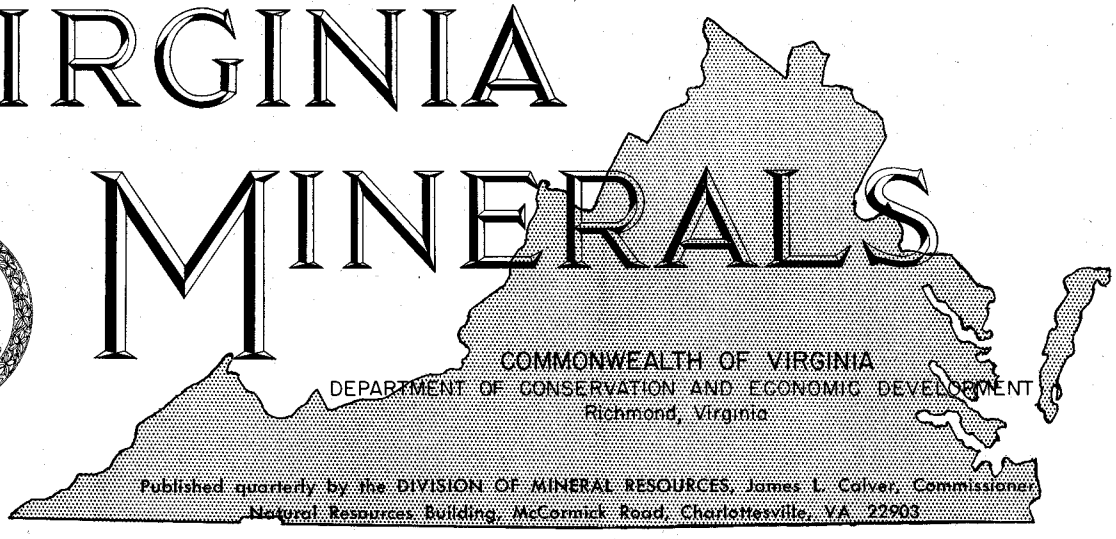
VIRGINIA MINERALS



Vol. 16 MAY, 1970 No. 2

MINERAL RESOURCE DEVELOPMENT[1]

Hollis M. Dole[2]

Among all the peoples of the world, we in the United States enjoy the highest average standard of living. That standard is based on our consumption of an extraordinary volume and variety of minerals and mineral products. If we expect to maintain and improve that standard, we must first insure that our essential mineral needs are met. And they must be met at costs that are in line with other material and service costs.

Even the most conservative projections of mineral consumption and requirements indicate that assuring future supply will require new discoveries and far more efficient extractive and processing technologies than we have today. Our own population is expected to total about 320 million by the beginning of the next century and that of the world should reach the 6½ billion mark by then. Right now, we have only 6 percent of the world's population but consume nearly a third of the world's minerals. If the estimates prove correct we will have only about 5 percent of the world's population in the year 2000, but the total number of people in this country will have increased by one-third and the world total will be almost twice what it is today.

Two conclusions are inescapable. First, our requirements for raw materials and energy in this country will mount rapidly over the next three decades. Second, throughout the world, competition for the resources that supply these basic necessities will increase enormously.

Already the gap is widening between the percentage of our mineral requirements that we are able to supply domestically and that which we must obtain from sources outside our boundaries. "Able" and "must" are highly significant words in this context. They represent the consequences of a choice that we have made.

During World War II our economy began to expand very rapidly and it has been zooming right ahead ever since. This rapid growth demanded a correspondingly large increase in mineral supply. But two world wars and the tremendous industrial development that made us a major world power had already skimmed much of the cream from our domestic mineral crop. It became clear that our burgeoning requirements would have to be satisfied either from our own domestic resources, which were diminishing in grade, or from richer foreign sources which, at that time, were eager to attract American capital.

The rapid industrialization that has occurred outside the United States in the past two decades has stimulated increased per capita demands for minerals abroad. Although these per capita rates are still far below the levels here at home, they are rising more rapidly than ours. And, as in-

[1] Excerpts from Department of the Interior news release, March 9, 1970.

[2] Assistant Secretary, Department of the Interior, Washington, D.C.

dustrialization gains momentum elsewhere in the world, the terms of trade for the United States are worsening. We no longer get the kind of deals we used to. Take, for example, the rise in host-government revenues from oil.

Moreover, the number of domestic mineral producers with the financial resources needed in shifting to foreign sources—or, for that matter, in conducting research on the necessary scale—is limited. As a result, many of our smaller producers have found themselves captive to a declining resource base and a relatively static technology.

This problem is compounded by the fact that it confronts us at a time when we are becoming acutely aware of the necessity for assuring optimum use of our land surface. The projected growth of our population will generate increased demands on the fixed quantity of land that we have. More land will be needed for growing food, more for living space, and more for recreation. The pressures already are intense enough in some parts of the country that the prices being asked for the land, in themselves, are so high as to preclude the profitable development of any minerals it might contain. Those pressures can only increase.

Not only do we need a technology that will enable industry to extract and process lower grade resources at reasonable monetary costs; we also need—and need desperately—mining and processing systems that are low-cost in terms of insult to the environment in which we all must live.

President Nixon has launched an intensive Federal effort to rescue our environment from the menace of pollution. It is "now or never," he has said. Clearly, we must begin the rescue within this decade or it will be too late. Time will run out on us. The President, accordingly, has begun the process of reordering our national priorities. Under his leadership the government this year will spend more on human resources and the improvement of our environment than on national defense. This is the first time *that* has been done in two full decades.

The national determination to have a quality environment carries grave implications for the industries that supply us with essential minerals and fuels. The technology utilized by these industries was originally designed to provide large volumes of raw material at low and stable prices over long periods. This it has done and done well. But that same technology has been predicated too often on the mistaken belief that costs could be avoided by using the air, the water, and the land as giant sinks for the disposal of mining and processing wastes. The costs weren't really avoided after all. They were merely deferred. As Secretary Hickel has put it: "We carelessly assumed that Nature could absorb unlimited punishment. Now, we have to pay the bill."

We have a lot of expensive cleaning up to do. But the real challenge lies ahead of us. Developing a mining and processing technology that is wholly compatible with our growing demands for environmental quality and at the same time capable of supplying an adequate share of our mineral requirements from resources that are diminishing in grade will present a monumental task. It has been considered more or less axiomatic, for example, that the lower the grade of the material being mined the more waste will be generated in the process. And the average grade of our domestic mineral deposits is diminishing. If we hope to get more out of less—as we clearly must—without further punishing our environment, we urgently need new and better extractive and processing methods . . . methods that drastically reduce waste.

And that brings me to what I consider to be one of the most critical aspects of our current minerals dilemma: the shortage of skilled manpower.

Technologic progress is based on scientific and engineering creativity. To accomplish the revolutionary changes that are called for in mineral technology, we need the energy and imagination of youth. We need bright young people by the thousands.

We are *not* getting them!

Twenty years ago, for example, the mining schools and universities in this country graduated, on the average, some 500 mining engineers each year. Last year we graduated 110. And many of those were foreign students who will return to their homelands to assist in the development of their own mineral resources. Fifteen years ago there were 37 educational institutions in the United States with accredited curricula in mining engineering. By 1967 there were only 17, and in many of them the courses of study were sorely in need of overhaul and upgrading. A similar pattern of decline can be detected in the fields of petroleum geology and engineering, and in none of the scientific and engineering disciplines that are essential to mineral and fuel development

can we be satisfied with the size and quality of our educational effort.

The bright young people who are highly motivated towards science and engineering are being lured into such glamour fields as electronics, atomic energy, and space exploration. They are going into the industries and programs that *consume* minerals and fuels. Meanwhile the supply end of the pipeline is being left to languish, unattended. This trend, unless reversed, will spell national disaster!

An adequate and dependable supply of minerals and fuels is essential to our economy, our security, and our industrial and social advancement. And we must assume further that a substantial share of that supply should be derived from the development of our own domestic resources.

The global nature of mineral supply and demand precludes the advocation of a complete self-sufficiency policy. Such a policy would serve neither our own interest nor that of the world trading system of which we are such an important part. And even if it would, we simply could not adopt it. We are not that affluent in all the materials that we must have. Already we depend on imports for many vital commodities and if we are to be realistic we must expect that dependency to grow.

Conversely, we produce surpluses of certain mineral commodities which, in our own interest, must compete successfully in world markets. Clearly then, we must continue to seek — on mutually favorable terms — access to foreign sources of minerals and fuels that are not available from domestic deposits at costs that we can afford.

The laws relating to mineral development on public lands are in many respects antiquated and are currently under review and in that process the need for being able to anticipate developments well ahead of time has become abundantly apparent. Every scrap of information that bears on the problem of obtaining the maximum beneficial use of our public lands in the public interest has been eagerly sought and carefully studied by the Public Land Law Review Commission. Even so, the Commission has encountered many difficulties in achieving the kind of long-range review it must have in making its recommendations. Here again, we can glimpse the future only as "through a glass darkly," because we have not yet developed the capabilities the Government must have if it is to play its role well.

Minerals represent the basic material strength of the United States, and every one of us has an immense stake in assuring that we have them in adequate quantity and variety. Each of us also shares to some degree the responsibility for guaranteeing that stake. The Federal responsibility as I have defined it incorporates anticipation of need and planning to meet it, encouragement and provision of information to State and local governments and to industry, and, when absolutely necessary, regulation in the public interest.

State and local governments have similar responsibilities and similar roles to play, though on a more limited scale. Industry has a responsibility to supply the goods and services the public needs and to do so in a fashion and at a cost the public can afford. Financial institutions have a responsibility to invest the monies entrusted to them by their clients in activities that are compatible with the public and the National good. It is time now for a reinvestment in America's future.

President Nixon has said that one of the central themes of his New Federalism is "a willingness to return power to the people and dignity to the individual, through financial help to State and local governments and renewed reliance on private, voluntary action."

For many decades now power has been flowing from the people to the Federal Government and with that power has gone responsibility. If the flow of power is now to be reversed, so also must be the flow of responsibility. State and local governments, private industry, and private citizens must be ready and willing to accept greater responsibility if ours is to remain a free society, fully capable of self determination.

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ADDITION TO STAFF

Mr. John Branch Green, Jr. was employed by the Division on March 16, 1970, and will assist in the transfer of geology to 7.5-minute topographic quadrangle maps.

He received his B.S. degree in geology from Old Dominion University in 1968. Before coming to the Division, Mr. Green served a year of active duty with the Virginia Air National Guard and worked for the Maryland Academy of Sciences at the Calvert Cliffs project. His interests are paleontology and Coastal Plain geology.

OIL AND GAS DEVELOPMENT IN VIRGINIA DURING 1969

David M. Young [1]

A total of 2,845,846 Mcf (thousand cubic feet) of natural gas was produced in Virginia during 1969, compared to 3,388,788 Mcf for the previous year. Production was reported from four counties as follows: Buchanan County, 810,525 Mcf; Dickenson County, 423,676 Mcf; Tazewell County, 1,602,683 Mcf; and Wise County, 8962 Mcf. Production of oil in Lee County declined to 842 barrels from one well in the Ben Hur field. No production was reported from the Rose Hill field where oil had been produced since 1943. During the year, one well was drilled in Highland County. This test of the Oriskany sandstone was completed as a dry hole at 3980 feet.

Four operators in Buchanan County produced a total of 810,525 Mcf of gas as follows: Ashland Oil and Refining Company, 628,920 Mcf; Cabot Corporation, 49,167 Mcf; P & S Oil and Gas Corporation, 52,500 Mcf; and United Fuel Gas Company, 79,938 Mcf. There was no drilling activity in Buchanan County during 1969, although part of the area was still under consideration by various operators as a result of the completion of a large-volume gas well just across the State boundary in Pike County, Kentucky.

The Clinchfield Coal Company, division of The Pittston Company, produced 423,676 Mcf of gas from 42 wells in Dickenson County. Of this total, 421,726 Mcf was delivered to lines of the Kentucky-West Virginia Gas Company, and 1950 Mcf was used in field operations.

Pennzoil United, Inc. plugged and abandoned a test of the Oriskany sandstone in Highland County; total depth of this well was 3980 feet. The location is on the Bertha Smith farm approximately 1800 feet west of longitude 79°20′ W, and 950 feet south of latitude 38°25′ N.

In Lee County, one well in the Ben Hur field produced 842 barrels of oil. No production was reported from the Rose Hill field where oil had been produced since 1943. There was no new drilling in either the Ben Hur or Rose Hill fields. Seven wells drilled prior to 1969 were still pending decisions to deepen, fracture, or abandon.

[1] Chief Geologist, Clinchfield Coal Company, division of the Pittston Company. The Virginia Division of Mines, W. Foster Mullins, Chief, furnished production data.

Small amounts of gas (less than 1000 Mcf) were produced for local use from a well in the Oriskany sandstone in Rockingham County and from a well in the "Big Lime" in Russell County.

Gas production from Tazewell County amounted to 1,602,683 Mcf as reported by two operators: Consol-Ray Brothers, 1,020,538 Mcf and United Fuel Gas Company, 582,145 Mcf. No drilling activity was reported for Tazewell County.

Two wells owned by the Penn Virginia Corporation in the Stonega field of Wise County produced 8962 Mcf of gas for use in the immediate area. There was no drilling activity in Wise County during 1969. The Trans State Oil Ltd. No. 1 Riggs wildcat located about 1.5 miles east of Big Stone Gap stood idle throughout the year with a fishing job at 1841 feet near the top of the Trenton limestone. If fishing operations are renewed and the hole cleared, drilling will probably proceed through the Trenton limestone. Also, it has been reported that an attempt will be made to stimulate a zone that had a show of oil from 970 to 985 feet in the Clinch sandstone before plugging and abandonment.

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GEOGRAPHIC NAMES IN VIRGINIA[1]

The following excerpts are taken from an article in a recent issue of Surveying and Mapping Magazine entitled "Geographic Names and the Public Interest" by Donald J. Orth, U. S. Geological Survey.

The act of naming is one of the most ancient arts of speech. Today, with a proliferation of various forms of communication, geographic names are an important and essential element in making our lives intelligible. Names have psychological, cultural, and legal significance. They may identify areas of administrative or political responsibility. They are important in defining property, mineral, or water rights. In this age of intense and sophisticated investigations of the environment and physical aspects of the land, public and scientific needs are for exact identification labels.

A United States Board on Geographic Names was established in 1890, and the current interdepartmental Board was authorized by an Act of Congress in 1947. Name controversies are re-

[1] Communications about geographic names should be addressed to: J. O. Kilmartin, Executive Secretary, Domestic Geographic Names, U. S. Geological Survey, Washington, DC 20242.

ferred to the Board to determine choice, spelling, and application of geographic names for Federal usage.

In considering name changes and proposed new names, the Board follows principles that avoid use of names duplicated locally, derogatory names, and names commemorative of living persons. The Board tends to have favorable action on names appropriate to the area, commemorative of persons or events associated with the area, euphemistically acceptable, or with a record of local or historical usage.

Bennington Mill: locality, 1.5 miles south of the village of Comers Rock; Grayson County, Virginia; 36°43′22″ N, 81°13′42″ W. Not: Benington Mill, Benington Mills.

Black Rock Mountain: mountain, elevation 3446 feet, 2.5 miles northwest of Wintergreen; Nelson County, Virginia; 37°54′29″ N, 78°56′15″ W. Not: Black Rocks.

Bogan Run: stream, 1.5 miles long, heads at 38°08′43″ N, 79°49′45″ W, flows northwest to Back Creek 8.5 miles northwest of the village of Warm Springs; Bath County, Virginia; 38°09′15″ N, 79°51′01″ W. Not: Bogen Run.

Bonner Mountain: ridge, elevation 3687 feet, extends northwest 1 mile from Warm Springs Mountain 3.5 miles north-northeast of the village of Warm Springs; Bath County, Virginia; 38°05′00″ N, 79°45′02″ W. Not: Boner Mountain.

Brattons Run: stream, 10 miles long, heads at 37°52′18″ N, 79°37′18″ W, flows northeast to the Calfpasture River 1.5 miles south of Goshen; Rockbridge County, Virginia; 37°58′09″ N, 79°30′15″ W. Not: Bratton Creek, Brattons Creek, South Fork.

Burgess: settlement, 5 miles west of Sunnybank; Northumberland County, Virginia; 37°53′00″ N, 76°20′52″ W. Not: Burgess Store.

Campbells Mountain: mountain, elevation 2414 feet, 5 miles northeast of Montvale; Bedford County, Virginia; 37°25′45″ N, 79°39′13″ W. Not: McFalls Mountain.

Catrons Mill: locality, 3.5 miles east-southeast of the village of Elk Creek; Grayson County, Virginia; 36°42′30″ N, 81°07′12″ W. Not: Cattron, Cattrons Mill.

Cowardin Run: stream, 2.8 miles long, heads at 38°01′25″ N, 79°48′50″ W, flows west-northwest to Rowan Run 3.8 miles west-southwest of the village of Warm Springs; Bath County, Virginia; 38°02′13″ N, 79°51′27″ W. Not: Cowardins Run, Rowan Run.

Donley Hollow: ravine, 1.4 miles long, heads at 38°06′41″ N, 79°40′13″ W, trends southeast to the Cowpasture River 21 miles northeast of the city of Clifton Forge; Bath County, Virginia; 38°06′00″ N, 79°39′00″ W. Not: Sandy Hollow, Turkeypen Hollow.

Drummonds Millpond: lakes, largest 0.4 mile long, 1.5 miles southwest of Parksley; Accomack County, Virginia; 37°46′00″ N, 75°41′23″ W. Not: Drummond's Mill Pond, Drummond Ponds [former decision].

Elliotts Creek: stream, 1.3 miles long, heads at 37°13′07″ N, 75°59′45″ W, flows west to Chesapeake Bay 2 miles northwest of Cheapside; Northampton County, Virginia; 37°13′07″ N, 76°00′52″ W. Not: Elliot's Creek, Elliots Creek [former decision], Elliott's Creek.

Fishermans Inlet: inlet, between Cape Charles and Fishermans Island; Northampton County, Virginia; 37°06′30″ N, 75°58′00″ W. Not: Fisherman Inlet [former decision], Fisherman's Inlet.

Fishermans Island: island, 1.5 miles long, at the entrance to Chesapeake Bay, 1 mile south of Cape Charles; Northampton County, Virginia; 37°05′35″ N, 75°58′10″ W. Not: Fisherman Island [former decision], Fisherman's Island, Linen Bar.

Kents Store: settlement, 9 miles north of Columbia; Fluvanna County, Virginia; 37°52′45″ N, 78°07′45″ W. Not: Kent [former decision], Kent's Store.

Lakeside Village: village, on the east side of Trice Lake 5 miles west of Cartersville; Cumberland County, Virginia; 37°39′45″ N, 78°10′45″ W. Not: Flanagan Mills [former decision], Flanagans Mill, Flanagans Mills.

Mill Gap: settlement, in Bluegrass Valley 9 miles southwest of Monterey; Highland County, Virginia; 38°19′20″ N, 79°42′15″ W. Not: Millgap [former decision].

Parkers Marsh: marsh, on a peninsula in Chesapeake Bay 4.5 miles northwest of Onancock; Accomack County, Virginia; 37°44′15″ N, 75°49′15″ W. Not: Parker Marsh.

Pocaty River: stream, 4 miles long, heads at 36°39′40″ N, 76°08′05″ W, flows east to the North Landing River 2.5 miles southwest of the community of Pleasant Ridge; Chesapeake and Virginia Beach cities, Virginia; 36°40′40″ N, 76°04′08″ W. Not: Pokety Creek.

Quinby Inlet: inlet, along the coast of the Atlantic Ocean, between Hog Island and Parramore Island; Accomack and Northampton counties, Virginia; 37°28′ N, 75°40′ W. Not: Little Machipongo Inlet.

Rowan Run: stream, 3.7 miles long, heads at 38°00′50″ N, 79°50′10″ W, flows northwest through Coles Hollow to the Jackson River 4.5 miles west of the village of Warm Springs; Bath County, Virginia; 38°02′52″ N, 79°52′10″ W.

Smilax Branch: stream, 1 mile long, heads at 38°56′49″ N, 77°21′34″ W, flows northwest to Sugarland Run 1.2 miles southeast of Herndon; Fairfax County, Virginia; 38°57′22″ N, 77°22′22″ W.

Stave Run: stream, 0.7 mile long, heads at 38°56′43″ N, 77°21′58″ W, flows northwest to Sugarland Run 1.4 miles southeast of Herndon; Fairfax County, Virginia; 38°57′08″ N, 77°22′30″ W. Not: Whiskey Barrel Run.

Stony Creek: stream, 6 miles long, heads at 37°55′50″ N, 78°57′05″ W, flows southeast to the South Fork Rockfish River 1.2 miles east of Wintergreen; Nelson County, Virginia; 37°53′00″ N, 78°52′44″ W. Not: Big Stony Creek, Big Stony Run, Stoney Creek.

Townsend Draft: watercourse, 3.5 miles long, heads at 38°17′37″ N, 79°48′07″ W, trends east to Back Creek 1.5 miles north-northwest of Valley Center; Highland County, Virginia; 38°17′09″ N, 79°44′48″ W. Not: Townsend's Draft, Townsman Draft [former decision], Warwick Run.

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GEOLOGY SECTION MEETING

Fifty-six papers describing research and uses of geology in Virginia will be presented at the May 7-8, 1970, annual meeting of the Geology Section, Virginia Academy of Science, to be held at the John Marshall Hotel, Richmond, Virginia. The invitational address, "Applying Environmental Geology," will be a discussion of how the geologist can apply his talents toward making recommendations for the most economical and efficient use of the earth's surface. Other papers will deal with water supply and design, damage caused by Hurricane Camille in Nelson County, soil surveys, earthquakes, geologic education methods and facilities, professional societies, highway geology, preparation of topographic maps, archeology, nature interpretive trails, and many aspects of rock and mineral characteristics in Virginia. Movies depicting the effects of the Alaska Good Friday earthquake and the eruption of the Hawaiian volcano, Kilauea, are also scheduled. All interested in geology and related sciences are invited to attend.

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STATUS AND AVAILABILITY OF AEROMAGNETIC INFORMATION

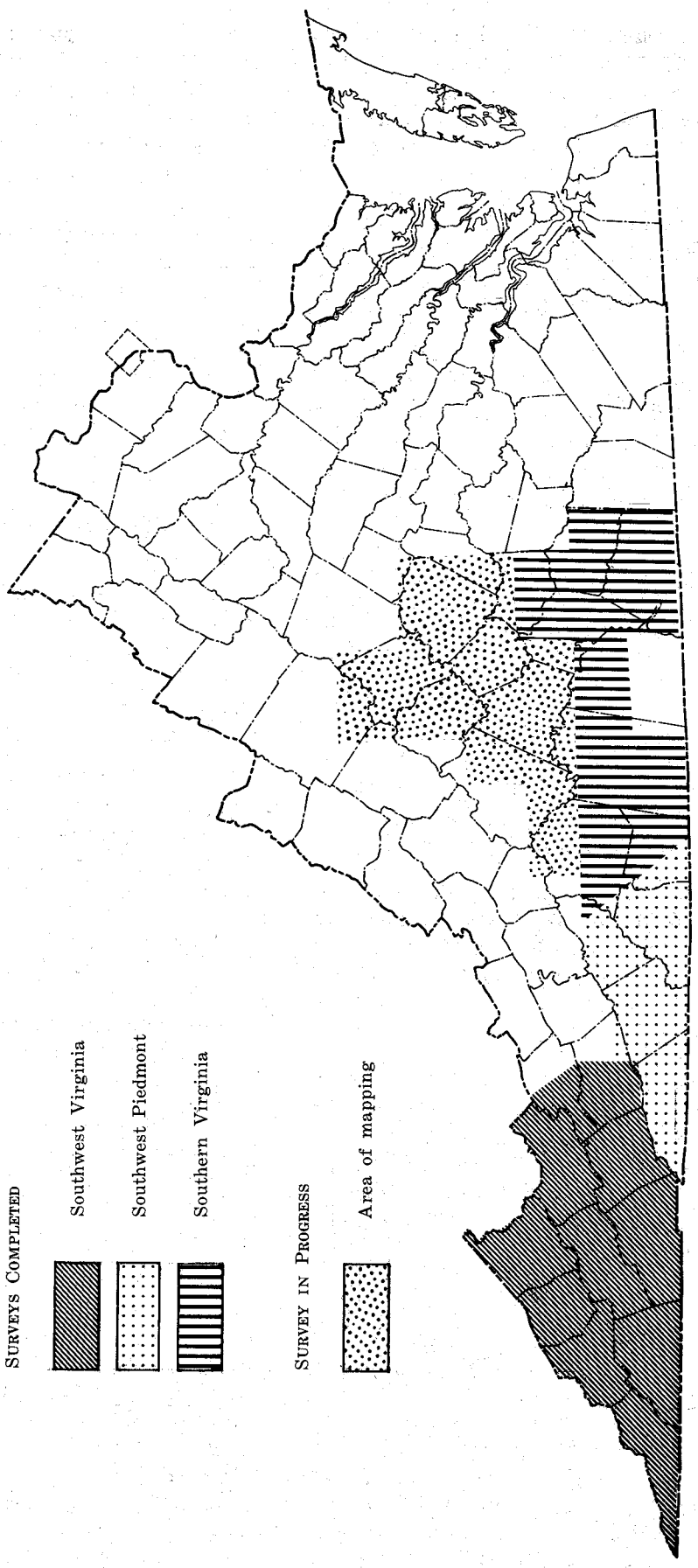
An aeromagnetic survey of southwest Virginia was flown in 1962. The results of this survey, which includes an area of 4000 square miles, are contained in a report that consists of six isomagnetic maps, a geophysical interpretation, and six interpretative maps.

During 1965, an airborne magnetic and radiometric survey was flown across an area of nearly 1700 square miles in the southwest Piedmont of Virginia. The results were published in Information Circular 12 which contains four maps.

An aeromagnetic survey of a 3450 square mile area in southern Virginia was made in 1969, and the information therefrom is contained on 16 maps. These maps are available for reference use at the Division's library in Charlottesville, or ozalid copies may be purchased upon request.

Aeromagnetic maps for all of the aforementioned areas are presently available for purchase. For further information, contact the Virginia Division of Mineral Resources, Box 3667, Charlottesville, VA 22903.

On March 24, 1970, a contract was awarded for an aeromagnetic survey that includes more than 3800 square miles in the central Virginia area. Work on this project is currently in progress, and will cover portions of Amherst, Appomattox, Augusta, Bedford, Buckingham, Charlotte, Cumberland, Franklin, Nelson, Pittsylvania, Prince Edward, Roanoke, and Rockbridge counties. The data will be compiled to provide basic information for the interpretation of the geology and evaluation of mineral occurrences.



STATUS OF AEROMAGNETIC MAPPING

Virginia Division of Mineral Resources
Box 3667
Charlottesville, VA 22903

Second-class postage paid at
Charlottesville, Virginia.

Return Postage Guaranteed

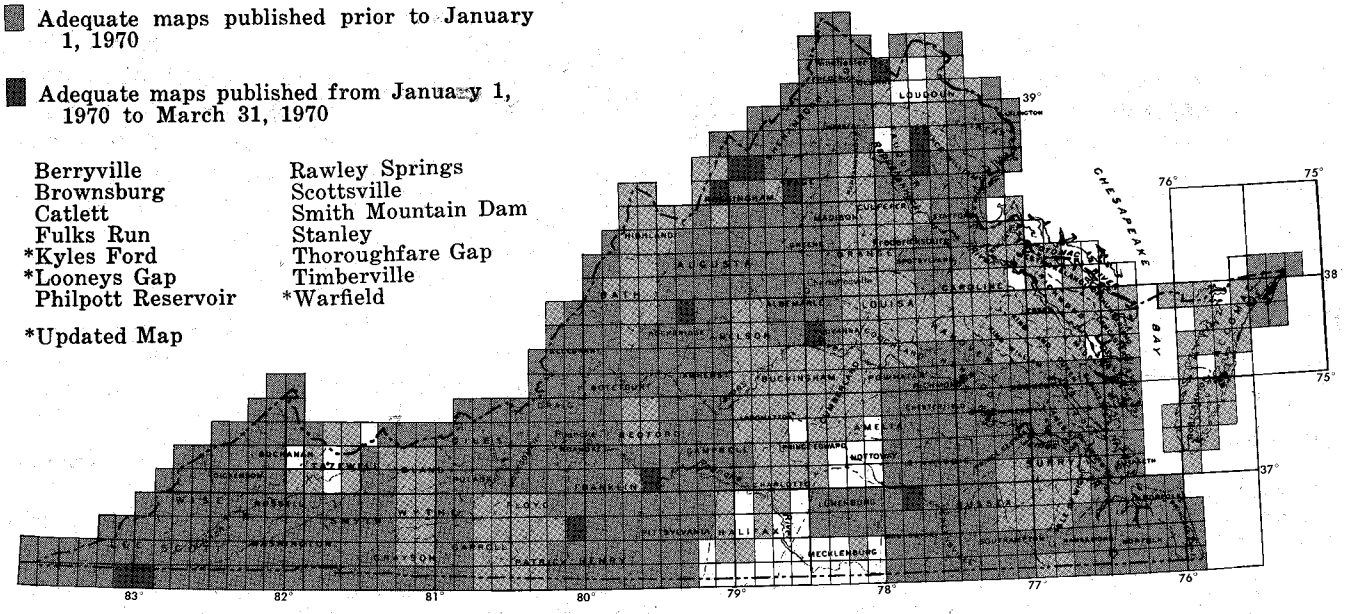
TOPOGRAPHIC MAPS

7.5-MINUTE QUADRANGLE TOPOGRAPHIC MAPS

- In preparation—map not yet available
- Advance prints and revision compilations available
- Adequate maps published prior to January 1, 1970
- Adequate maps published from January 1, 1970 to March 31, 1970

Berryville	Rawley Springs
Brownsburg	Scottsville
Catlett	Smith Mountain Dam
Fulks Run	Stanley
*Kyles Ford	Thoroughfare Gap
*Looneys Gap	Timberville
Philpott Reservoir	*Warfield

*Updated Map



ADVANCE PRINTS AND REVISION COMPILATIONS

Advance prints and copies of revision compilations are available at 50 cents each from the U. S. Geological Survey, Topographic Division, 1109 N. Highland St., Arlington, VA 22210.

PUBLISHED MAPS

State index is available free. Updated maps, on which recent cultural changes are indicated, are now available for certain areas of industrial, residential, or commercial growth. Published maps are available at 50 cents each from the Virginia Division of Mineral Resources, Box 3667, Charlottesville, VA 22903.