

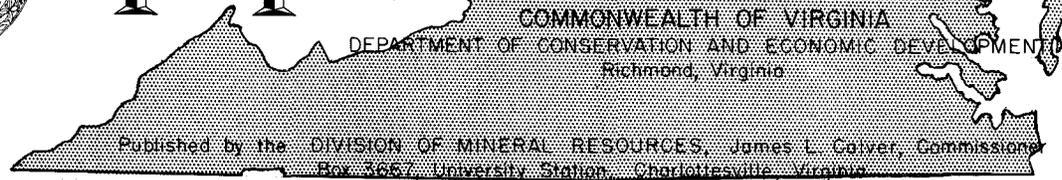
VIRGINIA



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THE MINERAL INDUSTRY OF VIRGINIA IN 1961¹

This review of the mineral industry of Virginia for 1961 is an advance summary of information that will be published by the U. S. Bureau of Mines in the "Minerals Yearbook" for 1961. Information on Virginia that is included in the annual "Minerals Yearbook" is prepared each year under a cooperative agreement between the U. S. Bureau of Mines and the Virginia Division of Mineral Resources. Data for individual companies are from non-confidential sources. Statistics for coal production include coal produced from deposits that lie within Virginia, whether the mine opening is in Virginia or in an adjacent state, and exclude production from operations that produced less than 1,000 tons during the year.

Value of Virginia's mineral output in 1961 rose 9 percent to \$222 million and was only slightly less than the high established in 1957, according to the Bureau of Mines, United States Department of the Interior. Bituminous coal, sand and gravel, zinc, stone, and kyanite established production records in both quantity and value. All of the construction materials were at accelerated rates of activity, registering gains in tonnage over 1960. Production of iron ore (pigment material), pyrites, salt, soapstone, and titanium concentrate were less than in the previous year. Production of bituminous coal, the leading commodity in terms of both quantity and value increased 9 percent and was 2 percent higher than the former high of 1959. Output of lead increased nearly 75 percent and that of zinc

nearly 50 percent over the previous year. The chief minerals in order of value of production were coal, stone, portland cement, sand and gravel, lime, and zinc. The values of fuels comprised 57 percent of the total value of mineral production in the State (60 percent in 1960 and 63 percent in 1959). The value of nonmetals was 39 percent of the total and that of metals 4 percent.

Trends and Developments. — Among the outstanding developments in Virginia in 1961 were: a new coal mine rated at 1.2 million tons annually; a new underground gypsum mine; and the doubling of capacity of the Norfolk & Western Railway Co. Lambert's Point coal pier at Norfolk. A new company, Minerals Development Corp., was formed for the exploration and possible development of iron ore deposits in iron-bearing sandstone in Giles and Bland Counties. This is a joint project of the Norfolk & Western Railway Co., the Roanoke Electric Steel Corp., and E. L. Keesling of Bramwell, W. Va. A number of prospecting permits have been taken up in the Jefferson National Forest in the above mentioned counties.

Of particular significance to the economy of the whole Norfolk and Hampton Roads area is the Chesapeake Bay Bridge-Tunnel, a 17½-mile \$200 million bridge-tunnel crossing of Lower Chesapeake Bay, from the tip of the Eastern Shore to a point near Norfolk. This project will require over 500,000 tons of sand and gravel and nearly 1.7 million tons of granite in sizes varying

¹ From summary report H-209—US Bureau of Mines, Region V.

from three-quarters of an inch to 10 to 15 tons. This material will be supplied principally from Virginia quarries by four companies. Part of the material, however, will be obtained from North Carolina. All of the sand and gravel will be supplied by Southern Materials Co., Inc., the prime contractor, and part producer of the rock used in the project. Most of the rock used in the project will be utilized in connection with the construction of four artificial islands.

Of particular interest to the Roanoke-Lynchburg-Danville area was the announcement of the pending construction of two dams along the Roanoke River, an Upper Dam across Smith Mountain Gap and a Lower Dam 17 miles downstream near Leesville.

Other developments in Virginia included the designing and building of a \$22 million nuclear core for the Consolidated Edison Co.'s Indian Point, N. Y. atomic installation. The active core for this project was built by Babcock & Wilcox Co., Atomic Energy Division Laboratory at Lynchburg.

Legislation and Government Programs. — Small quantities of mica were purchased from two operators in Amelia and Henry Counties for the National Stockpile. Purchases by the Government were effected through the General Services Administration (GSA), Spruce Pine (N. C.) and Franklin (N. H.) Materials Purchase Depots.

Mineral Fuels

Coal (Bituminous). — Spurred by sharply increased output in Dickenson and Wise Counties, production rose to 30.3 million short tons, a new high — 2 percent higher than in 1959, the previous record year. Production data includes coal produced from deposits within the State of Virginia whether the mine opening is or is not inside the State boundary and excludes operations producing less than 1,000 tons per year. Value of production however was 18 percent below the \$154 million recorded in 1959. The average value per ton was 6 percent less than in 1960. The continuing fall of coal prices attested to a vigorous program of modernization and cost cutting at the State's mines. Both low- and high-volatile coals were produced for domestic and industrial purposes and for export. A small tonnage of

semi-anthracite was mined for domestic heating. Coal was produced in 8 southwestern counties with Buchanan, Dickenson, Wise and Russell Counties accounting for 95 percent of the total. Of total production 93 percent came from underground mines. Strip and auger mined tonnage comprised 5 and 2 percent of output respectively, similar to 1960. Underground production increased 9 percent to 28.2 million tons.

Coal mechanically cleaned in 1961 totaled 15 million short tons or 50 percent of the total coal produced, compared with 48 percent in 1960, reflecting a greater demand for a better prepared product. Eighty-seven percent was prepared by wet-washing other than jigs. Twenty-two cleaning plants were in operation during the year. The quantity of coal crushed comprised 28 percent of the total compared with 31 percent in 1960 and 17 percent in 1959. Dust-allaying and anti-freezing preparations were used to treat 14 percent of the total coal mined.

A new 1.2 million ton coal mine was being developed by Republic Steel Co. and Island Creek Coal Co. in Buchanan County near Grundy. The Norfolk & Western Railway Co. doubled capacity of its Lambert's Point coal pier at Norfolk.

Coke. — Wise was the only coke producing county in the State. Five companies produced beehive coke in more than 660 ovens, including one battery of Mitchell or rectangular ovens. The annual coke production capacity was approximately 375,000 net tons. No slot-type ovens were operated in Virginia, and no byproducts were recovered.

Fuel Briquets and Packaged Fuel. — One firm in Virginia produced packaged fuel. Shipments of fuel briquets into Virginia totaled 29,942 tons in 1961, a decrease of 18 percent from 1960.

Petroleum and Natural Gas. — The production of petroleum and natural gas in Virginia was small and mostly of local significance. As in 1960, no new oil wells were completed and no new discoveries of oil were made. The only production of petroleum in Virginia was from the Rose Hill field, Lee County, where production was larger than in 1960. Production of natural gas was approximately the same as in the previous year. Eight successful natural gas wells were completed as well as eight dry holes. Of the

eight completed gas wells, six were in Buchanan County, and one each in Wise and Tazewell Counties. Formations from which natural gas was obtained included the Big Lime, Berea sand and the Ravencliff Sand. According to the American Gas Association, reserves of natural gas at the end of 1961 totaled 34,062 million cubic feet, a slight increase over reserves at the end of 1960. All reserves represented free gas, not in contact with crude oil in the reservoir, or so-called non-associated reserves.

Distribution of natural gas to consumers was through three pipe-line companies—Hope Natural Gas Co., Kentucky-West Virginia Gas Co., and United Fuel Gas Co. Four firms were active in drilling for natural gas during the year. These were United Producing Co., Inc., United Fuel Gas Co., Cabot Corp., and Clinchfield Coal Co. The wildcat oil test near Manquin on the Atlantic Coastal Plain in King William County was drilled to a total depth of 3,278 feet. Although the well was dry, it had significance because it indicated the presence of a hitherto unknown Triassic basin.

Nonmetals

Aplite. — Production of apelite by four firms in Amherst, Hanover and Nelson Counties totaled 97,465 long tons valued at \$650,770. This was the first year of full production for Metal and Thermit Corp. in Hanover County, near Montpelier. This output was used entirely in the manufacture of glass. Sizable tonnages, however, were consumed for roofing granules, as concrete aggregate and in the manufacture of brick and block, increasing uses in recent years.

Cement. — Stimulated by greater construction activity in 1961, shipments of portland and masonry cement each increased 13 percent over 1960. The same number of companies operated cement mills as in the previous year. Portland cement was produced by two firms operating three plants in Botetourt, Norfolk, and Augusta Counties. Two of the plants used the dry process and the third, the wet process. Two of the three plants manufacturing portland cement also produced masonry cement, and another firm in Warren County produced masonry cement only. The cement companies mined limestone, shale and calcareous marl for use in their own operations. The chief type of portland cement manufactured and marketed was general-use and moderate-heat

cement (Types I-II). Considerable quantities of high-early-strength cement also were produced. All shipments except a small quantity by boat were made by railroads. Most was shipped in bulk, the balance in paper bags.

Clays. — Output of clay rose 4 percent to 1.4 million short tons, a new record, although the total value was slightly less than in 1960. The production consisted entirely of miscellaneous clay or shale and was consumed mostly in making building brick. Small amounts of vitrified sewer pipe and flue linings also were produced. Lightweight aggregate and portland cement comprised the remaining markets for Virginia clay. As in 1960, 17 firms mined and processed clay from 22 mines in 17 counties. In order of value of output, the principal producing counties were Botetourt, Buckingham, Chesterfield, Nansemond, and Orange.

Feldspar. — Production of feldspar increased 8 percent over 1960, but the value decreased slightly. One firm produced potash and soda feldspar from three mines in Bedford County for grinding at the company mill at Bedford. Pottery and enamel were the chief markets for the ground feldspar. Other uses include abrasives, welding-rod coating and brick facing. Shipments of ground feldspar largely were to Maryland, Ohio, and New Jersey.

Gem Stones. — Gems and mineral specimens gathered by mineral collectors and hobbyists included amazonite in Amelia County.

Gypsum. — Production of crude gypsum at Plasterco, in Washington County by the United States Gypsum Co. continued. Output rose compared with 1960. A new underground mine in Smyth County, 18 miles from Saltville was under development in the last half of the year. Calcined gypsum and plaster board and other gypsum products were manufactured at Plasterco by the United States Gypsum Co. This firm also calcined domestic and imported gypsum at a mill in Norfolk. Several firms in the Norfolk area imported crude gypsum from Nova Scotia for grinding for use chiefly as an agricultural land dressing particularly for peanut farmers.

Kyanite. — Production of crude ore increased 5 percent and sales of refined kyanite increased 9 percent over 1960. Two mines and flotation plants and a pulverizing mill were operated by

Kyanite Mining Corporation. One mine and flotation plant was in Buckingham County and the other in Prince Edward County. The pulverizing mill was in Appomattox County. Output was marketed to the ceramic and refractory industries.

Lime. — Production increased 4 percent, and value 7 percent compared with 1960. This quantity was 3 percent less than in 1959, the largest recent year but the value topped 1959 by 5 percent. Of the total production, chemical and industrial uses comprised 95 percent and quicklime 92 percent. Although both agricultural and chemical lime increased, building lime was less than in 1960. Two companies used shell in the manufacture of lime. Eleven companies burned lime in 1961 compared with 10 in 1960. Included was a paper manufacturer in Alleghany County which produced captive lime. The principal lime-producing counties were Giles, Smyth, Alleghany, and Shenandoah. Natural gas, bituminous coal and coke fired the kilns, which included pot, shaft and rotary kilns. Both batch and continuous hydrators were used. The annual lime burning capacity of the 11 firms totaled nearly 900,000 short tons.

Quicklime was employed in the manufacture of calcium carbide, in the making of paper and whiting, in the manufacture of alkalis, for flux in steel making and other purposes. Hydrated lime was used for water purification, leather tanning, sewage-and-trade-waste treatment and other uses. Lime used in building was mostly hydrated. Both quicklime and hydrated lime were used for agricultural purposes although the major tonnage was hydrated.

Mica. — Small amounts of mica from Amelia and Henry Counties were sold through the GSA, Spruce Pine (N. C.) and Franklin, (N. H.) Purchase Depots. Domestic and foreign scrap mica were wet ground by Richmond Mica Corp., Newport News, for consumption in paint, rubber, wallpaper, plastics and other products. Both factory scrap and mine scrap and flake mica were purchased for grinding.

Nitrogen Compounds. — Allied Chemical Corp., Nitrogen Division, (Hopewell, Prince George County) manufactured nitrogen compounds for use chiefly as fertilizer ingredients. Included among products manufactured were ammonia, urea solution, ammonium sulfate and other nitrogen compounds.

Perlite. — A plant at Hopewell (Prince George County) expanded perlite obtained from Colorado for use chiefly in building plaster and concrete aggregate.

Pyrites. — General Chemical Division, Allied Chemical Corp., mined pyrites (pyrrhotite) at its Gossan mine in Carroll County. Production, which was only slightly under 1960 was shipped to Pulaski where it was consumed in the manufacture of sulphuric acid. The mine was closed in March, 1962.

Salt. — One company produced salt brine at Saltville (Smyth County). Production was slightly less than 1960. The product was used chiefly for the making of chlorine, soda ash, and other chemicals.

Sand and Gravel. — Stimulated by increased highway construction and the impact of the Chesapeake Bay Bridge-Tunnel project, output of sand and gravel rose 28 percent in quantity and 29 percent in value to a new record, 16 percent greater in tonnage and 19 percent in value than the previous record year 1959. Output for paving and building increased 24 percent and 10 percent, respectively, over 1960, and comprised 85 percent of the commercial production (50 percent paving, 35 percent building). Other markets included glass, molding, engine, filtration, railroad ballast, fill and miscellaneous sand (including sand for ice control). Gravel comprised 56 percent of the total output compared to slightly over half in 1960. The average value per ton remained at \$1.49. Output was reported from 30 counties. Commercial output comprised 97 percent of the total production; the remainder was State, Federal and local government output. Thirty-nine commercial producers operated 46 sand and/or gravel pits in 25 counties. The leading counties were Henrico, Fairfax, Chesterfield, Prince George and Princess Anne. Production in these five counties represented 78 percent of the total Virginia output.

Soapstone. — Two companies mined crushed and ground soapstone in 1961—one in Franklin and one in Nelson and Albemarle counties. Production of crude and sales of ground material were substantially less than in 1960. The product was used in roofing, rubber, foundry facing, and insecticides. Soapstone used as a dimension stone is included with miscellaneous stone in the stone section of this chapter.

Stone. — A vigorous highway and building construction program including the Chesapeake Bay Bridge-Tunnel brought about an 18 percent increase in output of stone over 1960 to new record highs in tonnage and value. Stone ranked second in both tonnage and value only to coal among minerals produced in Virginia. Of the total output, 69 percent was used for concrete aggregate and in highway construction, 9 percent for cement and 6 percent for lime. Many varieties of stone were produced in Virginia, including limestone, granite, basalt, sandstone, marble, miscellaneous stone (including soapstone, greenstone, and crushed and broken aplite), calcareous marl, slate and shell. The principal uses for shell were as agricultural land dressing (finely ground) and for lime manufacture. Shell is a byproduct of the oyster and mollusk fisheries industries. Slate was quarried and prepared for

use as roofing granules by one firm in Rockingham County. Two firms in Nelson County mined aplite from which roofing granules were prepared. Limestone comprised 61 percent of the total stone, granite 23 percent, and basalt 12 percent. Crushed and broken stone comprised the major portion of output. However, a small quantity of dimension sandstone and dimension miscellaneous stone was quarried. In order of tonnage produced, the chief stone-quarrying counties were Loudoun, Fairfax, Frederick, Washington and Greensville. Commercial stone was produced in 49 counties by 93 producers. Five State or municipal agencies in 11 counties produced Government-and-contractor stone. Four companies in three counties produced and marketed shell. Commercial stone producers for each type of stone were as follows: limestone 58 companies (65 quarries); granite, 11 companies (14 quar-

TABLE I. — Mineral production in Virginia 1/

MINERAL	1960		1961	
	Quantity	Value (thousands)	Quantity	Value (thousands)
Aplite thousand long tons	(2)	(2)	97	\$ 651
Clays thousand short tons	1,348	\$ 1,395	1,406	1,332
Coal (bituminous) do	27,838	122,723	30,332	126,121
Gem stones	(3)	5	(3)	6
Lead (recoverable content of ores, etc.) short tons	2,152	504	3,733	769
Lime thousand short tons	711	8,028	39	8,596
Mica, sheet pounds	103	1	(2)	(2)
Natural gas million cubic feet	2,227	604	2,466	4/700
Petroleum (crude) thousand 42-gallon barrels	2	(2)	3	(2)
Sand and gravel thousand short tons	7,666	11,432	9,839	14,697
Stone do	19,358	33,019	22,934	39,206
Zinc (recoverable content of ores, etc. 5/) short tons	19,685	5,142	29,163	6,726
Value of items that cannot be disclosed: Portland cement, masonry cement, feldspar, gypsum, iron ore (pigment material), kyanite, pyrites, salt, soapstone, titanium concentrate (ilmenite and rutile), and values indicated by footnote 2	—	6/26,027	—	27,749
Total Virginia 7/	—	6/203,887	—	221,860

1/ Production as measured by mine shipments, sales, or marketable production (including consumption by producers).

2/ Figure withheld to avoid disclosing individual company confidential data.

3/ Weight not recorded.

4/ Preliminary figure.

5/ Recoverable zinc valued at the yearly average price of prime western slab zinc, East St. Louis market. Value established after transportation, smelting, and manufacturing charges have been added to the value of ore at the mine.

6/ Revised figure.

7/ Total adjusted to eliminate duplicating value of clays and stone.

ries); basalt, 9 companies (9 quarries); sandstone, 8 companies (8 quarries); marble, 1 company (1 quarry); miscellaneous stone, 4 companies (4 quarries); calcareous marl, 3 companies (3 quarries); and slate, 3 companies (3 quarries). The number of companies does not add to the total shown above as four firms produced more than one kind of stone.

Sulfur. — Hydrogen sulphide was recovered from fuel gas and converted to sulfur by the American Oil Company at its Yorktown Refinery in York County. Both production and shipments of sulfur rose 10 percent compared with 1960.

Metals

Ferrous alloys. — Ferromanganese was produced in two blast furnaces at Reusens near Lynchburg by E. J. Lavino & Co. Although production was less than in 1960, shipments rose 15 percent over that year. These furnaces were closed in June, 1962.

Iron and Steel. — Ingot and casting steel were produced by Newport News Shipbuilding & Drydock Co. (Newport News) and Roanoke Electric Steel Corp. (Roanoke).

Iron Ore (Pigment Material). — Crude natural iron oxide pigments, including sienna, umber, ocher and other natural red and yellow iron oxides, and finished iron oxide pigments were

produced in Pulaski County. Another company produced chiefly natural red iron oxide and a wide variety of finished, natural and manufactured pigments near Henry in Franklin County.

Lead and Zinc Ores. — Output of recoverable zinc in 1961 rose to 29.2 thousand short tons valued at 6.7 million dollars, a new record, 8 percent in tonnage higher than the previous record of 27 thousand short tons in 1938, and 27 percent higher in value than the previous record established in 1957. The increase was due primarily to virtually continuous operation throughout the year, and need of New Jersey Zinc Co. to replace output lost when one of its mines in Tennessee hit an underground water course and was flooded. Production of recoverable lead, virtually a byproduct of zinc, also increased to the highest point since 1954. The average value per ton for both lead and zinc, however, was lower than in 1960. Zinc-lead ores from Wythe County and zinc-ore from Rockingham County were concentrated at mills at Austinville and Timberville, respectively. Ore from both the Ivanhoe and Austinville mines was treated at the Austinville Mill. Zinc concentrate was shipped for treatment to Josephstown and Palmerton, Pennsylvania and to East Chicago, Indiana. Lead concentrate was shipped to Carteret, N. J. and to Japan.

Titanium Concentrate. — Production of titanium concentrate in 1961 was about one-eighth less than in 1960. Output consisted chiefly of ilmenite, although a small quantity of rutile was recovered. American Cyanamid Company at Piney River

TABLE 2. — Coal (bituminous) production and value, by counties (thousand short tons and thousand dollars)

County	Quantity	1960		1961	
		Quantity	Value/1	Quantity	Value/1
Buchanan	10,568		\$ 44,216	10,949	\$ 41,072
Dickenson	7,120		29,665	8,438	34,901
Lee	616		2,261	453	1,626
Montgomery	9		33	12	41
Russell	2,284		11,104	1,935	9,149
Scott	16		70	17	76
Tazewell	1,751		10,688	933	4,981
Wise	5,474		24,686	7,595	34,275
Total	27,838		\$122,723	30,332	\$126,121

1/ Value received or charged for coal f.o.b. mine, including selling cost. (Includes value for coal not sold but used by producer, such as mine fuel, and coal coked as estimated by producer at average prices that might have been received if such coal had been sold commercially.)

(Amherst County) produced ilmenite while Metal and Thermit Corp. produced both rutile and ilmenite at its plant near Montpelier (Hanover County). The chief use for ilmenite was in making titanium dioxide pigment and rutile was used mainly in welding rod coatings.

New Mineral Developments

A new coke plant is being constructed by the Jewell Smokeless Coal Corporation at a site four miles east of Vansant, Buchanan County. The company will operate a total of 210 Mitchell-type ovens initially and will utilize coal from the Kennedy seam. The only other coke production in Virginia is in Wise County where five plants are in operation.

The A. H. Smith Stone Company commenced production in April 1962 of crushed stone from its granite quarry near Mineral, Louisa County. The quarry was formerly operated by the Louisa Stone Company.

S. J. Groves and Sons Company, a Minnesota construction firm, is producing sand along Aquia Creek, Stafford County, for use in the construction of a segment of U. S. Interstate Highway 95 near Stafford.

The Stone and Mineral Corporation operates a crushing plant near Syria, Madison County, at which quartz from several localities is crushed and bagged for shipment. The material is used in ornamental concrete blocks and flooring.

Quarries have been opened near Glade Spring, Washington County, by the Interstate Stone Corporation and by Lambert Brothers, and near Seven Mile Ford, Smyth County, by the Pendleton Construction Corporation. The operators are utilizing portable plants in the three quarries to produce crushed limestone and dolomite for highway construction purposes.

Grottoes Sand and Gravel Company, Inc., has acquired the sand operation of John H. Davis, Inc., located near Grottoes, Rockingham County. The new company will continue the production of sand for use in concrete and as a road sand.

E. C. Womack, Inc., is dredging sand at a pit near Kempsville, Princess Anne County, for use as fill material.

Field Conference and New Publication

The Division of Mineral Resources was sponsor for the Third Annual Field Conference of the Atlantic Coastal Plain Geological Association. During two previous meetings, this Association visited localities in states north of Virginia to examine strata of Cretaceous, Eocene, and Miocene age. Included in the itinerary this year for the group were stops at localities that contain type sections or representative strata in the Coastal Plain of Virginia between the Potomac and James rivers. In the group were geologists from Academy of Natural Sciences; College of William and Mary; Duke, Lehigh, North Carolina, Princeton, Rutgers, South Carolina, and Virginia universities; Virginia Polytechnic Institute; E. I. duPont DeNemours & Co.; Delaware Geological Survey; Phillips Petroleum Company; Sun Oil Company; Texaco, Incorporated; and U. S. Geological Survey. The guidebook that was used in conjunction with the conference is available from the Division of Mineral Resources:

Information Circular 6. **GUIDEBOOK TO THE COASTAL PLAIN OF VIRGINIA NORTH OF THE JAMES RIVER.** 46 p. with fossil lists and tables that contain relationships between geologic rock units. Price: \$0.75

WILLIAM M. MCGILL

William Butler Mahone McGill, who was State Geologist of Virginia from 1947 until his retirement in 1957, passed away on August 15, 1962, after a long illness. He was born in Petersburg, January 1, 1897. In 1919 he received a civil engineering degree from Virginia Military Institute and in 1922 a mining engineering and geology degree from Colorado School of Mines. Mr. McGill began employment with the Commonwealth of Virginia January 1, 1929.

