

THE MINERAL INDUSTRY OF GEORGIA

1978 and 1979



DEPARTMENT OF NATURAL RESOURCES

Joe D. Tanner, Commissioner

ENVIRONMENTAL PROTECTION DIVISION

J. Leonard Ledbetter, Director

GEORGIA GEOLOGIC SURVEY

William H. McLemore, State Geologist



CIRCULAR

3

For convenience in selecting our reports from your bookshelves, they will be color-keyed across the spine by subject as follows:

Red	Valley & Ridge mapping and structural geology
Dk. Purple	Piedmont & Blue Ridge mapping and structural geology
Maroon	Coastal Plain mapping and stratigraphy
Lt. Green	Paleontology
Lt. Blue	Coastal Zone studies
Dk. Green	Geochemical and Geophysical studies
Dk. Blue	Hydrology
Olive	Economic geology
	Mining directory
Yellow	Environmental studies
	Engineering studies
Dk. Orange	Bibliographies and lists of publications
Brown	Petroleum and natural gas
Black	Field trip guidebooks.

Colors have been selected at random and will be augmented as new subjects are published.

The Mineral Industry of Georgia

1978 and 1979

**Reprinted from the 1978-79
Bureau of Mines Minerals Yearbook**

**DEPARTMENT OF NATURAL RESOURCES
Joe D. Tanner, Commissioner**

**ENVIRONMENTAL PROTECTION DIVISION
J. Leonard Ledbetter, Director**

**GEORGIA GEOLOGIC SURVEY
William H. McLemore, State Geologist**

A t l a n t a

1981

The Mineral Industry of Georgia

This chapter has been prepared under a Memorandum of Understanding between the Bureau of Mines, U.S. Department of the Interior, and the Georgia Geologic Survey, Environmental Protection Division, Georgia Department of Natural Resources, for collecting information on all nonfuel minerals.

By James R. Boyle¹ and William H. McLemore²

The value of Georgia's nonfuel mineral production in 1978 and 1979 was \$588.1 million and \$698.7 million, respectively. Georgia led the Nation in the production of fuller's earth, kaolin, and dimension stone; was second in kyanite and iron oxide pig-

ments; third in bauxite and feldspar; fourth in barite and byproduct gypsum; and fifth in common clays and mica. With the exception of bauxite, kyanite, and sand and gravel, all commodities registered an increase in unit value in 1978.

Table 1.—Nonfuel mineral production in Georgia¹

Mineral	1977		1978		1979	
	Quantity	Value (thousands)	Quantity	Value (thousands)	Quantity	Value (thousands)
Cement:						
Portland ---- thousand short tons..	1,192	\$37,711	1,435	\$51,504	1,335	\$55,117
Masonry ---- do.	W	W	W	W	102	5,172
Clays ---- do.	7,554	288,223	8,476	358,654	8,322	437,671
Gem stones ---- do.	--	--	NA	20	NA	20
Sand and gravel ---- thousand short tons..	5,141	13,207	5,378	12,550	² 5,014	² 10,792
Stone:						
Crushed ---- do.	37,864	106,215	41,572	131,959	40,902	154,021
Dimension ---- do.	240	13,637	277	15,879	244	17,903
Talc ---- short tons..	23,540	63	W	W	W	W
Combined value of barite, bauxite, feldspar, iron ore (1977), kyanite, mica, peat, sand and gravel (industrial, 1979), and values indicated by symbol W ----	XX	15,307	XX	17,548	XX	17,989
Total ----	XX	474,363	XX	588,114	XX	698,690

NA Not available. W Withheld to avoid disclosing company proprietary data; value included with "Combined value" figure. XX Not applicable.

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

²Excludes industrial sand; value included in "Combined value" figure.

Table 2.—Value of nonfuel mineral production in Georgia, by county¹

(Thousands)

County	1977	1978	Minerals produced in 1978 in order of value
Bacon	W	W	
Baldwin	W	W	Sand and gravel.
Barrow	W	W	Stone.
Bartow	W	W	Barite, clays.
Bibb	W	W	Clays, sand and gravel.
Carroll	W	W	Stone.
Chatham	\$511	\$536	Sand and gravel.
Cherokee	W	W	Do.
Clarke	W	2,194	Stone.
Clayton	W	3,675	Do.
Cobb	W	W	Stone, sand and gravel.
Coffee	W	W	Sand and gravel.
Columbia	W	W	Clays, stone.
Columbus (city)	W	W	Stone, sand and gravel, clays.
Cook	W	W	Sand and gravel.
Coweta	W	W	Stone.
Crawford	W	W	Sand and gravel.
Decatur	W	12,934	Clays, sand and gravel.
De Kalb	6,152	W	Stone.
Dougherty	272	W	Sand and gravel.
Douglas	W	W	Stone, clays, sand and gravel.
Effingham	W	W	Sand and gravel.
Elbert	W	W	Stone, sand and gravel.
Evans	W	132	Sand and gravel.
Fayette	1,554	2,070	Stone.
Floyd	W	W	Stone, clays.
Forsyth	W	2,623	Stone.
Fulton	W	W	Cement, stone, clays, sand and gravel.
Gilmer	W	W	Stone.
Glynn	W	72	Sand and gravel.
Gordon	1,250	1,663	Stone.
Greene	W	W	Sand and gravel, stone.
Gwinnett	W	W	Stone.
Habersham	W	W	Do.
Hall	W	W	Do.
Hart	W	W	Mica.
Henry	W	W	Stone.
Houston	W	W	Cement, clays, stone.
Jasper	W	W	Feldspar, stone.
Jefferson	W	W	Clays.
Jones	W	W	Stone.
Laurens	W	W	Sand and gravel.
Lee	W	W	Stone, sand and gravel.
Lincoln	W	W	Kyanite.
Long	W	320	Sand and gravel.
Lowndes	W	W	Do.
Lumpkin	W	W	Stone.
Madison	W	W	Do.
Marion	W	W	Sand and gravel.
Miller	3	6	Peat.
Monroe	W	W	Stone.
Montgomery	W	W	Sand and gravel.
Murray	W	W	Talc.
Oglethorpe	1,835	2,220	Stone.
Paulding	W	W	Do.
Pickens	13,756	15,927	Do.
Pierce	W	W	
Pike	210	W	Sand and gravel.
Polk	W	W	Cement, stone, clays.
Quitman	W	W	
Rabun	700	1,306	Stone.
Richmond	W	W	Clays, stone, sand and gravel.
Screven	W	W	Peat.
Seminole	W	W	Sand and gravel.
Spalding	W	W	Stone.
Stephens	W	W	Do.
Sumter	W	W	Clays, bauxite.
Talbot	754	W	Sand and gravel.
Taylor	W	W	Do.
Thomas	W	W	Clays, sand and gravel.
Tift	W	W	
Troup	W	W	Stone.
Twiggs	76,494	63,239	Clays.
Union	W	W	Sand and gravel, stone.
Walker	W	W	Stone, clays.
Walton	W	W	
Ware	204	204	Sand and gravel.
Warren	W	W	Clays, stone.
Washington	80,047	121,234	Clays.
Wheeler	W	W	Sand and gravel.
Whitfield	2,380	3,400	Stone.

See footnotes at end of table.

Table 2.—Value of nonfuel mineral production in Georgia, by county¹—Continued

(Thousands)

County	1977	1978	Minerals produced in 1978 in order of value
Wilkinson-----	\$43,513	\$50,876	Clays.
Undistributed ² -----	244,728	303,481	
Total-----	³ 474,363	588,114	

W Withheld to avoid disclosing company proprietary data; included with "Undistributed."

¹The following counties are not listed because no nonfuel mineral production was reported: Appling, Atkinson, Baker, Banks, Ben Hill, Berrien, Bleckley, Brantley, Brooks, Bryan, Bulloch, Burke, Butts, Calhoun, Camden, Candler, Catawba, Charlton, Chattahoochee, Chattooga, Clay, Clinch, Colquitt, Crisp, Dade, Dawson, Dodge, Dooly, Early, Echols, Emanuel, Fannin, Franklin, Glascock, Grady, Hancock, Haralson, Harris, Heard, Irwin, Jackson, Jeff Davis, Jenkins, Johnson, Lamar, Lanier, Liberty, McDuffie, McIntosh, Macon, Meriwether, Mitchell, Morgan, Muscogee, Newton, Oconee, Peach, Pulaski, Putnam, Randolph, Rockdale, Schley, Stewart, Taliaferro, Tattall, Telfair, Terrell, Toombs, Towns, Treutlen, Turner, Upson, Wayne, Webster, White, Wilcox, Wilkes, and Worth.

²Includes gem stones and some clays that cannot be assigned to specific counties and values indicated by symbol W.

³Data do not add to total shown because of independent rounding.

Table 3.—Indicators of Georgia business activity

	1977	1978	1979 ^P	1978-79 percent change	
Employment and labor force, annual average:					
Total civilian labor force-----	thousands-----	2,254.0	2,309.0	2,334.0	+1.1
Unemployment-----	do-----	156.0	131.0	119.0	-9.2
Employment (nonagricultural):					
Mining ¹ -----	do-----	7.3	7.5	7.7	+2.7
Manufacturing-----	do-----	494.1	515.8	527.1	+2.2
Contract construction-----	do-----	91.6	101.2	98.1	-3.1
Transportation and public utilities-----	do-----	120.3	129.1	136.1	+5.4
Wholesale and retail trade-----	do-----	443.1	476.0	493.5	+3.7
Finance, insurance, real estate-----	do-----	100.0	103.6	107.0	+3.3
Services-----	do-----	286.0	309.1	326.9	+5.8
Government-----	do-----	384.0	407.9	417.7	+2.4
Total nonagricultural employment ¹ -----	do-----	1,926.4	² 2,050.1	2,114.1	+3.1
Personal income:					
Total-----	millions-----	\$30,482	\$34,465	\$38,456	+11.6
Per capita-----	do-----	\$6,047	\$6,779	\$7,515	+10.9
Construction activity:					
Number of private and public residential units authorized-----	do-----	33,543	³ 37,529	42,446	+13.1
Value of nonresidential construction-----	millions-----	\$473.4	\$600.0	\$612.4	+35.4
Value of State road contract awards-----	do-----	\$215.0	NA	\$286.0	
Shipments of portland and masonry cement to and within the State-----	thousand short tons-----	2,261	2,409	2,289	-5.0
Nonfuel mineral production value:					
Total crude mineral value-----	millions-----	\$474.4	\$588.1	\$698.7	+18.8
Value per capita, resident population-----	do-----	\$94	\$116	\$137	+18.1
Value per square mile-----	do-----	\$8,057	\$9,988	\$11,867	+18.8

^PPreliminary. NA Not available.

¹Includes bituminous coal extraction.

²Data do not add to total shown because of independent rounding.

³Series revised in 1978; data not comparable with those of prior years.

Sources: U.S. Department of Commerce, U.S. Department of Labor, Highway and Heavy Construction Magazine, and U.S. Bureau of Mines.

Trends and Developments.—Construction continued on a new bulk storage warehouse and material handling system at the Georgia Port Authority's Brunswick facility. When the system is completed in 1980, annual throughput capabilities will be 125,000 tons. Market studies indicated that bulk tonnage of materials such as salt cake,

fuller's earth, potash, fertilizers, solar salt, and nitrates will double within 15 years. Most foreign exports of kaolin pass through the Georgia Port Authority's Savannah facility, which also handles significant tonages of bauxite, kyanite, and zircon sand.

According to published records, Georgia has produced almost \$6 billion worth of

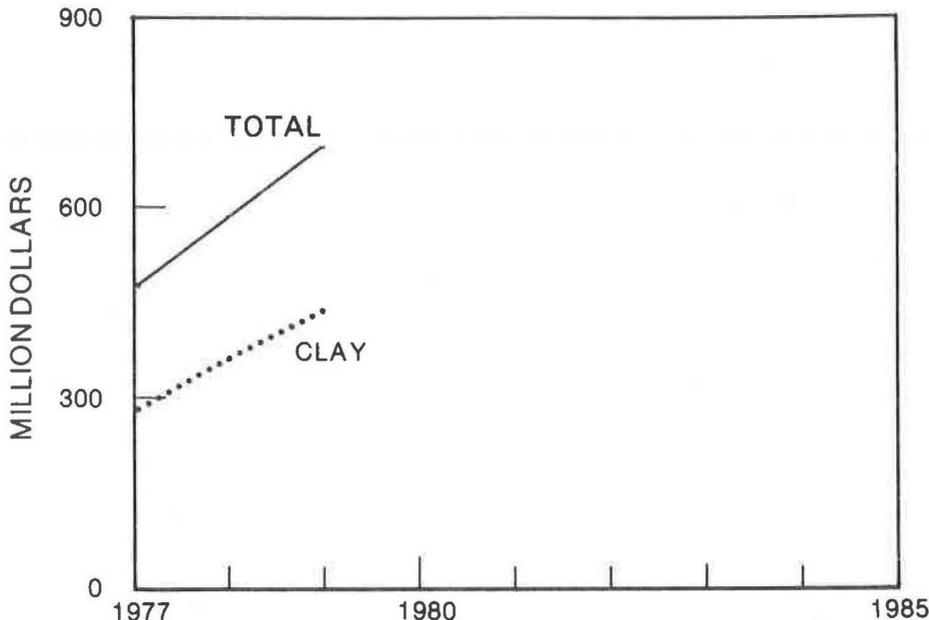


Figure 1.—Value of clays, and total value of nonfuel mineral production in Georgia.

minerals. To emphasize the importance of minerals to the State, the Cartersville Tourism and Industry Council opened a minerals and mining museum in 1979 that illustrates the mineral heritage of the Bartow County area and the rest of Georgia, while emphasizing the economic aspects of mineral production in Georgia. The museum is of interest to all ages, and many of the exhibits are participatory in nature.

Legislation and Government Programs.—Work continued at the Federal Bureau of Mines Engineering Laboratory in Boulder City, Nev., on the development of an economically viable process for extracting alumina from kaolin; Thiele Kaolin Co. supplied the kaolin from a mine in Washington County. During the first quarter of 1978, a 10-day miniplant test run was conducted using the hydrochloric acid (HCl) leach process with gas sparging crystallization.

A mineral appraisal team from the Federal Bureau of Mines' Eastern Field Operations Center (EFOC) completed a field survey in the proposed Ellicot Rock Wilder-

ness Area, which includes portions of Georgia, North Carolina, and Tennessee, and in the proposed Cohutta Wilderness Area, Georgia. Reports for the Cohutta Area and the Big Frog Wilderness Study Area, which includes portions of Tennessee and Georgia, were completed and submitted for publication.

EFOC personnel inventoried active and abandoned mine locations in the State for updating the Bureau's Mineral Industry Location System, a computerized data storage and retrieval system that contains mine locations and other pertinent data for the Nation's mineral industry.

In a report prepared for the Bureau, Zellars-Williams, Inc., evaluated the phosphate resources in Georgia, North Carolina, and South Carolina. Georgia's phosphate resources are located in the Savannah area and south-central Georgia. The study identified resources of 15.1 billion tons of in-place ore, with a weighted average P_2O_5 content of 8.6%.

During the biennium, work continued on Georgia's Coastal Zone Management Pro-

gram, and the State received a \$553,436 grant to complete program development. A legal analysis and authorities paper was submitted to the Office of Coastal Zone Management in December 1978. However, in 1979, the Governor notified the U.S. Department of Commerce that the incentives offered for participation in the program were basically insufficient, and the State was dropping out of the program. The State is expected to develop and administer its own coastal management program to fit the State's needs.

In similar action, the Governor notified the U.S. Department of Interior's Office of Surface Mining that Georgia does not plan to develop a program consistent with the Federal Surface Mining Control and Reclamation Act of 1977. It was felt that the small number of coal mines in the State did not justify participation by the State in the program.

A 1979 study, commissioned by the Georgia Institute of Technology, concluded that the imposition of severance taxes on Georgia's mineral producers would be inappropriate because (1) revenues generated by severance taxes would be more than offset by a reduction in sales, (2) for those Georgia minerals sold locally, severance taxes would be passed on directly as a regressive tax, and (3) many of the marginal mineral reserves in Georgia would not be mined, with resulting waste of resources.

The State legislature passed a bill to provide for permitting and inspection of dams constructed in the State. The legislation, which included settling ponds and impoundments constructed for mineral op-

erations, became effective July 1, 1978, and requires that dam construction, modification, and inspection be the responsibility of the Environmental Protection Division, Georgia Department of Natural Resources. The law requires certification by both a geologist and an engineer, stating that the dam design is safe and adequate to meet State standards.

The Georgia Division of Geology and Water Resources was reorganized as part of an economy move in the Department of Natural Resources. The Division was reassigned to a branch-level function, renamed the Georgia Geologic Survey, and placed under the Environmental Protection Division.

The Georgia Geologic Survey continued basic mapping, ground water investigations, airborne geophysical surveys, and environmental atlas work initiated in previous years. The Survey assisted the mineral industry in Georgia by evaluating (1) construction materials of the Georgia Coastal Plain, (2) geology and mineral resources of the mafic and ultramafic rocks of Georgia, (3) uranium and thorium in selected sands of coastal Georgia, and (4) uranium in graphitic phyllites and other selected rocks in the Georgia Piedmont and Blue Ridge.

At yearend, all but four of the 1,016 7-1/2-minute quadrangles that cover the State had been published, and the remaining four were completed in single-copy, advance sheet format.

During the period, the Georgia Institute of Technology was designated by the Secretary of the Interior as a State Mining and Mineral Resources and Research Institute pursuant to Title III of Public Law 95-87.

REVIEW BY NONFUEL MINERAL COMMODITIES

NONMETALS

Nonmetals accounted for nearly all of the State's total mineral production value in 1978 and 1979. The principal nonmetals produced, in descending order of value, were clays, crushed stone, cement, dimension stone, and sand and gravel.

Barite.—Georgia ranked fourth nationally in the production of primary barite. Production in 1978 decreased, while value rose. Production in 1979 remained at about the same level as that of 1978. Barite production was limited to the Cartersville district in Bartow County in the northwest-ern part of the State. Although 23 companies have produced barite from the district,

only two, New Riverside Ochre Co. and Paga Mining Co., are presently active. The barite concentrates were used in the manufacture of chemicals, as fillers and extenders in paint and rubber products, as a weighting material in drilling muds, and in glassmaking, flux, and heavy products. In 1978, New Riverside Ochre Co. and Paga Mining Co. conducted a drilling program for barite on jointly owned land in the Cartersville district; significant barite reserves reportedly were proven.

Paga Mining Co. maintained a 35-acre park in an abandoned barite mining area in the historic Cartersville District in northwest Georgia. Numerous trails allow access to geologic exposures that relate to barite

Table 4.—Georgia: Kaolin sold or used by producers, by kind and use
(Short tons)

Use	1977				1978				1979			
	Airfloat	Unprocessed	Water-washed ¹	Total	Airfloat	Unprocessed	Water-washed ¹	Total	Airfloat	Unprocessed	Water-washed ¹	Total
Domestic:												
Adhesives	38,582	--	18,998	57,580	39,053	--	17,155	56,208	36,553	--	8,191	44,744
Alum (aluminum sulfate) and other chemicals	243	214,941	20,831	236,015	--	216,860	23,150	240,010	200	245,004	8,181	253,385
Animal feed	W	--	--	W	W	--	--	W	W	--	--	W
Asphalt tile and linoleum	36,128	--	--	36,128	37,004	2,980	--	39,984	38,871	4,670	--	43,541
Catalysts (oil refining)	W	--	W	87,046	W	--	W	50,401	W	W	W	62,171
China and dinnerware; crockery and earthenware	18,459	--	18,121	36,580	23,717	3,486	20,287	47,490	15,707	3,398	18,830	37,935
Electrical porcelain	W	--	W	23,147	W	--	W	15,569	16,894	--	--	16,894
Face brick	W	31,980	W	32,412	W	32,400	W	32,506	267	18,500	55	18,822
Fiberglass and mineral wool	58,221	--	--	58,221	101,871	--	--	101,871	109,807	--	2,393	112,200
Firebrick, block, shapes	14,177	13,904	23,457	51,538	1,083	14,123	--	15,206	536	11,112	--	11,648
Floor and wall tile, ceramic	W	--	W	8,725	W	--	W	21,472	W	--	W	13,248
Flue linings and high-alumina brick	39,327	14,168	--	53,495	41,687	14,994	--	56,681	41,195	13,043	--	54,238
Foundry sand	1,798	--	100	1,898	2,489	9,078	--	11,567	770	--	--	770
Glazes, glass, enamels, hobby ceramics	11,590	W	--	W	W	--	--	W	W	--	--	W
Grogs and crudes, refractory	3,024	295,418	--	298,442	22,333	318,042	--	340,375	18,533	400,270	17	418,820
Ink	W	--	W	12,000	W	--	W	745	W	--	--	W
Kiln furniture, mortar, cement	13,745	W	--	W	W	W	--	18,316	W	W	W	34,681
Medical, pharmaceutical, cosmetic	W	--	W	1,842	W	--	W	1,091	W	--	W	2,036
Paint	12,413	--	98,754	111,167	--	--	119,058	119,058	10,651	--	109,273	119,924
Paper coating	63,918	--	1,748,921	1,812,839	167,004	--	2,068,225	2,235,229	61,872	--	2,212,338	2,274,210
Paper filling	144,690	--	650,942	795,632	106,119	--	654,952	761,071	86,853	--	771,452	858,305
Plastics	3,212	--	55,096	58,308	3,596	--	58,423	62,019	2,436	--	53,487	55,923
Pottery	5,921	--	--	5,921	4,777	--	--	4,777	7,988	15,284	--	23,272
Roofing granules	W	--	W	19,590	W	W	--	26,877	W	--	W	12,646
Roofing and structural tile	35,561	--	--	35,561	1,526	--	--	1,526	--	4,995	--	4,995
Rubber	73,204	--	9,037	82,241	65,321	--	10,562	75,883	77,303	--	11,615	88,918
Sanitary ware	108,616	W	W	142,119	103,578	W	W	103,632	117,074	W	W	128,400
Miscellaneous airfloat:												
Fertilizer, oil and grease absorbents, pet waste absorbents, pesticides and related products, unknown	15,725	--	--	15,725	15,219	--	--	15,219	5,356	--	--	5,356
Miscellaneous, unprocessed:												
Gypsum products, common brick (1979), flower pots (1979), sewer pipe (1979), quarry tile (1979), portland cement (1979)	--	31,951	--	22,039	--	33,176	--	33,176	--	23,891	--	23,891

Miscellaneous, water-washed:												
Gypsum products, pesticides and related products (1979), waterproofing and sealing, unknown, other -----												
Undistributed	85,632	--	101,006	101,006 ²	132,164	102,739	86,964	86,964	49,424	92,563	65,087	65,087
			65,406				85,446	² 185,718			83,142	² 89,021
Total -----	784,186	602,362	2,810,669	4,197,217	868,541	747,878	3,144,222	4,760,641	698,290	832,730	3,344,061	4,875,081
Exports:												
Foundry sand -----		148,406		148,406		113,873		113,873				
Paint -----			30,714	30,714	1,295		23,348	24,643	17,999		12,151	30,150
Paper coating -----			507,517	507,517			523,629	523,629			580,435	580,435
Paper filling -----	8,423		31,031	39,454	3,164		46,900	50,064	1,082		52,859	53,941
Plastics -----			20,348	20,348			18,401	18,401			23,324	23,324
Refractories -----	8,300		1,739	10,039	8,798		1,948	10,746		276,037		276,037
Rubber -----	198		862	1,060	7		740	747	78		843	921
Undistributed -----	152	3,850	24,853	28,855	1,552		27,539	29,091		172,069	47,151	219,220
Total -----	17,073	152,256	617,064	786,393	14,816	113,873	642,505	771,194	19,159	448,106	716,763	1,184,028
Grand total -----	801,259	754,618	3,427,733	4,983,610	883,357	861,751	3,786,727	5,531,835	717,449	1,280,836	4,060,824	6,059,109

W Withheld to avoid disclosing company proprietary data; included with "Undistributed."

¹Includes calcined and delaminated.

²Incomplete total; remainder included in totals for specific uses.

mineralization and the major rock types in the area. Also areas can be reached that illustrate three distinct periods of mining. Pick, shovel, and wheelbarrow; steam shovel; and hydraulic mining. All exposures and mining areas are identified. A large geologic map with an explanatory text describing the stratigraphy and structure of the area is located at a scenic point. This park was approved by the Georgia Mined Land Reclamation Branch.

Cement.—Three companies, Medusa Cement Co., Marquette Cement Manufacturing Co., and Martin Marietta Corp., produced portland and masonry cement from plants located in Houston, Polk, and Fulton Counties, respectively.

End use of portland cement in 1978 was ready-mix concrete (49.1%), concrete products (16.5%), and highway contractors (15.3%); the balance was for other uses. The majority of shipments were made by truck.

Masonry cement production and value increased in 1978, then decreased slightly in 1979. Masonry cement constitutes a small fraction of total production.

Raw materials used were mainly cement rock, limestone, and clay, with smaller amounts of shale, sandstone, sand, iron ore, and gypsum.

The Department of Energy's Economic Regulatory Administration issued orders to the Atlanta cement facility of Martin Marietta Corp. prohibiting the use of oil and natural gas as a primary fuel. When the conversion is completed, the company will use an estimated 84,000 tons of coal per year.

Clays.—Georgia continued to lead the Nation in the production of clay. Total clay production and value increased in 1978; in 1979, production decreased while value increased. Clays mined in the State, in order of decreasing value, were kaolin, fuller's earth, and common clay.

Georgia led the Nation in production of kaolin. The State's industry in 1978 was composed of 21 companies operating 56 mines along the Fall Line kaolin belt in east-central Georgia. Production in 1978 totaled 5.5 million tons, valued at \$325.3 million; in 1979, production was 6.1 million tons, valued at \$404.2 million. Major uses for premium-grade kaolin were paper coating and filler applications. Most of the water-washed kaolin producers increased capacity in 1979 and plan further expansion in the future.

Many of the kaolin producers announced

plans to expand their capacity over the next few years. Engelhard Minerals & Chemicals Corp. plans to spend over \$20 million to upgrade and expand facilities at McIntyre and add 100,000 tons per year to their capacity. The project is scheduled for completion early in 1981. Freeport Kaolin Corp. plans to spend \$22 million to increase production by 100,000 tons per year at Gordon. Anglo-American Clays Corp. was developing a calcined kaolin product that is expected to increase production by 30,000 tons per year. The high brightness, low abrasion calcined clays produced are used in paper filling and coating. Nord Kaolin Co. announced a second-stage expansion at its Jeffersonville operation. The project, to take 4 years, includes installation of a magnetic separator, a new spray dryer, and an expanded crude clay blending and processing system. Capacity is expected to increase to 300,000 tons per year by the end of 1980.

The largest bagged shipment of kaolin in history was exported by Engelhard Minerals & Chemicals Corp. Approximately 17,000 metric tons of kaolin was shipped from Engelhard's central Georgia mining operation to Savannah, Ga. The kaolin was destined for Japan, where it was used in manufacturing a premium-grade paper stock.

Engelhard Minerals & Chemicals Corp. completed a \$9 million expansion for making fluidized-bed cracking catalysts at the Attapulugus, Ga., facility. Kaolin mined in McIntyre, Ga., is fractionated, and special grades are sent for catalyst processing 200 miles away at the Attapulugus catalyst plant. The new expansion increased the plant capacity to 100 to 150 tons per day, depending on the type of catalyst produced.

Georgia ranked first in the Nation in the production of fuller's earth. In 1978, seven companies in Decatur, Houston, Jefferson, and Thomas Counties produced a total of 618,805 tons, valued at \$27.1 million; production and value increased slightly in 1979 over that of 1978.

Anschutz Minerals Corp., a subsidiary of the Denver-based Anschutz Corp., purchased a fuller's earth operation near Ochlocknee in Thomas County in the southwestern fuller's earth district. The plant, previously operated by Cherokee Industries and later by Control Packaging, Inc., was expanded to a 100,000-ton-per-year capacity.

Engelhard Minerals & Chemicals Corp. increased capacity at its Attapulugus fuller's

earth plant. Output was doubled, and further expansions were underway in late 1979. Fuller's earth products have been finding increasing application in liquid fertilizers, paints, and oil well drilling muds.

Common clay and shale, used in brick, cement, and tile, was produced by 12 companies operating 19 pits in 10 counties. Production in 1978 increased 16.9% to 2.3 million tons, with value increasing 56.0% to \$6.2 million. In 1979, production decreased

to 1.6 million tons valued at \$4.7 million.

Atlanta Brick and Tile Co., a subsidiary of the Jenkins Brick Co., announced plans for a \$2 million expansion in the Atlanta area. Atlanta Brick and Tile will construct a new tunnel kiln that will double brick capacity and raise employment to 130.

Feldspar.—Georgia ranked third nationally in the production of feldspar. High-potash feldspar was mined from weathered pegmatite at the Monticello mine in Jasper

Table 5.—Georgia: Kaolin sold or used by producers, by kind

(Short tons)

Kind	1977		1978		1979	
	Quantity	Value	Quantity	Value	Quantity	Value
Airfloat	882,228	\$20,709,493	883,357	\$21,893,179	717,449	\$20,483,169
Calcined	656,058	57,668,552	858,312	76,481,595	920,961	91,925,829
Delaminated	420,133	28,960,143	398,343	31,954,998	358,293	31,891,253
Unprocessed	308,087	1,077,116	317,975	1,339,717	359,875	2,483,198
Water-washed	2,717,104	153,449,022	3,073,848	193,596,761	3,702,531	267,402,172
Total	4,983,610	261,864,326	5,531,835	325,266,250	6,059,109	404,185,621

Table 6.—Georgia: Kaolin sold or used by producers, by use

(Short tons)

Use	1977	1978	1979
Domestic:			
Adhesives	57,580	56,208	44,744
Chemicals	236,015	240,010	253,385
Fiberglass and mineral wool	58,221	101,871	112,200
Firebrick, block, shapes	51,538	15,206	11,648
Floor and wall tile, ceramic	8,725	21,472	13,248
Paint	111,167	119,058	119,924
Paper coating	1,812,839	2,235,229	2,274,210
Paper filling	795,632	761,071	858,305
Plastics	58,308	62,019	55,923
Rubber	82,241	75,883	88,918
Sanitary ware	142,119	103,632	128,400
Whiteware	42,501	47,490	37,935
Other	740,331	921,492	876,241
Exports	786,393	771,194	1,184,028
Total	4,983,610	5,531,835	6,059,109

Table 7.—Georgia: Kaolin sold or used by producers, by county

(Thousand short tons and thousand dollars)

County	1977			1978			1979		
	Number of mines	Quantity	Value	Number of mines	Quantity	Value	Number of mines	Quantity	Value
Sumter	W	W	W	W	W	W	W	W	W
Twiggs	6	1,343	76,494	5	1,078	63,239	6	1,193	77,218
Warren	W	W	W	W	W	W	3	697	38,916
Washington	5	1,542	80,047	9	2,004	121,234	6	1,902	131,949
Wilkinson	6	759	43,513	6	808	50,876	6	924	69,128
Other counties ¹	4	1,340	61,810	9	1,642	89,917	7	1,343	86,974
Total	21	4,984	261,864	29	5,532	325,266	28	6,059	404,186

W Withheld to avoid disclosing company proprietary data; included in "Other counties."

¹Includes Columbia (1977), Houston, and Richmond Counties, and data indicated by symbol W.

County by The Feldspar Corp. Production in 1978 increased 8.3%, while value increased 41.7%; 1979 production and value increased 7.3% and 12.8%, respectively, over that of 1978.

In 1979, The Feldspar Corp. opened a new mine in Greene County. Ore is shipped by truck to the processing plant at Monticello. The plant is expected to be moved to the new mine in the early 1980's.

Gypsum.—Calcined gypsum and gypsum board products were produced by three firms from raw materials mined in other states. National Gypsum Co. and the Flintkote Co. in Chatham County, and the Gypsum Div. of Georgia-Pacific Corp. in Glynn County produced wallboard, cement retarder, fillers, and agricultural sand additives. American Cyanamid Co. recovered gypsum as a byproduct in a titanium plant in Savannah.

Kyanite-Mullite.—Georgia ranked second nationally in the production of kyanite. C-E Minerals, Inc., a division of Combustion Engineering, Inc., operated a surface mining operation and a flotation plant at Graves Mountain in Lincoln County. Production increased in 1978 and 1979.

Synthetic mullite, a product of sintering a mixture of aluminous and siliceous materials and aluminum silicate refractory grogs, was produced by Mulcoa Div. of C-E Minerals, Inc., in Sumter County.

Lime.—Although Georgia has abundant resources of high-quality limestone, none has been developed. Georgia's 1978 lime requirements were imported from surrounding States; consumption in 1978 increased slightly.

Mica.—Franklin Mineral Products Co., Inc., mined flake mica from an open pit

mine in Hart County. Both production and value decreased in 1978 and again in 1979. The mica is ground for use as an extender and filler in various products including paint, wall paper, and rubber products.

Peat.—Two companies in Miller and Screven Counties produced peat for use as a potting medium and general soil conditioner. Production and value increased in 1978, and maintained the same level in 1979.

Perlite.—Armstrong Cork Co. expanded perlite at a plant near Macon in Bibb County. The product was used in acoustical tile, pipe insulation, and other lightweight insulating material. Raw material was obtained from mines in the Western United States.

Sand and Gravel.—Sand and gravel was produced in 1978 by 45 companies, operating 48 mines in 33 counties; industry structure was the same in 1979. Leading counties were Chatham, Crawford, Talbot, and Taylor. Although production increased, a lower unit value of \$2.33 in 1978 compared with \$2.57 in 1977, resulted in a lower total value. In 1979, unit value increased to \$2.63 while production increased only slightly. Shipments were primarily by truck.

Stone.—Crushed stone production in 1978 increased for the fourth straight year but decreased slightly in 1979. Georgia ranked first in the production of dimension stone, which also had a slight increase in unit value. Dimension stone produced included granite, marble, and sandstone. Crushed stone produced included limestone, granite, marble, sandstone, and slate. In 1978, 51 companies produced crushed and/or dimension stone at 99 quarries; in 1979, 64 companies produced from 112 quarries. Although most dimension stone quarries produced

Table 8.—Georgia: Construction sand and gravel sold or used, by major use category

Use	1977			1978			1979		
	Quantity (thousand short tons)	Value (thousands)	Value per ton	Quantity (thousand short tons)	Value (thousands)	Value per ton	Quantity (thousand short tons)	Value (thousands)	Value per ton
Concrete aggregate -----	2,896	\$6,300	\$2.18	2,994	\$5,915	\$1.98	3,348	\$6,670	\$1.99
Plaster and gunite sands -----	NA	NA	NA	196	320	1.63	230	418	1.81
Concrete products -----	270	642	2.37	316	774	2.45	256	660	2.58
Asphaltic concrete -----	639	2,114	3.31	471	1,602	3.40	360	1,249	3.47
Roadbase and coverings -----	300	590	1.97	377	809	2.15	393	1,165	2.93
Fill -----	645	753	1.17	737	866	1.18	353	454	1.29
Snow and ice control -----	NA	NA	NA	--	--	--	W	W	W
Railroad ballast -----	W	W	W	--	--	--	--	--	--
Other uses -----	60	97	1.35	7	24	3.50	70	178	2.54
Total ¹ or average ---	4,809	10,496	2.18	5,097	10,310	2.02	5,014	10,792	2.15

NA Not available. W Withheld to avoid disclosing company proprietary data; included in "Other uses."

¹Data may not add to totals shown because of independent rounding.

relatively small tonnage, 21 crushed stone quarries each produced in excess of 900,000 tons of stone per year. Of the total stone tonnage, 91% was produced by eight companies.

Crushed stone was produced at 64 quarries in 1978 and 67 quarries in 1979. Leading producers were Vulcan Materials Co., Martin Marietta Aggregates, and Ivy Corp. Shipments were mainly by truck, followed by railroad, waterway, and other. Crushed stone was used mainly for dense road base, concrete and bituminous aggregate, railroad ballast, and cement manufacture.

Dimension stone was produced at 37 quarries in 1978 and 46 quarries in 1979 for rough monumental stone, dressed monumental stone, and rough blocks. The State's dimension granite industry was centered in Elbert County, northeast of Atlanta, while the dimension marble and sandstone industries were located in Pickens County, north of Atlanta.

Martin Marietta Aggregates completed an \$8.5 million expansion program at its Macon, Ga., crushed stone plant. Capacity of the operation increased from 1,000 to more than 1,500 tons per hour. Principal elements of the expansion were a \$3.1 million gyratory crusher, a \$2.4 million expansion of stone-sizing facilities, a \$1.5 million improvement of rail and truck-loading facilities, and a new \$1.5 million electric shovel.

Rosario Resources, Inc., sold its wholly owned subsidiary, Dixie Lime and Stone Co., to Florida Rock Industries, Inc. Three active crushed stone quarries and one inactive quarry in Georgia, and one dolomite quarry in Florida were included for a reported \$12 million.

The Georgia Marble Co., a subsidiary of

Jim Walters Corp., and the Nation's largest producer of crushed marble, began work to divert the East Branch of Long Swamp Creek at the company's New York Mine at Marble Hill, Ga. The relocation of the creek will allow development of a new portal and shorter mileage distance into the lower levels of the New York Mine. Output is used for extender and filler applications.

The Tate Div. of the Georgia Marble Co. opened a new dimension marble quarry at the southern end of the Tate quarry complex. The general area in Pickens County has been the scene of dimension marble quarrying since the 1840's. The new quarry will produce Cherokee-type marble, the principal variety of marble quarried in the district.

The outlook for the crushed stone industry is cautious optimism; for large operations there is sufficient work to run through 1980, while small operators do not have the advantage of long-term contracts. The expansion of Hartsfield International Airport near Atlanta, improvements to the Interstate system, and subway construction in the Atlanta area indicate continued demand for crushed stone.

Talc.—The Southern Talc Co. produced talc from two underground mines in the Fort Mountain area of Murray County. The crude talc was trucked to the Chatsworth mill where it was ground for use in ceramics, insecticides, roofing, rubber, and various other products.

METALS

Bauxite.—Georgia was one of three bauxite-producing States in the Nation. Production decreased in 1978 and 1979. Bauxite was used in refractories and aluminum-based chemicals.

Table 9.—Georgia: Sand and gravel sold or used by producers, by use

Use	1977			1978			1979		
	Quantity (thousand short tons)	Value (thousands)	Value per ton	Quantity (thousand short tons)	Value (thousands)	Value per ton	Quantity (thousand short tons)	Value (thousands)	Value per ton
Construction:									
Sand	3,496	\$6,762	\$1.93	4,220	\$7,539	\$1.79	4,110	\$7,736	\$1.88
Gravel	1,313	3,735	2.84	877	2,770	3.16	904	3,057	3.38
Total ¹ or average	4,809	10,496	2.18	5,097	10,310	2.02	5,014	10,792	2.15
Industrial sand	332	2,711	8.17	281	2,242	7.98	W	W	W
Grand total ¹ or average	5,141	13,207	2.57	5,378	12,550	2.33	W	W	W

W Withheld to avoid disclosing company proprietary data.

¹Data may not add to totals shown because of independent rounding.

Table 10.—Georgia: Crushed stone¹ sold or used by producers, by use

(Thousand short tons and thousand dollars)

Use	1977		1978		1979	
	Quantity	Value	Quantity	Value	Quantity	Value
Agricultural limestone	229	695	193	604	453	2,219
Concrete aggregate	¹ 7,219	¹ 20,217	7,338	23,433	6,992	25,530
Bituminous aggregate	6,287	16,524	7,320	21,587	7,328	25,601
Macadam aggregate	—	—	W	453	—	—
Densegraded roadbase stone	9,750	25,618	11,576	34,214	8,158	26,289
Surface treatment aggregate	687	1,588	855	2,670	1,857	5,986
Other construction aggregate and roadstone	5,515	14,161	5,996	17,305	9,051	30,428
Riprap and jetty stone	89	284	152	561	120	471
Railroad ballast	2,745	6,130	2,566	6,821	2,823	8,080
Manufactured fine aggregate (stone sand)	469	913	945	2,742	345	1,163
Cement manufacture	1,304	2,370	1,668	3,305	1,518	3,343
Asphalt filler	79	166	—	—	W	W
Slate flour	—	—	—	—	20	300
Lightweight aggregate	W	2,400	W	W	W	W
Other uses ²	3,491	15,149	2,962	18,263	2,237	24,609
Total ³	37,864	106,215	41,572	131,959	40,902	154,021

¹Revised. W Withheld to avoid disclosing company proprietary data; included with "Other uses."²Includes limestone, granite, marble, sandstone and slate.³Includes stone used for filter stone, terrazzo and exposed aggregate, abrasives (1979), whiting (1979), other filler, roofing granules (1977-78), building products (1977-78), unspecified uses, and uses indicated by symbol W.⁴Data may not add to totals shown because of independent rounding.Table 11.—Georgia: Dimension stone¹ sold or used by producers, by use

Use	1977			1978			1979		
	Short tons	Cubic feet (thousands)	Value (thousands)	Short tons	Cubic feet (thousands)	Value (thousands)	Short tons	Cubic feet (thousands)	Value (thousands)
Rough blocks	17,025	163	\$509	44,309	434	\$1,239	53,551	511	\$1,545
Irregular-shaped stone	43,568	493	1,510	33,432	359	1,031	37,961	428	1,727
Rubble	¹ 13,103	137	130	21,940	246	271	11,938	136	181
Rough monumental	¹ 148,196	1,506	5,642	133,953	1,351	5,223	111,846	1,146	5,606
Rough flagging	3,162	35	123	W	W	W	W	W	W
Dressed monumental	11,919	135	4,541	14,436	164	5,714	7,688	75	1,673
Other uses ²	3,488	41	1,182	29,211	324	2,400	21,406	240	7,176
Total ³	240,461	2,511	13,637	277,281	2,877	15,879	244,390	2,535	17,908

¹Revised. W Withheld to avoid disclosing company proprietary data; included with "Other uses."²Includes limestone, granite, marble, sandstone, and slate.³Includes stone used for cut stone, sawed stone, curbing, dressed flagging (1979), and uses indicated by symbol W.⁴Data may not add to totals shown because of independent rounding.

Gold.—With the increase in the price of gold in 1979, panning and dredging of stream gravels increased. Several major gold producers initiated exploration programs in the State.

Iron Ore.—There was no reported production of iron ore in 1978 or 1979. Depletion of known shallow reserves and high reclamation costs were given as reasons for cessation of operations in 1977.

Iron Oxide Pigments.—Georgia was one of four States with crude iron oxide pigment production and ranked second nationally. Ochre and umber production by the New

Riverside Ochre Co. was produced from surface mined material in Bartow County.

Titanium-Zirconium.—Heavy minerals mined and concentrated in Florida were shipped to the Folkston plant, owned by Humphrey's Mining Co., for ilmenite and zircon recovery. The Folkston plant has used Florida concentrate since 1978, when the Georgia deposits were depleted.

¹State mineral specialist, Bureau of Mines, Tuscaloosa, Ala.²State geologist, Georgia Geologic Survey, Environmental Protection Division, Georgia Department of Natural Resources.

Table 12.—Principal producers

Commodity and company	Address	Type of activity	County
Barite, primary:			
New Riverside Ochre Co	Box 387 Cartersville, GA 30120	Open pit mine	Bartow.
Paga Mining Co	Box 130 Cartersville, GA 30120	---do---	Do.
Bauxite:			
American Cyanamid Co.....	Berdan Ave. Wayne, NJ 07470	Open pit mine	Sumter.
C-E Minerals, Inc	901 East 8th Ave. King of Prussia, PA 19406	Open pit mine	Do.
Cement:			
Marquette Cement Manufacturing Co ...	20 North Wacker Dr. Chicago, IL 60606	Plant	Polk.
Martin Marietta Cement Corp.....	18th Floor, Daniel Bldg. Birmingham, AL 35233	---do---	Fulton.
Medusa Cement Co	Box 5668 Cleveland, OH 44101	---do---	Houston.
Clays:			
American Industrial Clay Co.....	433 North Broad St. Elizabeth, NJ 07207	Open pit mines.	Warren and Washing- ton.
Engelhard Minerals & Chemical Corp ...	Menlo Park Edison, NJ 08817	---do---	Decatur.
Freeport Kaolin Co	733 3d Ave. New York, NY 10017	---do---	Twiggs.
J. M. Huber Co	Thornall St. Edison, NJ 08817	---do---	Twiggs and Warren.
Feldspar:			
The Feldspar Corp	Box 99 Spruce Pine, NC 28777	Open pit mine and plant.	Jasper.
Gypsum:			
The Flintkote Co	400 Westchester Ave. White Plains, NY 10604	Plant	Chatham.
Georgia Pacific Corp.....	Box 311 Portland, OR 97207	---do---	Glynn.
National Gypsum Co	4100 First International Bldg. Dallas, TX 75270	---do---	Chatham.
Kyanite:			
C-E Minerals, Inc	433 Gulph Rd. King of Prussia, PA 19406	Open pit mine and plant.	Lincoln.
Mica:			
Franklin Mineral Products Co., Inc.....	Box O Wilmington, MA 01887	Open pit mine	Hart.
Peat:			
Shep Peat Co	Box 307 Colquitte, GA 31737	Bog	Miller.
Perlite, expanded:			
Armstrong Cork Co	1010 Concord Lancaster, PA 17604	Plant	Bibb.
Sand and gravel:			
Brown Brothers Sand Co	Howard, GA 31039	Open pit mines.	Talbot and Taylor.
Colwell Construction Co	Box 6 Blairsville, GA 30512	Open pit mine	Upson.
Crawford County Mining Co., Inc	3166 Maple Dr. Atlanta, GA 30305	---do---	Crawford.
Dawes Silica Mining Co.....	Box 470 Thomasville, GA 31792	Open pit mines.	Dougherty, Effingham, Thomas.
Howard Sand Co	Box 118 Butler, GA 31006	---do---	Talbot and Taylor.
Stone:			
Florida Rock Industries, Inc	Box 4667 Jacksonville, FL 32201	Quarries	Fayette, Floyd, Spalding.
Georgia Marble Co	3460 Cumberland Pkwy., NW. Atlanta, GA 30303	---do---	De Kalb, Douglas, Gilmer, Pickens.
Ivy Corp	100 Peachtree St. Atlanta, GA 30303	---do---	Clarke, Fulton, Haber- sham, Hall, Stephens.
Martin Marietta Aggregates	6801 Rockledge Dr. Bethesda, MD 20084	---do---	Columbia, Jones, Lee, Richmond, Warren.
Vulcan Materials Co	Box 7324-A, 1 Office Park Birmingham, AL 35228	---do---	Carroll, Cobb, Coweta, Douglas, Fulton, Greene, Gwinnett, Henry, Troup.
Talc:			
Southern Talc Co.....	Box F Chatsworth, GA 30705	Mines and mill.	Murray.

Printed by
DOAS
Printing Services

Dist #348
Quantity 500

The Department of Natural Resources is an Equal Opportunity employer and employs without regard to race or color, sex, religion, and national origin.