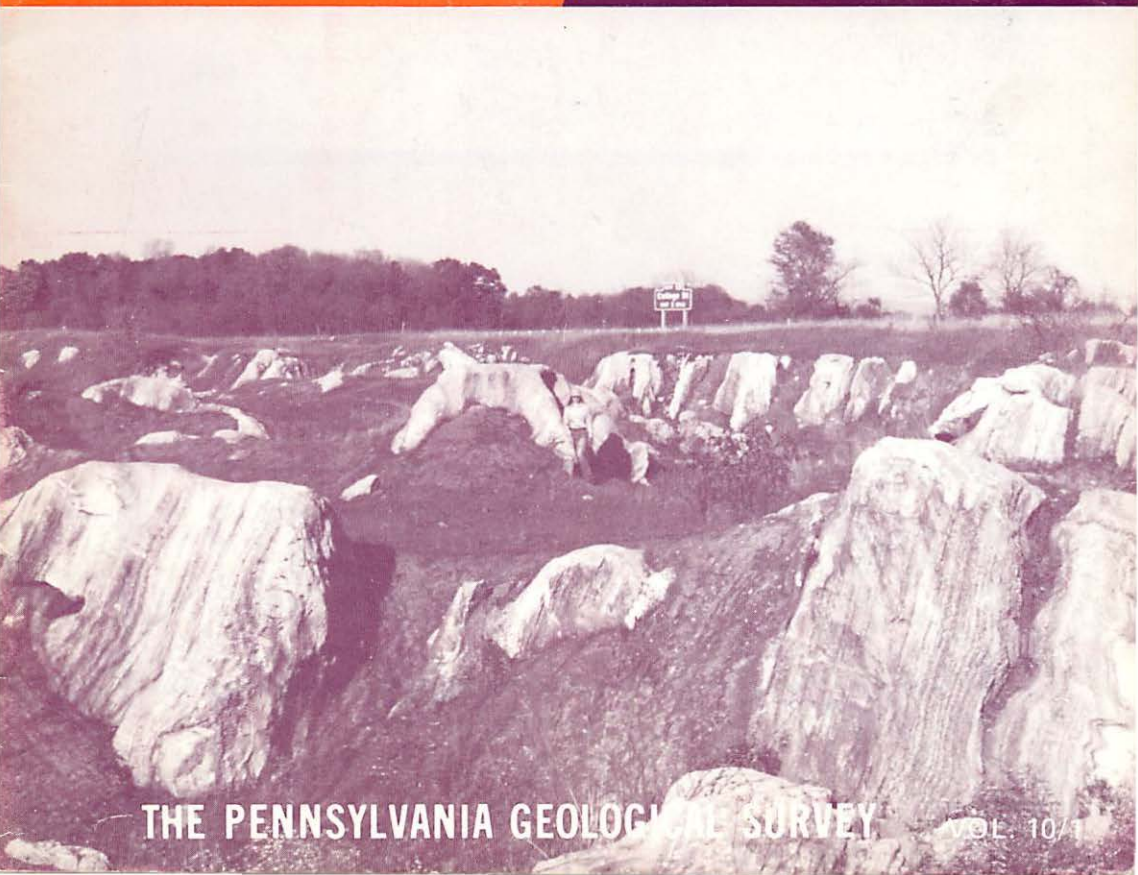
PENNSYLVANIA GEOLOGY



THE PENNSYLVANIA GEOLOGICAL SURVEY VOL. 10/1

COMMONWEALTH OF PENNSYLVANIA
Dick Thornburgh, Governor

DEPARTMENT OF ENVIRONMENTAL RESOURCES
Clifford L. Jones, Secretary

TOPOGRAPHIC AND GEOLOGICAL SURVEY
Arthur A. Socolow, State Geologist

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ON THE COVER: Pinnacle weathering developed on limestone along I-81 in Cumberland County, 5 miles southwest of Carlisle. Photo courtesy of Pennsylvania Historical and Museum Commission.

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

FEBRUARY 1979

FROM THE DESK
OF THE
STATE GEOLOGIST . . .

THE NUMBERS GAME

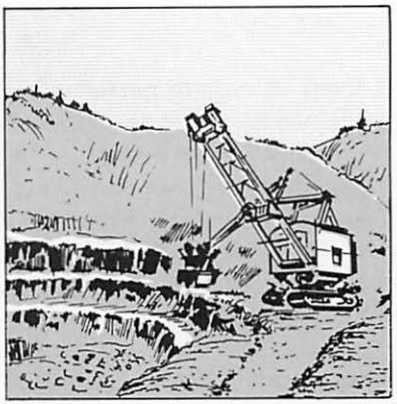
Even as we are participating in an assessment of our future computer needs, I wonder about the trend to force geologic observations into the numbers needed to satisfy the monster machines. It wasn't always that way. If one reads the classic tomes that were issued by the geologic greats of the 1800's and early 1900's there are certain qualities of communication, inspiration, and romance in the descriptions they offered which are missing in today's cold, quantitative reports. Were those geologic investigators of yesteryear less the scientists for their style of reporting? Do the hard numbers we pursue today throughout our society necessarily serve us better?

Of course, quantification is a valuable tool, but hopefully not at the expense of qualitative expression, the beauties of nature, and human values. The quantification which pervades our society has brought us such recent "classics" as the decision by a federal agency not to initiate flood controls along the Susquehanna River due to computed "unfavorable cost-benefit ratio!" And there are also the management techniques of calculated budget-productivity ratios which tend to overlook the elements of quality and of response to human needs; shades of Charlie Chaplin's "Modern Times."

As we move to further utilize the computers, I would hope that they will be our servants, and not our masters. As we function in an era which calls upon us to respond by numbers, my hope is that we shall not lose our appreciation for quality, beauty, and the needs of people and nature.

Arthur A. Socolow

Some Interesting Notes on the Minerals Industry of Pennsylvania



A recent report prepared by the U.S. Bureau of Mines, updated in part by the Pennsylvania Geological Survey, provides some interesting information concerning the mineral industry of Pennsylvania.

The mining industry in Pennsylvania presently directly employs approximately 45,000 persons. Although they represent only a small percentage of the State's population, these workers are a vital force in our society. Together they produce a variety of minerals needed to support the manufacturing and construction industries which are so essential to our way of living.

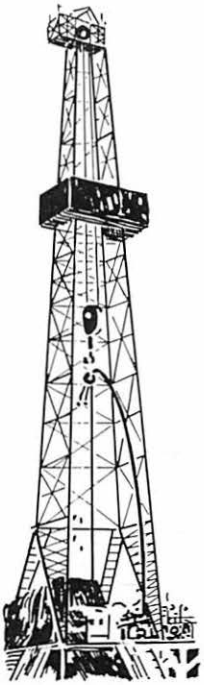
Statistics for 1977 show that Pennsylvania ranks first among the states in the production of anthracite coal and stone, 2nd in lime, masonry cement, and fire clay, 3rd in portland cement, bituminous coal, and peat, 6th in natural abrasives, 7th in crude mica and zinc, 9th in common clay, 10th in kaolin, iron ore, and industrial sand and gravel, 13th in copper, 15th in construction sand and gravel, 22nd in natural gas liquids, 24th in crude petroleum production, and 27th in the value of semi-precious stones.

Bituminous coal accounted for over 70 percent of the $3.2 billion credited to mineral production in the State in 1977. Plans by industry for new surface and underground mines should increase those figures in the future. Although Washington, Indiana, and Clearfield were the three leading counties in the State in bituminous coal production in 1977, Greene County, with 12 major underground mines planned, may become the "numero uno" county for coal production in the future.

Over half the coal consumed annually in Pennsylvania is used to generate electricity, placing the State third in the Nation as a producer of electric energy. Pennsylvania's 1975 installed electrical capacity showed coal accounting for 63 percent of the total, oil 18 percent, nuclear 14 percent, and hydro 5 percent. However, power

production does not necessarily correspond to the installed capacity, and owing to fuel costs, shutdowns, repairs and various maintenance stoppages, coal actually supplied 77 percent of the State's electric generating needs, nuclear 15 percent, oil 7 percent, and hydro 1 percent. Apparently the State's generating capacity is evolving toward a coal-nuclear mix from its former coal-oil-gas-combination.

Production of anthracite coal in 1977 was approximately 6 million tons, with brighter prospects for this industry indicated in a recent report by Berger Associates who predict the potential market may reach 17 million tons by 1990. One electric power company recently had under consideration a large-scale open pit mining system within the Pennsylvania anthracite region.



Since 1859, the year the Drake well, this Nation's first oil well, was drilled in Pennsylvania, over 240,000 oil-producing wells have been drilled in the State. Of these, 28,400 were still producing in 1977 at an average rate of 0.26 barrel per day, making Pennsylvania the 24th leading producing state in the Nation, even though most of the wells fall into the category of "stripper wells." (A stripper well is one which produces less than 10 barrels per day.)

Natural gas provided 17 percent of the State's energy requirements in 1975. Of the gas used in the state, residential customers use about 42 percent, industry 40 percent, commercial 15 percent, and other uses the remaining 3 percent. At the end of 1977, the number of gas producing wells in Pennsylvania approximated 17,900. Leading counties both in gas production and new gas wells drilled were Indiana, Westmoreland, Jefferson, and Clearfield Counties. Although consumption of natural gas decreased somewhat between 1972 and 1975, it began a comeback in 1976, and should increase further in the future due to: (1) additional supplies being made available by transmission companies; (2) the availability of liquefied natural gas; (3) more competitive pricing; (4) the possibility of discovering gas in Lake Erie; (5) the technology of degasification of virgin coal seams, and; (6) technology related to the development of organic-rich shales of Devonian age in Pennsylvania.

The five most energy-intensive industrial groups in Pennsylvania

are: (1) stone, clay, and glass; (2) primary metals; (3) petroleum and coal; (4) paper and allied products; and (5) rubber and plastics. Collectively, these industries use almost 65 percent of Pennsylvania industry's share of energy, although they employ only about 26 percent of the State's manufacturing workers. While a decrease in energy flow to these energy-intensive industries would have little immediate effect on statewide employment, production shortages in these industries would have a devastating effect on almost every other industry. Virtually every industry in Pennsylvania relies on the products of at least one of these industries as an input into its own production processes.

Persons interested in obtaining a free copy of the U.S. Bureau of Mines report should request it from Publications Distribution Branch, U.S. Bureau of Mines, 4800 Forbes Avenue, Pittsburgh, PA 15213. The report is identified as SMP-37, titled "Minerals in the Economy of Pennsylvania," and is dated September, 1978.

Survey Offers National Map Information

The Pennsylvania Geological Survey has formalized an agreement which will greatly increase its ability to provide the public with information on the availability of maps, aerial photographs, space images, and other cartographic products produced by federal, state and private agencies. Pennsylvania is one of the first eastern states to sign a cooperative agreement to join with the National Cartographic Information Center (NCIC) headquartered at the U.S. Geological Survey in Reston, Virginia.

The NCIC is specifically dedicated to hunt for, organize, and distribute information on the existence and availability of cartographic products. At the Pennsylvania Survey this cartographic reference material will be available through the Survey's geology library. A total of 18 types of multi-use maps and charts are accessible through the NCIC system, as well as five kinds of geodetic survey data and four types of aerial and space imagery.

The eventual plan is to tie the geologic library in Harrisburg by computer terminal to the main NCIC computers in Reston and at Sioux Falls, South Dakota.

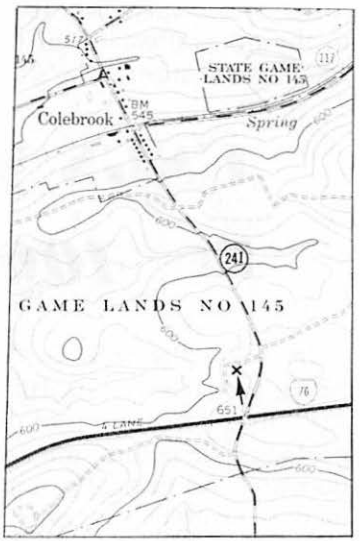
The public is invited to utilize the new cartographic information services at the Survey library, 916 Executive House, Second Street, Harrisburg. Mail and Phone inquiries are welcome. It is anticipated that map information assistance can benefit all who make use of any of the various types of maps and imagery, including foresters, farmers, sportsmen, planners, engineers, conservationists, and property owners.

A DIABASE DINOSAUR

by William H. Bolles[1]

A wooded area southeast of Colebrook in Lebanon County contains a unique geologic feature. An unusual example of weathering of a diabase "sheet" which crosses eight of the southeastern counties of the Piedmont physiographic province has produced a configuration that resembles the head of a dinosaur.

The diabase intrusion was once a molten mass of rock called magma which slowly cooled and solidified at depth forming dikes, sills and sheets. Erosion has removed the overlying rock layers and the hard, dense diabase forms ridges and hills that exhibit a striking



DINOSAUR ROCK – Located in the woods north of Lawn in Lebanon County is this unusual example of the weathering of diabase

[1]Dept. of Education

topographic contrast between the soft, red shales and siltstones of the surrounding valley lowlands.

In some places where the diabase is quarried the term "black granite" has been used to describe the rock. However, since granite is a rock composed of over 50 percent quartz, diabase can't be called granite since it contains very little, if any, quartz. An old term used to refer to the diabase was "trap rock" which probably originated from the German, "Treppe," meaning steps. The term was applied to the rock by quarrymen in Germany because it could be quarried in large blocks due to its rectangular jointing and could be worked from the face of a quarry in a series of steps. The common local term in referring to the diabase is "ironstone" which came about due to the extreme hardness of the rock and its dark color as well as the fact that in some areas the diabase will give off a clear bell-like tone when struck with a hammer, giving rise to another name, "ringing rocks." Elsewhere in the Commonwealth, diabase has contributed to the mineral wealth of the state as a source rock for building stone and crushed stone.

USGS To Celebrate 100th Year

In 1979, the U.S. Geological Survey, established by Congress in 1879, will observe its 100th anniversary. The original Act provided for " the classification of the public lands and the examination of the geological structure, mineral resources, and products of the national domain." Additional acts and statutes expanded this authorization to include examinations outside the national domain, and for gaging the streams and determining the water supply of the United States.

To carry out its missions, the USGS employs more than 13,000 scientists, engineers, technicians and administrative support personnel throughout the United States and in some foreign countries. Major facilities include the National Center, Reston, Va; and Regional Centers at Denver, Colorado and Menlo Park, California. Special services and investigative facilities include the EROS (Earth Resources Observation Systems) Data Center, Sioux Falls, SD; Center for Astrogeologic Studies, Flagstaff, AZ; Hawaiian Volcano Observatory, HI; and Gulf Coast Hydroscience Center, Bay St. Louis, MS.

Dr. H. William Menard, the present and 10th director of the USGS in its 100-year history, said, "While centennial activities will reflect Survey contributions to the nation's past growth, they will serve to focus on the challenges of the future to the earth science community. To make decisions for rational use of lands, to explore for and develop our resources wisely, to mitigate the effects of geologic hazards — these and other related problems are formidable and sobering challenges to all Americans. In particular, however, heavy burdens of responsibility will be placed on earth scientists, for sound knowledge about the Earth and natural processes are basic to the solution of these critical resource and environmental problems."

"For the Survey," Menard said, "its centennial will be a time for re-dedication and re-commitment to the goal of those who preceded us — the pursuit of earth science knowledge in the public interest."

The USGS will mark its centennial year with commemorative programs, symposia, special publications, and exhibits. Among the planned USGS centennial activities:

"Centennial Day" ceremonies at the Survey's National Center, Reston, Va., and other major facilities, on March 2 and 3, featuring guest speakers and public tours.

A USGS International Centennial Symposium in October will examine the challenges being faced by the USGS and Geological Surveys of other countries in meeting global requirements for resources for the coming century.

USGS exhibits at Survey, federal, or other facilities in and outside the Washington, D.C. area, including a display of earth science maps at the Library of Congress, and a history of the Survey in photographs at the Survey's national and regional centers.

Special publications to include a four-volume history, "Minerals, Lands, and Geology for the Common Defense and General Welfare," a single-volume history of the USGS, and publication of "Maps for America," covering cartographic products of the USGS and other agencies.

A special postal cancellation to be used during the period of March 1 to August 31 in 10 major cities and at large USGS centers.

Symposia and technical sessions treating USGS current and planned activities to be held at annual and regional meetings of professional geological organizations.

The Pennsylvania Geological Survey, founded in 1836, extends birthday greetings and good wishes to its younger, brother agency.

How Many Minerals In Pennsylvania

by Robert C. Smith II
John H. Barnes

Well, quite frankly, we don't know exactly, but a good estimate would be about 500. What we do know is that 309 have been carefully verified up to the end of 1978. Verification of many of the other mineral species will probably require unusually sophisticated techniques.

Few states have such carefully verified lists of mineral species. Pennsylvania, however, has been blessed with a long line of excellent mineralogists, the three most outstanding being F.A.L.K.W. Genth (*Mineralogy of Pennsylvania,* 1875), S.A. Gordon (*Mineralogy of Pennsylvania,* 1922), and Arthur Montgomery (*Mineralogy of Pennsylvania 1922-1965,* 1969). Because of their high standards of scientific accuracy, it has been relatively easy to prepare up-to-date lists that include species more recently discovered, such as the lists presented by R.W. Grant, *Keystone Newsletter,* August, 1974; A.R. Geyer and others, *Mineral Collecting in Pennsylvania,* 1976; R.C. Smith II, *The Mineralogy of Pennsylvania 1966-1975,* 1978; and the one below.

Active research on Pennsylvania's minerals for purely mineralogic purposes is now being conducted at no less than six major research institutions. One result of this research has been the identification and naming of three new species in the past few years; desautelsite, downeyite, and matulaite. With this interest and the technical facilities at their disposal, we can expect the Pennsylvania list to grow at a slow, steady rate for many years to come. The Pennsylvania Geological Survey encourages this research and hopes that additional species will be verified by at least two independent methods and that mineralogists will be cautious in their identifications. It is hard to say whether more misidentifications are perpetrated by amateur or professional mineralogists! For example, the first author of this article knows of six professionals, including himself, who have been fooled into misidentifying ferroan dolomite as ankerite. Even the X-ray diffraction standard file makes this mistake.

Two forthcoming Bureau publications will describe the mineral occurrences that have been the source of many additions to the Pennsylvania list in recent years. One deals with the minerals that form as a result of underground fires in anthracite mines and waste

piles. The other describes the copper-uranium occurrences and minerals in the Picture Rocks and Sonestown 7½′ quadrangles. These reports demonstrate the relationship between mineral identification and man's environment.

PENNSYLVANIA MINERAL SPECIES AS OF DECEMBER 31, 1978

acanthite
actinolite
albite
allanite
alloclasite
allophane
almandine
alunite
alunogen
analcime
anatase
ancylite
andersonite
andesine
andradite
anglesite
anhydrite
anorthite
anthophyllite
antigorite
apophyllite
aragonite
*arsenolite
arsenopyrite
artinite
augite
aurichalcite
autunite
azurite
"babingtonite"
*bararite
barite
bastnaesite
beraunite
*berndtite
beryl
beta-uranophane
bianchite
billietite
biotite
bismuthinite
bismutite
boehmite
boltwoodite
bornite
*boussingaultite
brochantite
brookite
brucite
bytownite
cacoxenite
calcite
cancrinite
carbonate-fluorapatite
carnotite
*cassiterite
celestine
cerussite
chabazite
chalcanthite
chalcocite
chalcophyllite
chalcopyrite
chamosite
chervetite
chevkinite
chloritoid
chondrodite
chromite
chrysocolla
chrysotile
clausthalite
clinochlore
clinohumite
clinozoisite
cobaltite
coffinite
conichalcite
copiapite
copper
cordierite
corkite
cornubite
corundum
covellite
crandallite
*cryptohalite
cryptomelane
cuprite
datolite
desautelsite
descloizite
diaspore
dickite
digenite
diopside
djurleite
dolomite
*downeyite
dravite
dumortierite
enargite
enstatite
epidote
epsomite
erythrite
fayalite
ferrimolybdite
ferroaxinite
ferrocolumbite
fluorapatite
fluorite
forsterite
fourmarierite
francevillite
gahnite
galena
gersdorffite
gibbsite
gismondine
glauconite
goethite
gold
goslarite
graphite
greenockite
grossular
gypsum
halite
halloysite
halotrichite
harmotome
heazlewoodite
hedenbergite
hematite
hemimorphite
*herzenbergite
heulandite
hexahydrite
hinsdalite
hornblende
huntite
hyalophane
hydromagnesite
hydroxyl-apatite
hydrozincite
hypersthene
idaite
"illite"
ilmenite
ilvaite
jarosite
jordanite
kammererite
kaolinite
kasolite
kieserite
kyanite
labradorite
langite
lansfordite
lanthanite
laumontite
lepidocrocite
liebigite
linarite
lizardite
mackinawite
magnesiochromite
magnesite
magnetite
malachite
manganaxinite
marcasite
margarite
marialite
*mascagnite
matulaite
meionite
melanterite
mesolite
meta-autunite
metanovacekite
metatorbernite
metatyuyamunite
meta-uranocircite
metazeunerite
microcline
millerite
mimetite
molybdenite
molybdenite-3R
monazite
montmorillonite
morenosite
*mullite
muscovite
natrolite
nepheline
nesquehonite

nontronite
nsutite
oligoclase
olivenite
opal
*orpiment
orthoclase
orthoferrosilite
*ottemannite
palygorskite
paragonite
pectolite
pentlandite
phillipsite
phlogopite
phosphuranylite
pickeringite
*picromerite
piemontite
pigeonite
plumbojarosite
posnjakite
*potash alum
powellite
prehnite
pseudomalachite
pumpellyite
pyrite
pyroaurite
pyrolusite
pyromorphite
pyrope
pyrophyllite
pyrrhotite
quartz
*realgar
renardite
retgersite
riebeckite
rockbridgeite
"rosasite-(Mg)"
rozenite
rutile
*salammoniac
safflorite
"safflorite-(Fe)"
sauconite
scheelite
schorl
schroeckingerite
*selenium
sepiolite
serpierite
siderite
sillimanite
silver
sklodowskite
skutterudite
smithsonite
spessartine
sphalerite
spinel
starkeyite
staurolite
stilbite
stilpnomelane
strengite
strontianite
sulfur
susannite
*syngenite
talc
tennantite
tetrahedrite
thaumasite
*thenardite
thomsonite
thorianite
thorite
thorogummite
titanite
tochilinite
torbernite
tremolite
*tschermigite
turquoise
tyrolite
tyuyamunite
uraninite
uranophane
uranospinite
uvarovite
vanadinite
vandendriesscheite
variscite
vermiculite
vesuvianite
violarite
vivianite
*voltaite
wavellite
weeksite
wollastonite
wolsendorfite
wulfenite
wurtzite
zaratite
zircon
zoisite

*Materials recently formed in Pennsylvania in environments such that the first author and some other mineralogists regard them as not fulfilling the "naturally occurring" clause of most classical definitions of a mineral. Other mineralogists, including the second author, feel that they do fit the definition of a mineral. For additional information on these minerals, the reader is referred to Finkelman and others, 1974, *Observations on minerals from burning anthracite seams and culm in Pennsylvania* (Geol. Soc. America Abstracts w. Program, v. 5, n. 1, p. 27-28); Finkelman and Mrose, 1977, *Downeyite, the first verified natural occurrence of SeO_2* (Am. Mineralogist, v. 62, p. 316-320); and Finkelman, 1978, *Release of trace elements from a burning bituminous culm bank* (USGS Open File Rpt. 78-868).

COASTAL MAPPING HANDBOOK, edited by M. Y. Ellis

A new publication dealing with maps and related services has been released by the National Oceanic and Atmospheric Administration in cooperation with the United States Geological Survey. The handbook should help planners and managers of coastal programs to determine their mapping requirements, and to be aware of various map products so that they can select the best maps and charts for their needs. The handbook provides basic information on maps, mapping procedures and sources of technical assistance.

Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C., 20402. Stock No. 024-001-03046-2. Price: $5.25.

THE DEVIL IN PENNSYLVANIA

by Alan R. Geyer

Dr. Thomas R. Beveridge, a long-time friend now deceased, published an inventory of geologic features for the State of Missouri.* While "Tom" was State Geologist of Missouri (1955-1964), we talked of a raft trip down the Missouri River, fishing for those giant catfish and geologizing as we drifted. His magnificant book reflects this and other similar trips he must have taken during those years. I wish I could have been along.

An intriguing chapter, titled *The Devil in Missouri*, appears in his work. What "Tom" found in Missouri, is also true in Pennsylvania. His story follows, changed slightly to fit our Commonwealth.

Pioneer Pennsylvanians, largely of Scotch-Irish and German backgrounds, were preoccupied with the Devil, largely as a result of Calvinistic teachings. This Devilish influence is in sharp contrast to the western United States where the Latin-American settlers predominated and features named commonly alluded to angels and Heaven.

The following list of over 30 geologic features named for this "fellow" has been compiled from published reports and topographic maps. It is definitely not complete but represents the majority of Pennsylvania's geologic features named for creations, haunts, and physical parts of the Devil.

*Beveridge, Thomas R. (1978), *Geologic Wonders and Curiosities of Missouri*; Missouri Division of Geology and Land Survey, Educational Series No. 4, 451 p.

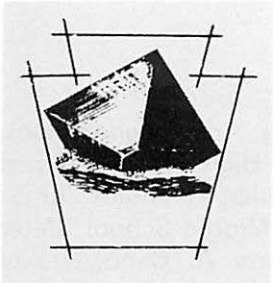
DEVILS DEN,

ADAMS COUNTY

DEVILISH HAUNTS IN PENNSYLVANIA

NAME	TYPE OF FEATURE	LOCATION
Devil Alex Hollow	Stream valley	Franklin County, Scotland Quad
Devil Head	Rock promontory	Berks County, Manatawny Quad
Devils Backbone	Ridge	Erie County, Albion Quad
Devils Course	Stream	Dauphin County, Manada Gap Quad
Devils Den	Erosional remnant	Adams County, Gettysburg Quad
Devils Den	Rock promontory	Elk County, Ridgeway Quad
Devils Den	Rock promontory	McKean County, Smethport Quad
Devils Den Cave	Boulder cave	Adams County, Gettysburg Quad
Devils Den Cave	Sinkhole cave	Westmoreland County, Derry Quad
Devils Elbow	Hill	Centre County, Snow Shoe SE Quad
Devils Elbow	Meander	Clearfield County, Devils Elbow Quad
Devils Elbow	Stream valley	Tioga County, Morris Quad
Devils Elbow	Hill	Union County, Weikert Quad
Devils Feather Bed	Stream valley	Northumberland County, Riverside Quad
Devils Garden	Boulders	Sullivan County, Eagles Mere Quad
Devils Hole	Stream valley	Elk County, Wildwood Fire Tower
Devils Hole	Stream valley	Monroe County, Buck Hill Falls Quad
Devils Hole	Rock shelter	York County, Red Lion Quad
Devils Hole Caves	Boulder caves	Lancaster County, Morgantown Quad
Devils Hole Creek	Stream	Monroe County, Buck Hill Falls Quad
Devils Hole Run	Stream	Columbia County, Benton Quad
Devils Hump	Ridge	Berks County, Boyertown Quad
Devils Potato Patch	Boulder field	Northampton County, Palmerton Quad
Devils Pulpit	Rock promontory	Carbon County, Palmerton Quad
Devils Punchbowl	Plunge pool (glacial)	Susquehanna County, Susquehanna Quad
Devils Racecourse	Boulder field	Dauphin County, Enders Quad
Devils Racecourse	Boulder field	Franklin County, Iron Springs Quad
Devils Run	Stream	Clearfield County, Clearfield Quad
Devils Run	Stream	Franklin County, Blue Ridge Summit Quad; MD-PA
Devils Wall	Ridge	Carbon County, Palmerton Quad
Hells Kitchen	Stream valley on mountain slope and rock promontories	Luzerne County, Freeland Quad

DEVILS WALL, CARBON COUNTY



EARTH SCIENCE TEACHERS' CORNER

PILOT TESTING OF CRUSTAL EVOLUTION EDUCATION PROJECT MATERIALS IN PENNSYLVANIA

Thirty-one Pennsylvania teachers of Earth and Space Science will be involved in the pilot testing of the Crustal Evolution Education Project (CEEP) curriculum materials. They will be among 205 other teachers at 12 test centers across the country who will be participating in the evaluation of a total of 64 modules.

The CEEP materials were developed under a grant from the National Science Foundation awarded to the National Association of Geology Teachers and Edward C. Stoever, Project Director, at the Southeast Missouri State University. The purpose of the project was to develop materials related to current research into the composition, history, and developmental processes of the earth's crust and the applications of this knowledge to man's activities. A major thrust of the project is to shorten the time lag between ongoing research and its translation into secondary school curriculum materials which are highly appealing to students and readily usable by teachers.

During the past year the instructional modules were developed at six Development Centers involving 52 research scientists and 83 teachers. Accompanying each module is a Teacher's Guide; the pilot teachers will also be evaluating the effectiveness of these Teacher's Guides.

Most test centers around the country consist of 12 to 15 pilot teachers and a center director; however, due to the large student enrollment in Earth and Space Science in Pennsylvania that center was asked to acquire double the number of teachers. The Pennsylvania test center is directed by William H. Bolles, Department of Education; the National testing program is directed by Victor J. Mayer at the Ohio State University. The pilot teachers are: Theodore E. Aiken, Pennfield Junior High School; William L. Bechtel, Selinsgrove Area High School; John E. Biddle, Upper Dublin Area High School; Robert Caruse, York County AVTS; Peter C. Christ, Owen J. Roberts High School; Vincent DiDonato, Huntingdon Junior

High School; Dennis W. Dull, Chambersburg Area High School; Deborah DuBoise Ehleiter, Beverly Hills Junior High School; William Eunson, Interboro High School; James J. Fackler, Reynolds Junior High School, David B. Fluri, F.D. Roosevelt Middle School; Peter Gamber, Hershey Junior High School; Anthony A. Geno, Drexel Hill Junior High School; Thomas C. Hertel, Iroquois High School; Helen S. Kelly, Vandergrift Junior High School; Thomas P. Knorr, Pen Argyl Junior High School; Jennie Melisis, Monessen Junior-Senior High School; John P. Mentzer, Big Spring High School; Robert T. Mintmier, Westmont Hilltop Junior High School; Virgil Moraca, Shade Central City School; Alfred C. Palmer, Springton Lake Junior High School; Wallace S. Penrod, Garfield Junior High School; Joseph Ptacin, Sunbury Middle School; Frank Pipik, Phillipsburg Junior High School; Fred Ramin, A.G. Curtin Junior High School; John Rogers, Elizabethtown Area High School; Anthony M. Russell, South Hills High School; Robert J. Thomas, Linton Intermediate High School; Elden F. Walthour, Monroeville Junior High School; Gary T. Zelinske, Lebanon Senior High School; and James S. Zuck, Donegal High School.

At the conclusion of the testing and evaluation program the most successful of the modules will be published by Ward's Natural Science Establishment, Inc. They hope to have a few modules ready to distribute at the National Science Teachers convention at Atlanta in March.

William H. Bolles
Science Education Adviser
Department of Education

The York Rock and Mineral Club will hold its Tenth Annual Mineral and Gem Show on Saturday, April 7 and Sunday, April 8, 1979 at the Manchester Township Fire Company #1 in the Manchester Township Building, Emigsville, PA. The firehouse is located in Emigsville, PA on Route 181, going North from York, PA.

Show hours are Saturday, April 7 – 10 AM to 9 PM and Sunday, April 8 – 10 AM to 6 PM. Admission – $.75; children under 12 free.

SURVEY ANNOUNCEMENTS

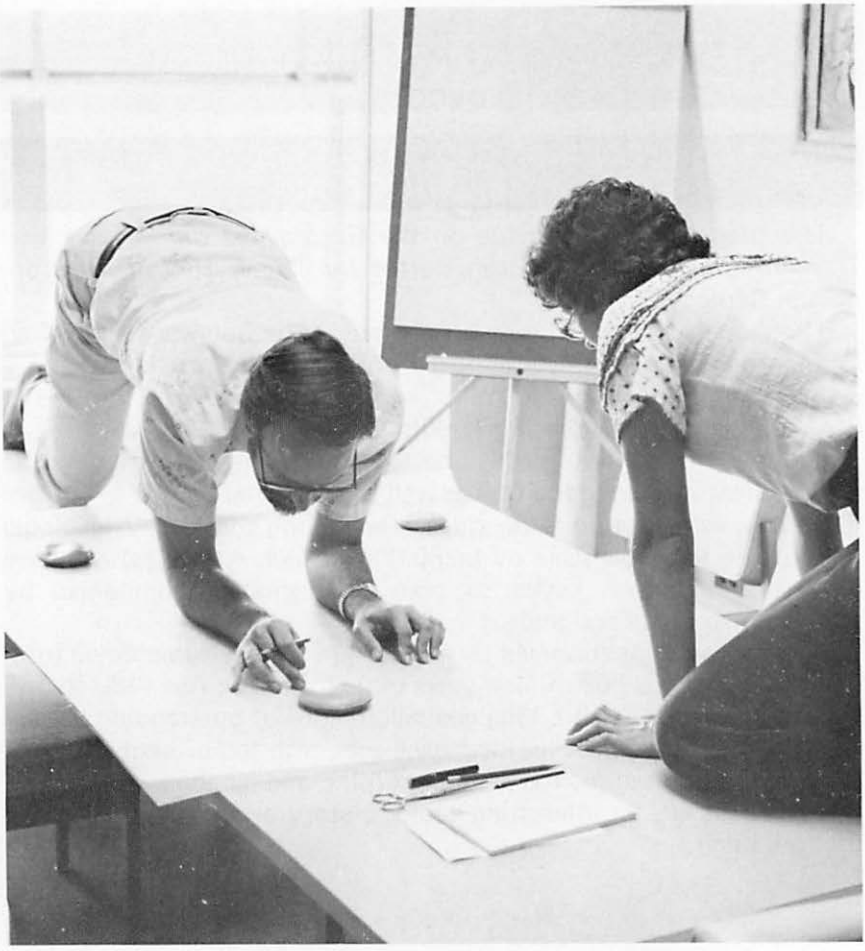
WORK BEGINS ON GEOLOGIC GUIDE TO THE APPALACHIAN TRAIL

The preparation of a guide on the *Geology of the Appalachian Trail in Pennsylvania* has been started by J.P. Wilshusen, Environmental Geology Division.

The Appalachian Trail enters the state at the Delaware Water Gap in Monroe County, traverses three physiographic provinces over a distance of more than 200 miles, and crosses the Maryland line at PenMar, near Waynesboro in Franklin County.

Utilizing maps, photographs and text, the guidebook will describe geologic features along the trail as well as those that can be seen from the many vantage points on ridge crests along the trail. A geologic map of the trail at a scale of 1:250,000 (1 inch = 4 miles) will have designated locations keyed to text descriptions accompanied by detailed map insets and photos.

Rock formations traversed by the Trail in Pennsylvania range from Cambrian (575 to 500 million years old) to Jurassic Age (180 to 135 million years old) with a long geologic record of outstanding events, extending through the Pleistocene ice ages, into the present. All rock types, including sedimentary, metamorphic and igneous, are encountered. All in all, an interesting geologic story awaits the reader and the trail hiker.



Geologists At Work

These staff geologists are neither praying, nor bowing to the Director, nor looking for their contact lenses. They are working on the final stages of a geologic map for which the basic data was originally collected through geologic investigations and measurements in the field. The results of our field work, however, are always made available to the public by published maps and reports. In the accompanying photo, the geologists were in the process of checking the accuracy of drafting compilation of a large geologic map which lies under the transparent tracing paper upon which they are kneeling. The geologic map will soon be on its way to the printer.

PENNSYLVANIA GEOLOGICAL SURVEY STAFF

Arthur A. Socolow, *State Geologist*
Donald M. Hoskins, *Assistant State Geologist*

TECHNICAL SERVICES

Shirley J. Barner, *Stenographer*
Sandra Blust, *Librarian*
John G. Kuchinski, *Draftsman*
Christine Miles, *Geologist Supervisor*
Virginia Milewski, *Draftsman*
Mary A. Miller, *Stenographer*
Lynda A. Ronemus, *Typist*
Geary L. Sarno, *Draftsman*
Marjorie Steel, *Stenographer*
Albert Van Olden, *Draftsman*

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Jesse Craft, *Geologist* (Pittsburgh Office)
Donna M. Snyder, *Stenographer*
Larry E. Taylor, *Hydrogeologist*
Martha Walter, *Clerk*
John P. Wilshusen, *Geologist*
Denise T. Wisehaupt, *Geologist*

GEOLOGIC MAPPING DIVISION

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Albert D. Glover, *Geologist*
Jon D. Inners, *Geologist*
Lauris J. MacAskill, *Typist*
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Vincent J. Pietrobon, Jr., *Geologist*
Henry W. Schasse, *Geologist*
William D. Sevon, *Geologist*
Viktoras W. Skema, *Geologist*
John H. Way, Jr., *Geologist*

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OIL AND GAS GEOLOGY DIVISION

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Robert Fenton, *Laboratory Technician*
John A. Harper, *Geologist*
Louis Heyman, *Geologist*
John Petro, *Draftsman*

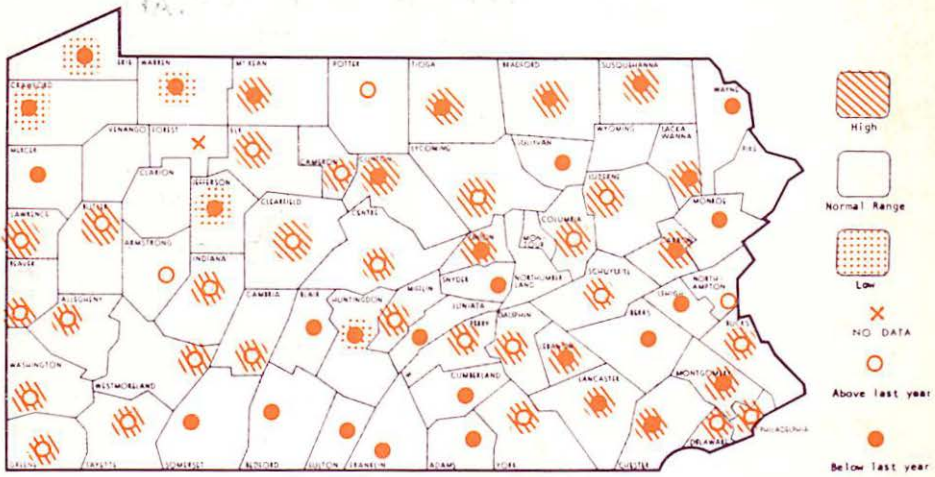
TOPOGRAPHIC DIVISION

In Cooperation with The U.S. Geological Survey

GROUND WATER DIVISION

In Cooperation with The U.S. Geological Survey

GROUND-WATER LEVELS
FOR
JANUARY 1979



Bureau of Topographic and Geologic Survey
Dept. of Environmental Resources
P.O. Box 2357
Harrisburg, Pa. 17120

Address Corrections Requested

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