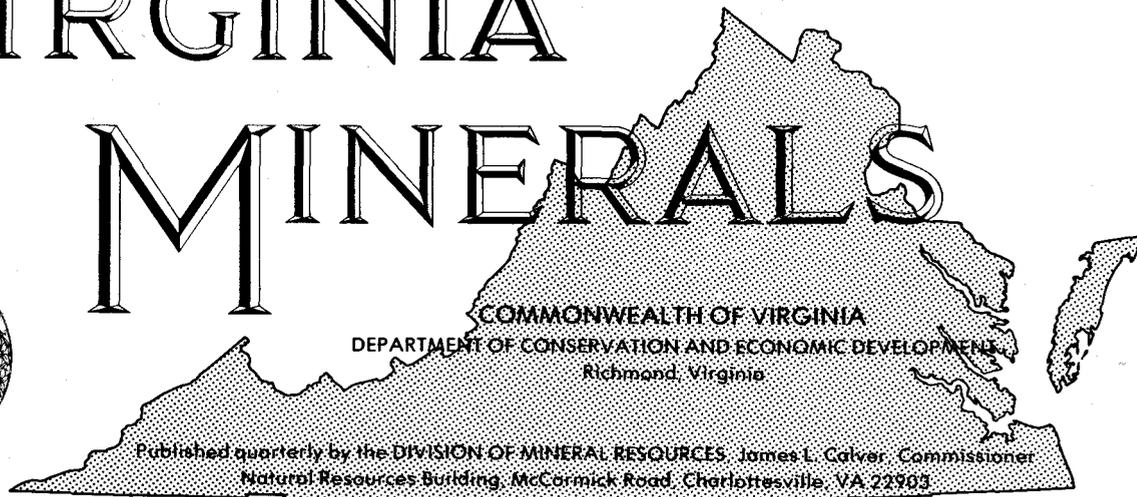


VIRGINIA

MINERALS



Vol. 24

August 1978

No. 3

STATE GEOLOGIST RETIRES

After 21 years of leadership for the Division of Mineral Resources, Dr. James L. Calver retired on June 30, 1978. During this time the Division became nationally recognized for its accomplishments that include compilation and publishing of State geologic, aeromagnetic, gravity, and mineral resources maps; gathering of geologic data for 75 quadrangle areas; installation of a seismograph to monitor earthquakes; and obtaining State-wide detailed topographic map coverage. In honor of his efforts and foresight in having geologic data obtained for the Commonwealth, the recently released Publication 7 entitled, "Contributions to Virginia Geology-III", was dedicated to Dr. Calver.

Initial efforts upon becoming State Geologist in mid-1957 were to organize reference collections as repositories for representative rocks, fossils, and well cuttings; to reorganize library holdings for easier reference; to obtain microfilm collection of theses and dissertations on Virginia geology; and to develop a geologic mapping program for data in sufficient detail for land-use planning, mineral-resources exploration, and research into Virginia geologic history.

Liaison was made with mine and quarry operators by means of periodic visits. Representative rock and mineral sets were distributed to secondary schools across the State. Information on base and



precious-metal deposits was published. Results of high-silica sand and regional coal studies suitable for commercial use were reported. Data on ground-water conditions in some counties, cities, and Federal and State parks was published.

Detailed information on rock type, structure, and potential resource is being collected in the field by quadrangle area. Recent reports contain descriptions of geologic factors that govern land modification for several Virginia cities as well as some counties. Regional stratigraphic and structural studies were made to provide data on the framework of the Coastal Plain and Piedmont areas.

Topographic maps showing cultural and natural features of quadrangle areas have been prepared for all of the Commonwealth. This is the result of an accelerated State-Federal cooperative mapping program initiated by Dr. Calver in 1962. The program was supported by citizen groups, industrial interests, and governmental agencies, at a time when only about 10 percent of the State had adequate maps. Some 805 useful products are now available for planners, engineers, and outdoorsmen. The Commonwealth of Virginia became the 10th state to have complete map coverage in 1972. By means of high-altitude photography these maps are being examined once each 5 years for revision need. Those selected for revision depict growth features in purple, which shows the dimension of time. Map products such as orthophotoquads, slope maps, county maps, and orthophoto maps have been produced for selected areas as new products for the map users benefit. A listing of map names of places, landforms, water-features and religious institutions for geographic reference was compiled. These maps are of great value in property planning, recreation, forest fire control and some several hundred other uses.

Geophysical maps for use in minerals and energy resource exploration and in studies of the geologic framework of the State were initiated. Regional aeromagnetic surveys to obtain geologic information on rock structure obscured by soil cover were started in 1962. State coverage is now available from which faults and other structures have been interpreted. Aeroradiometric surveys useful in locating concentrations of radioactive minerals and in monitoring natural radiation of the earth's surface were begun in 1975. Data from a network of more than 11,000 gravity stations were used to produce the State gravity map.

Dr. Calver has been active in a number of professional societies including the Association of American State Geologists of which he is a Past President; the Geological Society of America of which he is a Fellow; the American Association of

Petroleum Geologists; the American Mineralogical Society; the American Institute of Mining, Metallurgical and Petroleum Engineers of which he is a past Chairman of the Southeastern Section of the Industrial Minerals Committee; the American Geophysical Union; the American Ceramic Society; the Appalachian Geological Society; the Virginia Academy of Science; the Geological Society of Washington; and the Seismological Society of America.

Under Dr. Calver's guidance a vital role in obtaining geologic data for the Commonwealth and translating it for many uses was realized. The Division is directly concerned with pointing out potential mineral resources which enable Virginians to maintain a high standard of living.

✕ ✕ ✕

MINERALS RESOURCE PUZZLE

There are names of 29 important mineral resources of Virginia listed in the puzzle below. Can you spot them? The names are listed on page 27 of this issue.

E	C	G	S	A	G	L	A	R	U	T	A	N	D	F
T	N	E	A	P	B	J	E	K	V	Z	S	G	E	B
I	F	L	M	L	C	N	H	Y	P	F	L	R	H	U
M	G	A	P	I	S	G	R	A	V	E	L	E	F	S
O	R	H	H	T	P	L	D	N	B	L	E	V	A	A
L	A	S	I	E	L	H	A	I	S	D	H	L	I	D
O	N	D	B	A	S	A	L	T	M	S	S	I	Q	N
D	I	R	O	N	E	G	I	E	E	P	R	S	P	D
Q	T	C	L	A	T	B	M	C	G	A	E	L	R	I
M	E	N	I	S	M	U	E	L	O	R	T	E	P	A
S	U	E	T	I	Z	T	R	A	U	Q	S	O	V	B
T	D	S	E	V	I	E	T	I	R	D	Y	H	N	A
A	C	A	P	E	N	O	T	S	P	A	O	S	G	S
O	U	N	G	Y	C	X	I	B	L	P	F	Y	Z	E
R	F	D	M	S	G	J	D	C	N	K	V	L	I	W

✕ ✕ ✕

OIL AND GAS DEVELOPMENT IN VIRGINIA DURING 1977¹

A total of 8,220,185 Mcf (thousand cubic feet) of natural gas was produced in Virginia during 1977, which is an increase of 1,282,859 Mcf from 1976 production. Reported production was from 202 wells in four counties: Buchanan County, 3,624,711 Mcf; Dickenson County, 3,897,296 Mcf; Tazewell County, 692,986 Mcf; Wise County, 5,192 Mcf. Oil production in Lee County was 1,742 barrels from four wells.

Twenty three new test wells were drilled during the year and 2 old wells were deepened (Table 1). Columbia Gas Transmission Corporation drilled 9 new wells in Buchanan and Wise counties with combined footage of 40,139 feet; one old well was

drilled deeper in Buchanan County for an additional 740 feet and had a final open flow of 365 Mcf. Eight of these wells were development and two were exploratory tests with all of them completed as producers. Combined final open flow from 8 wells was 10,491 Mcf; one well was to be cleaned up and one well was to be fractured. Philadelphia Oil Company drilled 5 new wells in Dickenson County for a combined footage of 25,814 feet and one old well was deepened by 783 feet; all of these wells were completed as producers. Combined final open flow from 4 wells was 3,492 Mcf; one well was to be cleaned out and one well was to be fractured. Texas

Table 1. — Summary of Virginia drilling during 1977.

Operator	Lease	Well. No.	Total Depth (feet)	Status
Buchanan County				
Ashland Oil Inc.	Clinchfield Coal Co.	077051	5,233	Gas well
Columbia Gas Transmission Corporation	Pittston Co.	9550	*4,384	Gas well
"	G. W. Yates	20301	4,789	Gas well
"	Bart Elswick	20340	4,123	Gas well
"	Pittston Co.	20343	4,628	Gas well
"	Big Sandy Coal Corp.	20439-T	3,448	Gas well
"	Howard Coleman	20467	4,741	Will fracture
"	Kentland Co.	20468	3,850	Gas well
"	Pittston Co.	20469	4,081	Gas well
"	Pittston Co.	20470	4,739	Gas well
Texas International Petroleum Corporation	C. L. Ritter Lumber Co.	I.C.—1	4,736	Gas well
"	Big Vein	I.C.—3	5,066	Gas well
"	Big Vein	I.C.—6	5,110	Gas well
"	C. L. Ritter Lumber Co.	I.C.—9	4,820	Dry hole
"	Slocum Land Corp.	I.C.—10	5,052	Gas well
Dickenson County				
Philadelphia Oil Company	Pittson Co.	P—55	4,782	Gas well
"	Pittson Co.	P—59	*5,072	Gas well
"	Pittston Co.	P—65	4,831	Cleaning up
"	Pittston Co.	P—66	4,864	Gas well
"	Pittston Co.	P—67	5,311	Will fracture
"	Letcher Mullins	P—68	6,026	Gas well
Lee County				
Lee Oil Drilling Company	Don Grabeel	1	7,209	Plugged & abandoned; 2 barrels oil per day
"	Lloyd Harris	1	1,762	Dry hole
Russell County				
Gulf Oil Corporation	W. Russell Price	1	17,003	Dry Hole
Wise County				
Columbia Gas Transmission Corporation	Penn Virginia Corp.	20338—T	5,740	Cleaning up

*well deepened

¹Information supplied by William W. Kelly, Jr., Virginia Division of Mines and Quarries.

International Petroleum Corporation drilled 5 exploratory tests in Buchanan County for a combined footage of 24,784 feet. Four of these wells were completed as producers, with a combined final open flow of 6,392 Mcf. One test was a dry hole. Ashland Oil, Inc. drilled and completed one well in Buchanan County for a total footage of 5,233 feet; final open flow was 1,873 Mcf. Lee Oil Drilling Company drilled 2 wells (1 exploratory and 1 development) in Lee County for a combined footage of 8,971 feet; both wells were dry holes. Gulf Oil Corporation drilled a wildcat well in Russell County to a total depth of 17,003 feet. It was plugged and abandoned as a dry hole.

Four operators in Buchanan County produced 3,624,711 Mcf of gas: Ashland Oil, Inc. 470,791 Mcf; Cabot Corporation, 27,893 Mcf; Columbia Gas Transmission Corporation, 3,083,080 Mcf; and P and S Oil and Gas Corporation, 42,947 Mcf. Eight new wells were drilled and one old well was drilled deeper by Columbia Gas Transmission Corporation in Buchanan County. Footage drilled by this company totaled 35,139 feet. Combined final open flow from 8 wells was 10,491 Mcf; one well was to be fractured. Texas International Petroleum Corporation drilled 5 exploratory tests for a combined footage of 24,784 feet. Four of these wells were completed as producers with a combined final open flow of 6,392 Mcf. One test was a dry hole. Ashland Oil, Inc. drilled and completed one well with a total footage of 5,233 feet; final open flow was 1,873 Mcf.

In Dickenson County the Clinchfield Coal Company delivered 88,012 Mcf of gas to the pipelines of Kentucky-West Virginia Gas Company. Philadelphia Oil Company began production from 40 new wells and produced 2,683,884 Mcf of gas that was also delivered to the pipelines of Kentucky-West Virginia Gas Company. Philadelphia Oil Company drilled 5 new development wells for a combined footage of 25,814 feet and one old well was deepened by 783 feet; all of these wells were producers. Combined final open flow from 4 wells was 3,492 Mcf; one well was to be cleaned up and one well was to be fractured. Columbia Gas Transmission Corporation produced 1,125,400 Mcf to give Dickenson County a total production of 3,897,296 Mcf.

In Lee County oil production by Robert F. Spear totaled 1,742 barrels from 4 wells; 3 wells are located in the Rose Hill field and 1 well is in the Ben Hur field. Lee Oil Drilling Company drilled two wells in 1977. One development well in the Rose Hill field was drilled to a depth of 1,762 feet. The well was plugged and abandoned as a dry hole. The second test was a wildcat several miles northeast of the Rose Hill field; total depth was 7,209 feet and the well was plugged and abandoned.

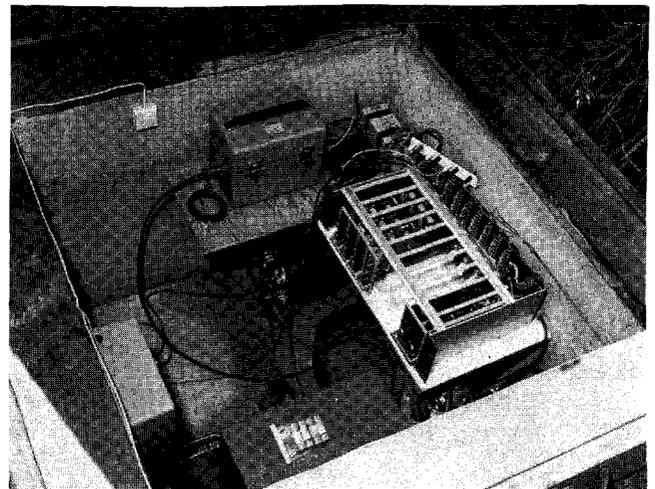
In Russell County, Gulf Oil Corporation completed drilling an exploratory wildcat test north-northwest of Dickensonville to a total depth of 17,003 feet; the well was plugged and abandoned as a dry hole.

Two operators in Tazewell County produced 692,986 Mcf of gas; Columbia Gas Transmission Corporation, 263,539 Mcf, and Consol-Ray Resources, 429,447 Mcf.

Penn Virginia Corporation produced 5,192 Mcf of gas in Wise County for use in a coal preparation plant. Columbia Gas Transmission Corporation drilled one test in the county to a depth of 5,740 feet; this test was completed as a producing well.

MICRO—EARTHQUAKE MEASURING DEVICE INSTALLED

With a mutual interest in earthquake activity the Division of Mineral Resources is sharing its seismic facility with the Department of Geological Sciences of Virginia Polytechnic Institute and State University. They are monitoring microseisms — those of very low magnitude. This monitoring effort is a long range project to determine microseismic activity in central Virginia. Several such instruments are being installed. The College of William and Mary has set aside two acres of land near Charlottesville for the Division of Mineral Resources so that this activity could continue without interruption in future years in order that a continual monitoring program could be maintained.



Interior view of vault from which seismic activity is monitored. Instruments shown receive and amplify ground vibrations for transmission to recorders.

NEW PUBLICATIONS

(Available from the Division of Mineral Resources, Box 3667, Charlottesville, VA 22903; State sales tax is applicable only to Virginia addressees)

Publication 3. **GEOLOGY OF THE WAYNESBORO EAST AND WAYNESBORO WEST QUADRANGLES, VIRGINIA**, by Thomas M. Gathright II, William S. Henika, and John L. Sullivan III; 53 p., 2 maps in color, 38 figs., 7 tables, 1977. Price \$6.25 plus \$0.25 State sales tax, total \$6.50.

The rocks of the Blue Ridge anticlinorium are complexly folded and faulted and consist of five sequences ranging from Precambrian gneisses to Cambrian clastics. The Massanutten synclinorium within the study area is formed from the overlying Cambrian and Ordovician carbonate sequence. These carbonate rocks are overlain by the Ordovician clastic sequence. Many of these rock units are locally intruded by diabase dikes of Triassic age and are locally covered by alluvial Quaternary sediments.

The intensity of deformation increases from northwest to southeast with recumbent folds, thrust faults, and zones of cataclastic rocks present in the southeastern portion of the area.

Sources of agricultural limestone, limestone aggregate, and in limited quantities of high-calcium limestone are present. Ceramic clay, crushed stone, sand and gravel, and iron and manganese ore have been produced in small quantities.

Fourteen environmental geologic units having similar geologic factors—bedrock, residuum, and soil properties—affecting land modification have been delineated. Each is briefly evaluated with respect to slope stability, erodibility, and response to excavation or other types of land modification. Rockfall, karst, and cave areas have been delineated.

Publication 7. **CONTRIBUTIONS TO VIRGINIA GEOLOGY—III**. 154 p., 61 figs., 21 tables, 1978. Price \$4.50 plus \$0.18 State sales tax, total \$4.68.

This publication is dedicated to Dr. James L. Calver, State Geologist, upon his retirement. Accomplishments of the Division under his leadership are discussed in "The Calver Years—1957-1978". Other articles include the following:

PRODUCTION OF MINERAL RESOURCES IN VIRGINIA by D. C. Levan

At present more than 30 different mineral resources are produced in Virginia. The value of mineral production in 1976 exceeded a billion dollars, of which mineral fuels contributed about 84 percent, nonmetallic minerals about 15 percent, and metallic

ores slightly less than 1 percent. The principal mineral fuel commodity is bituminous coal. Nonmetallic resources produced include crushed and dimension stone, raw materials for cement and lime, sand and gravel, clay materials, kyanite, gypsum and anhydrite, feldspathic rock (Virginia aplite), silica sand, mineral pigments, talc and soapstone, marl, shells, and specimen and lapidary materials. Production of metallic ores is currently limited to mining of lead and zinc minerals at one locality. Summary information is given for the various commodities, including history, scope of activity, source of materials, uses, tables of tonnage and value where available, and selected references. Other resources that have been recovered in the past are outlined briefly.

GEOPHYSICAL CHARACTERISTICS OF THE BLUE RIDGE ANTICLINORIUM IN CENTRAL AND NORTHERN VIRGINIA by Stanley S. Johnson and Thomas M. Gathright, II

Evaluation of regional aeromagnetic, and simple Bouguer gravity maps and detailed gravity profiles of the Blue Ridge anticlinorium in central and northern Virginia provides greater insight into the structure and distribution of rock units depicted on existing geologic maps. Characteristic radioactivity and magnetic signatures of known rock units can be traced into adjacent areas and will aid future detailed geologic mapping of these areas. The geophysical data is used to interpret gradational relationships between the major metamorphosed plutonic rock units within the anticlinorium and to delineate smaller felsic intrusives. Aeroradiometric data provides insight into the location of cataclastic and sedimentary rock units that could possibly be overlooked in normal field mapping. Detailed gravity data provides valuable information on the near surface and deep structural features such as the large, low density rock body beneath overturned quartzite beds at the Shady-Antietam contact.

TOPOGRAPHIC MAPS OF VIRGINIA by Harry W. Webb, Jr.

Due to the completion of a cooperative Virginia Division of Mineral Resources—U. S. Geological Survey mapping program detailed 1:24,000—scale topographic maps are available for all of the Commonwealth. Maps of growth areas are being updated from inspection of aerial photography each 5 years. Maps are especially useful for engineers, foresters, geologists, planners and for recreation such as fishing, hiking, and hunting. By-products of the mapping program are aerial photographs and geodetic control. Four different scale series are available to show features of the State. These range in use from depiction of small areas in much detail to large areas with little detail. Map products are available for some parts of the State as orthophotoquads and as slope, county, orthophoto, and land-use maps.

ORDOVICIAN SHELF—TO—BASIN TRANSITION, SHENANDOAH VALLEY, VIRGINIA by Eugene K. Rader and William S. Henika

Detailed mapping and petrographic study of Ordovician carbonate and siliciclastic lithofacies in the Shenandoah Valley provide the data from which depositional units can be related. An Ordovician shelf—to—basin transition is recognized throughout the Shenandoah Valley. Areal and vertical distribution of lithofacies can be related to a gently subsiding carbonate platform that existed from Middle Cambrian through early Middle Ordovician time. In early Middle Ordovician time the platform began to collapse in isostatic response to rising tectonic highlands to the southeast. Collapse of the platform edge occurred earliest and most precipitously in rocks now exposed along the southeastern limb of the Massanutten synclinorium.

SAND AND GRAVEL RESOURCES IN VIRGINIA by Palmer C. Sweet

In Virginia more than one-third billion short tons of sand and gravel have been produced during the 20th century. Sand has been produced for use as an abrasive, building, paving, engine (traction), fill, filter, fire (furnace), foundry (molding) and glass sand and for ice control, golf courses, railroad ballast, pottery, and other industrial sands. Gravel resources have been produced for use in building, fill, paving, railroad ballast, and miscellaneous products.

Figures on the average cost of some sand and gravel products over the last 40 years as well as some requirements for concrete aggregate are provided. A graph depicts the quantity and value of sand and gravel resources produced by year. Some mention of specifications, governmental regulations and restrictions, and reclamation requirements that sand and gravel producers encounter is also made.

STREAM-SEDIMENT GEOCHEMISTRY OF THE IRISH CREEK TIN DISTRICT, ROCKBRIDGE COUNTY, VIRGINIA by Oliver M. Fordham, Jr.

Sediments of the Irish Creek tin deposits were analyzed for Be, Co, Cu, Fe, Mn, Ni, Pb, and Zn by atomic absorption, for Sn, Ti, and Zr by x-ray fluorescence, and for heavy-mineral percentage by heavy-liquid separation.

The concentration of Be, Ti, Fe, and heavy minerals in stream sediments were found to be useful as pathfinders. Statistical evaluation of Co, Cu, Mn, Ni, Pb, and Zn in the iron-manganese oxide coatings on the sediments proved these elements to be independent of the tin content and unrelated to tin mineralization.

X-ray fluorescence analysis is a precise and rapid technique for the determination of tin; the 4 ppm detection limit is sufficient to detect all known tin-bearing areas in the Irish Creek district. Tin and beryllium in the 80-230 mesh stream sediment fraction were found to be the best variables tested for outlining greisen containing tin mineralization. An area unrelated to previous mining activity or known tin veins was located that has anomalous tin and beryllium concentrations.

RARE-EARTH AND THORIUM MINERALIZATION IN SOUTHEASTERN RAPPAHANNOCK COUNTY, VIRGINIA by Christopher R. Halladay

An aeroradiometric contour map of a portion of southeastern Rappahannock County, Virginia shows several thorium anomalies. The main anomaly, located near Woodville, is related to occurrences of rare-earth and thorium mineralization. The proximity of the rare-earth and thorium-bearing rocks to outcrops of alkali granite suggests the mineralization is related to alkaline magmatism in the late Precambrian.

GEOLOGY AND GEOPHYSICS OF WARREN COUNTY, VIRGINIA by Eugene K. Rader and Stanley S. Johnson

Detailed geologic and geophysical mapping in Warren County by the Division of Mineral Resources affords the opportunity to examine the correlation of geological and geophysical data in the Blue Ridge and Valley and Ridge physiographic provinces in the northern part of Virginia.

Along the west slope of the Blue Ridge the Catoctin and Pedlar formations and the Chilhowee Group are readily distinguishable

by their characteristic magnetic pattern. Large greenstone intrusives are well defined by linear magnetic highs in the southern part of the county. Major faults are frequently shown as a series of aligned magnetic lows. Northeast of Front Royal the aligned magnetic lows are associated with a collapse breccia zone.

A north-northwestward-trending linear extends across Warren County from near Compton Peak through Buckton. It corresponds to the abrupt Bouguer gravity gradient change. The sinuous nature of the Front Royal Fault may be explained by late basement movement along the linear that warped the fault as part of a northeastward-facing monocline.

CORRELATION OF STREAM-SEDIMENT MINERALOGY WITH GEOLOGY, CENTRAL PIEDMONT OF VIRGINIA by Richard S. Good

Semiquantitative analysis of minerals in stream sediments in Fluvanna and western Goochland counties accurately reflects nearby bedrock geology in much of the area and is useful as an aid or supplement to geologic mapping.

Rapid analysis by X-ray diffraction and binocular microscope was made on samples already collected for regional trace-element studies. Comparisons of stream-sediment and soil mineralogy samples were indicative of a much greater abundance and freshness of unstable minerals in stream sediments compared to soils.

Microcline in large amounts (5 to 25 percent) was found to be associated with sediments derived from migmatite of the Hatcher complex, particularly in areas of younger plutons within the Hatcher and in areas of pegmatite. Microcline is strikingly absent (less than 2 percent) in the Columbia syncline. Amphibole (hornblende) comprises 3 to 15 percent of samples taken from streams draining Chopawamsic metavolcanic rocks and actinolite from some diorite intrusives. Epidote in amounts of 3 to 15 percent is characteristic of sediments derived from the Hatcher complex and is strikingly absent from the Arvonian and Columbia synclines and thus outlines them. The garnet-staurolite mica schist belt of the Columbia syncline is shown by both garnet and staurolite, and rocks of the Candler Formation are reflected in a broad zone of high mica stream sediments with statistically high lithium content.

GEOLOGY OF THE PIEDMONT OF VIRGINIA—INTERPRETATIONS AND PROBLEMS by James F. Conley

Virginia contains three areas of exposed Grenville-age basement—the Sauratown Mountains anticlinorium, the Blue Ridge anticlinorium, and the gneiss dome in Goochland County. Rocks of the Lynchburg, Catoctin, Candler, and Chopawamsic formations overlie the basement on the southeastern limb of the Blue Ridge anticlinorium. The Chopawamsic Formation is correlated with metavolcanic rocks to the southwest at Danville. Rocks of the Carolina slate belt are suggested to conformably overlie these metavolcanic rocks. The Quantico and Arvonian synclines contain rocks that are tentatively correlated with each other and are believed to unconformably overlie the Chopawamsic Formation. The Quantico syncline is thought to be folded around the northwest limb and nose of the later-formed Columbia synform. With increasing metamorphic grade to the southeast, rocks of the Chopawamsic Formation grade into the Hatcher complex. The discovery of billion-year-old felsic gneiss in an antiformal structure in Goochland County is evidence that continental crust underlies this sequence of rocks and makes questionable a suture zone in the Piedmont of Virginia.

ADDITIONS TO STAFF

Mr. David A. Hubbard, Jr. was employed by the Division on January 16, 1978 and will assist with geologic mapping studies in the Coastal Plain area of the State. He earned his B.A. in geology from the University of Virginia, Charlottesville, Virginia in 1973 and later pursued environmental work to receive his M.S. from the same school in 1977. He has worked with recent sediments and maintains an interest in developing applications of geologic information related to land-modification planning and development.

Mr. Peter S. Frischmann joined the Division staff on March 16, 1978 and has been assigned to the western mapping section. He is engaged in geologic investigation supportive to development of sequential land use of the State. Mr. Frischmann received his B.A. in geology from Lafayette College, Easton, Pennsylvania in 1974 and his M.A. in geology from Temple University, Philadelphia, Pennsylvania in 1978.

✕

✕

✕

PUZZLE ANSWERS

Did you find all these important mineral resources as shown on page 22 in the puzzle?

Amphibolite	Gravel	Petroleum
Anhydrite	Granite	Quartzite
Aplite	Gypsum	Sand
Basalt	Iron	Shale
Clay	Kyanite	Silver
Coal	Lead	Slate
Diabase	Lime	Soapstone
Dolomite	Marl	Talc
Feldspar	Natural Gas	Zinc
Gems	Oyster Shells	

✕

✕

✕

NATURAL HERITAGE DAY

Sunday, June 18, 1978, was designated as Natural Heritage Day by Governor John N. Dalton on behalf of the Virginia Department of Conservation and Economic Development. According to Mr. Fred Walker, Department Director, this was an opportunity for Virginians to consider and observe the State's natural heritage, particularly the industrial jobs and products that benefit from it. The economic well-being of Virginia's citizens can co-exist with protection of the environment. At many facilities of the Department's Divisions special events were held to emphasize the importance of the Day.

VIRGINIA GEOLOGY FIELD CONFERENCE

On October 14-15, 1978, the Tenth Annual Field Conference will be conducted by Wayne Newell and Robert Mixon, U. S. Geological Survey about the fault-controlled Coastal Plain margin at Fredericksburg, Virginia. Conference trips, where geological features are discussed in the field, are open to all interested in the geology of Virginia. For information contact Bruce Goodwin, Department of Geology, College of William and Mary, Williamsburg, VA. 23185.

Organized in 1968 by members of the Geology Section, Virginia Academy of Science, the Field Conference was established to provide annual fall field trips, on which anyone interested in the geology of Virginia would have the opportunity to view and discuss geological features in the field. The trips brought together and helped establish communication and fellowship between geologically oriented persons from such diverse groups such as colleges, industry, State and Federal geological surveys, earth science teachers, soil scientists, and rock and mineral collectors. Guidebooks are written for the trips; these can also be used for other groups or individuals to retrace the routes and study the geology. For availability of past guidebooks contact Bruce Goodwin at address listed above. The only officer is a Secretary, elected for an indefinite length of time by the members of the Geology Section, Virginia Academy of Science.

The first trip of the Field Conference was held in Williamsburg in the Fall of 1969 with about 80 participants and a great deal of optimism and enthusiasm. Since then annual trips have been held in the areas of Lexington, Charlottesville, Abingdon, Martinsville, Richmond, Big Stone Gap, Front Royal and Harrisonburg. All the physiographic provinces of the Commonwealth have been visited at least once. Some years over 150 people have attended. At the 1978 spring meeting of the Geology Section, Virginia Academy of Science, the members voted to establish an award of \$50 each year to the student who presents the best paper at the section annual meeting.

The broad support for the Field Conference is indicated by the diversity of trip leaders. Of the nine field trips, five have been organized by college faculty, two by staff of the Virginia Division of Mineral Resources, and two by members of the United States Geological Survey.

✕

✕

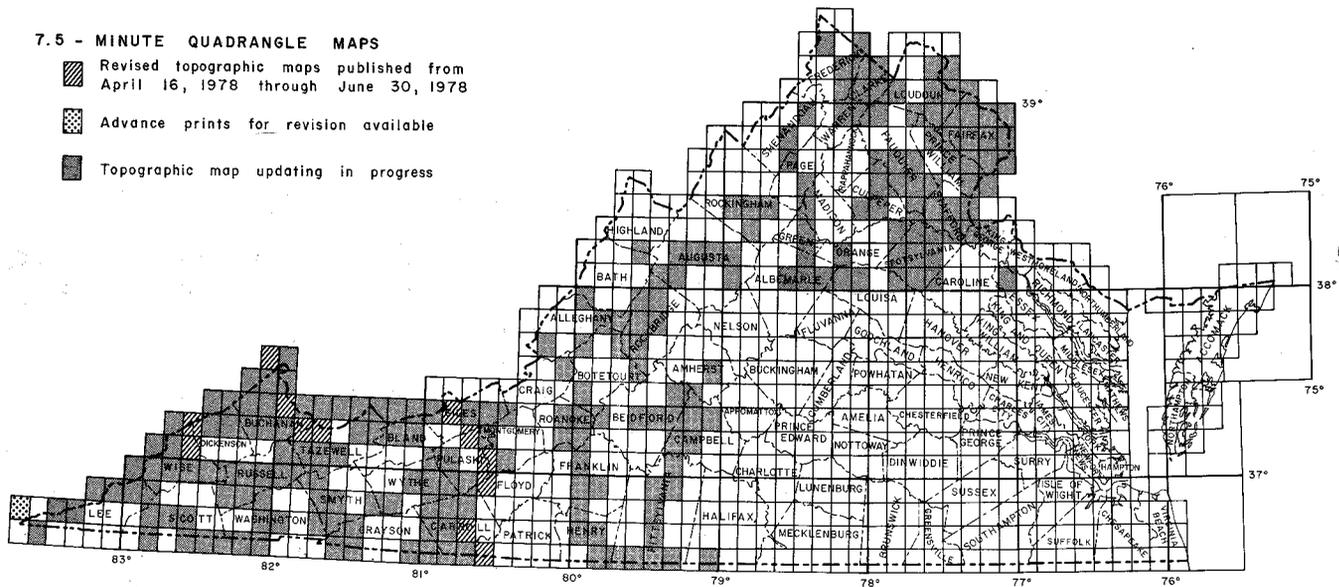
✕

Return Postage Guaranteed

TOPOGRAPHIC MAPS

7.5 - MINUTE QUADRANGLE MAPS

-  Revised topographic maps published from April 16, 1978 through June 30, 1978
-  Advance prints for revision available
-  Topographic map updating in progress



Revised 7.5-minute quadrangle maps published from April 16 through June 30, 1978:

Revised Maps

Amonate	Jewell Ridge	Patterson
Fancy Gap	Majestic	Pound
Indian Valley	Mt. Airy North	Radford South
Jenkins East	Narrows	Staffordville

ADVANCE PRINTS

Advance prints are available at \$1.25 each from the Eastern Mapping Center, Topographic Division, U.S. Geological Survey, Reston, Virginia 22902.

Advance Prints for Revision Middlesboro North

PUBLISHED TOPOGRAPHIC MAPS

Total State coverage completed; index is available free. Updated photorevised maps, on which recent cultural changes are indicated, are now available for certain areas of industrial, residential, or commercial growth. Published maps for all of Virginia are available at \$1.25 each (plus 4 percent State sales tax for Virginia residents) from the Virginia Division of Mineral Resources, Box 3667, Charlottesville, Virginia 22903.