The Mineral Industry of Tennessee

This chapter has been prepared under a cooperative agreement between the Bureau of Mines, U.S. Department of the Interior, and the Tennessee Division of Geology, for collecting information on all minerals.

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The 1972 production of the Tennessee mineral industry was valued at $270 million, an increase of 13% over that of 1971. Tennessee continued to be the leading producing State for ball clay, pyrite, and zinc.

Extensive development and exploration of the zinc ore body in middle Tennessee and the growth of the coal industry to a record $81 million for the year were the most significant aspects of Tennessee's mineral industry in 1972.

Legislation and Government Programs.—On March 23, 1972, Governor Winfield Dunn signed into law the new Tennessee Surface Mining Law, Chapter 547, Public Acts of 1972, which was passed by the State's 87th General Assembly. This new law will produce significant environmental improvement as related to surface mining. The purpose of the act is to provide for the regulation of surface mining and reclamation and revegetation of lands affected by such operations.

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Table 1.—Mineral production in Tennessee [1]

Mineral	1971		1972	
	Quantity	Value (thousands)	Quantity	Value (thousands)
Barite—thousand short tons	21	$342	W	W
Cement:				
Portland—do	1,713	33,733	1,695	$37,176
Masonry—do	159	3,649	176	4,104
Clays [2]—do	1,537	6,595	1,718	7,719
Coal (bituminous)—do	9,271	59,368	11,260	81,386
Copper (recoverable content of ores, etc.)—short tons	13,916	14,473	11,310	11,581
Gold (recoverable content of ores, etc.)—troy ounces	192	8	176	10
Natural gas—million cubic feet	89	20	25	8
Petroleum (crude)—thousand 42-gallon barrels	398	W	198	W
Phosphate rock—thousand short tons	2,571	12,151	2,154	10,732
Sand and gravel—do	8,018	11,845	10,839	15,328
Silver (recoverable content of ores, etc.) thousand troy ounces	131	203	83	141
Stone—thousand short tons	32,369	48,665	35,942	55,512
Zinc (recoverable content of ores, etc.)—short tons	119,295	38,413	101,722	36,111
Value of items that cannot be disclosed: Clay (fuller's earth), lime, pyrites, and values indicated by the symbol W	XX	10,197	XX	10,006
Total	XX	239,662	XX	269,814
Total 1967 constant dollars	XX	203,785	XX	p 224,458

p Preliminary. W Withheld to avoid disclosing individual company confidential data; included with "Value of items that cannot be disclosed." XX Not applicable.
[1] Production as measured by mine shipments, sales, or marketable production (including consumption by producers).
[2] Excludes fuller's earth; included with "Value of items that cannot be disclosed."

Table 2.—Value of mineral production in Tennessee, by county [1]

(Thousands)

County	1971	1972	Minerals produced in 1972 in order of value
Anderson	W	W	Coal, stone.
Bedford	$420	W	Stone.
Benton	W	W	Sand and gravel, stone.
Bledsoe	246	W	Coal.
Blount	W	W	Stone.
Bradley	W	W	Do.
Campbell	15,437	$16,225	Coal, stone, sand and gravel.
Cannon	W	W	Stone.
Carroll	--	W	Clays.
Carter	W	W	Stone.
Claiborne	12,826	W	Coal, stone.
Clay	W	W	Stone, petroleum.
Cocke	--	W	Stone.
Coffee	W	W	Do.
Cumberland	1,942	2,515	Stone, sand and gravel, coal.
Davidson	11,195	13,212	Stone, cement, clays.
Decatur	W	W	Stone, sand and gravel.
De Kalb	224	231	Stone.
Dickson	W	W	Do.
Fayette	W	W	Stone, sand and gravel.
Fentress	1,032	2,883	Coal, stone, petroleum.
Franklin	4,466	5,142	Cement, stone, sand and gravel, clays.
Gibson	W	W	Sand and gravel.
Giles	1,224	968	Stone, phosphate rock.
Grainger	143	35	Stone.
Greene	W	W	Stone, sand and gravel.
Grundy	W	W	Coal, sand and gravel, stone.
Hamblen	W	W	Stone.
Hamilton	16,087	16,651	Cement, stone, sand and gravel coal, clays.
Hancock	W	W	Zinc, stone.
Hardeman	W	W	Sand and gravel.
Hardin	W	W	Sand and gravel, stone.
Hawkins	W	W	Stone, sand and gravel.
Haywood	7	W	Sand and gravel.
Henderson	W	W	Do.
Henry	W	2,568	Clays.
Hickman	W	W	Phosphate rock.
Humphreys	W	W	Stone, sand and gravel.
Jefferson	26,911	26,981	Zinc, stone.
Johnson	W	W	Stone.
Knox	20,132	22,347	Cement, zinc, stone, lime, sand and gravel, clays.
Lauderdale	74	W	Sand and gravel.
Lawrence	--	W	Stone.
Lincoln	W	W	Stone, barite.
Loudon	408	W	Stone, clays, sand and gravel.
McMinn	444	W	Stone, sand and gravel.
McNairy	W	W	Sand and gravel.
Macon	W	W	Stone.
Marion	W	W	Cement, coal, stone.
Marshall	W	W	Stone.
Maury	W	W	Phosphate rock, stone.
Meigs	W	W	Stone.
Monroe	W	759	Stone, barite, sand and gravel.
Montgomery	W	W	Stone.
Moore	W	30	Do.
Morgan	2,820	3,626	Coal, petroleum, natural gas.
Obion	W	W	Sand and gravel.
Overton	W	460	Stone, petroleum, coal.
Perry	W	182	Sand and gravel.
Pickett	71	W	Stone, petroleum.
Polk	23,782	20,232	Copper, pyrites, zinc, silver, sand and gravel, gold.
Putnam	2,097	1,410	Stone, coal, sand and gravel.
Rhea	W	W	Stone, coal, clays.
Roane	W	W	Stone, coal.
Robertson	W	W	Stone.
Rutherford	940	W	Do.
Scott	4,510	11,574	Coal, petroleum, natural gas.
Sequatchie	W	W	Coal.
Sevier	W	W	Stone, sand and gravel.
Shelby	2,178	4,072	Sand and gravel.
Smith	81	W	Stone.
Stewart	W	W	Sand and gravel, stone.
Sullivan	W	W	Cement, stone, clays.
Sumner	W	W	Stone.
Tipton	W	13	Sand and gravel.
Unicoi	W	W	Do.
Union	1,140	W	Stone.
Van Buren	1,095	W	Coal.
Warren	W	W	Stone.

See footnotes at end of table.

Table 2.—Value of mineral production in Tennessee, by county [1]—Continued
(Thousands)

County	1971	1972	Minerals produced in 1972 in order of value
Washington	W	W	Sand and gravel, stone, clays.
Wayne	W	W	Sand and gravel.
Weakley	W	$4,761	Clays.
White	W	1,094	Coal, stone.
Williamson	W	5,360	Phosphate rock, stone.
Wilson	W	W	Stone.
Undistributed [2]	$87,723	106,486	
Total [3]	239,662	269,814	

W Withheld to avoid disclosing individual company confidential data; included with "Undistributed."
[1] The following counties are not listed because no production was reported: Cheatham, Chester, Crockett, Dyer, Houston, Jackson, Lake, Lewis, Madison, and Trousdale.
[2] Includes some sand and gravel and stone that cannot be assigned to specific counties, and values indicated by symbol W.
[3] Data may not add to totals shown because of independent rounding.

Table 3.—Indicators of Tennessee business activity

		1971	1972 p	Change, percent
Employment and labor force, annual average:				
Total work force	thousands	1,742.1	1,831.1	+5.1
Unemployment	do	79.4	63.4	−20.2
Total nonagricultural employment	do	1,356.6	1,450.4	+6.9
Mining	do	7.0	7.2	+2.9
Manufacturing	do	460.5	488.3	+6.0
Construction	do	68.0	76.2	+12.1
Transportation and public utilities	do	67.0	69.3	+3.4
Wholesale and retail trade	do	270.1	296.6	+9.8
Finance, insurance, and real estate	do	59.2	62.4	+5.4
Services	do	192.9	210.2	+9.0
Government	do	231.9	240.2	+3.6
Personal income:				
Total	millions	$13,183	$14,671	+11.3
Per capita		$3,300	$3,640	+10.3
Construction activity:				
Number of new housing units authorized		36,852	43,335	+17.6
Value of nonresidential construction	millions	$271.5	$305.3	+12.4
Cement shipments to and within Tennessee	thousand short tons	1,721	1,800	+4.6
Mineral production value	millions	$239.7	$269.8	+12.5

p Preliminary.

Sources: Survey of Current Business; Employment and Earnings; Construction Review; Area Trends in Employment and Unemployment; and U.S. Bureau of Mines.

The Tennessee Division of Geology continued its program of quadrangle mapping of geology and mineral resources, and 15 new maps and reports were published for the following quadrangles: Eagle Creek, Hookers Bend, Waynesboro, Paris Landing, Fairview, Martins Mills, Craigfield, Three Churches, Ketner Gap, Wolf Pit Ridge, Whitfield, Lillamay, White Bluff, Chestnut Grove, and Burrville. The mapping program was a cooperative project with the Tennessee Valley Authority (TVA), and about 265 quadrangles and reports have been published since 1962. A new magnetic quadrangle map series was also started and three quadrangles were published: Pleasant Hill, Dorton, and Crossville. In addition, two new special maps [4] and two new technical reports were published.[5] A detailed inventory of mining establishments and mineral processing industries were started with the assistance of grants from the Bureau of Mines and TVA.

The Bureau of Mines Liaison Office in Nashville continued to be involved in a wide variety of informal cooperative mineral-related activities with various State agencies, especially with the Division of Mines (Department of Labor), The Division of Geology and Division of Surface Mining

[4] Tennessee Division of Geology. Well Location Map of Morgan County, Tenn., 1972.
———. Well Location Map of Scott County, Tenn., 1972.
[5] Luther, E. T., and R. C. Johnson. Strippable coal and the Northern Cumberland Plateau Area of Tenn. Div. Geol., RI 34, 1972, 41 pp.
Miller, R. A., and S. W. Maher. Geologic Evaluation of Sanitary Landfill Sites in Tennessee. Tenn. Div. Geol., Environmental Geology Series, No. 1, 1972, 38 pp.

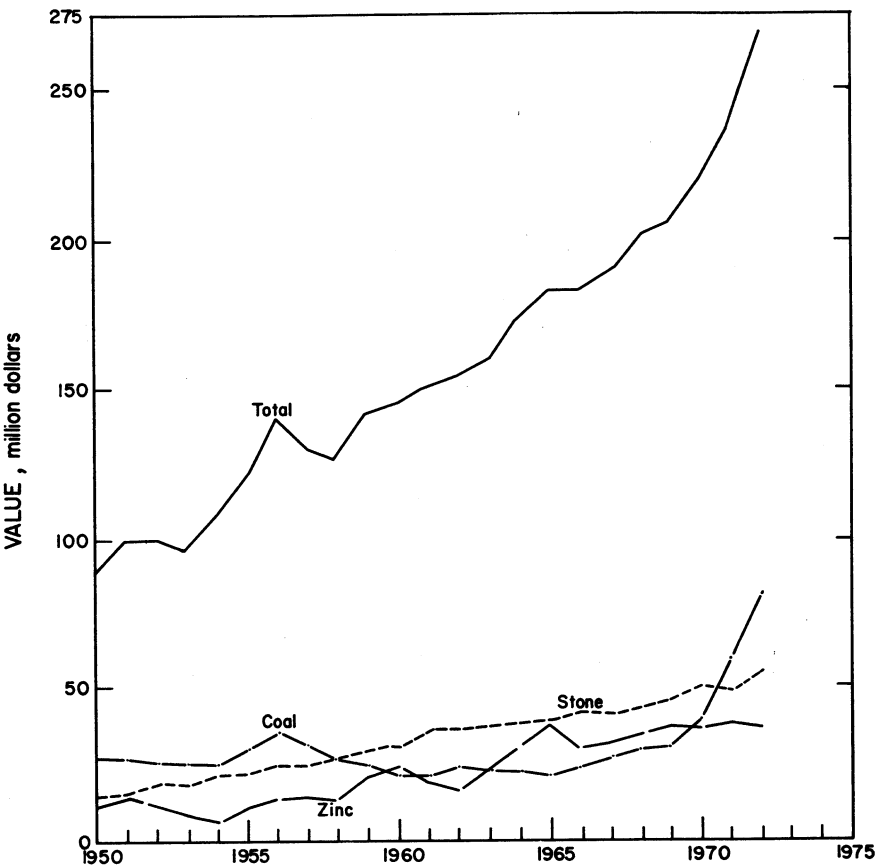

Figure 1.—Value of stone, coal, zinc, and total value of mineral production in Tennessee.

(Department of Conservation), and the Division of Water Quality Control, Division of Air Pollution Control, and Division of Environmental Sanitation (Department of Public Health). A close working relationship was also maintained with several branches of TVA and the U.S. Geological Survey (USGS).

TVA continued construction on three major powerplants: The Sequoyah nuclear plant, the Raccoon Mountain pumped storage project near Chattanooga, and the Cumberland coal-fired steam plant near Dover in northwest Tennessee. The first unit of the Raccoon Mountain project was scheduled to be in operation in November 1974, and the first unit of Sequoyah in December 1975. The Cumberland plant was completed in 1972. Construction began on a new plant, the Watts Bar nuclear plant near Knoxville, with completion scheduled for 1978. Construction continued on the Normandy dam on the Duck River in middle Tennessee; completion was slated for January 1976.

The Geologic Branch of TVA continued

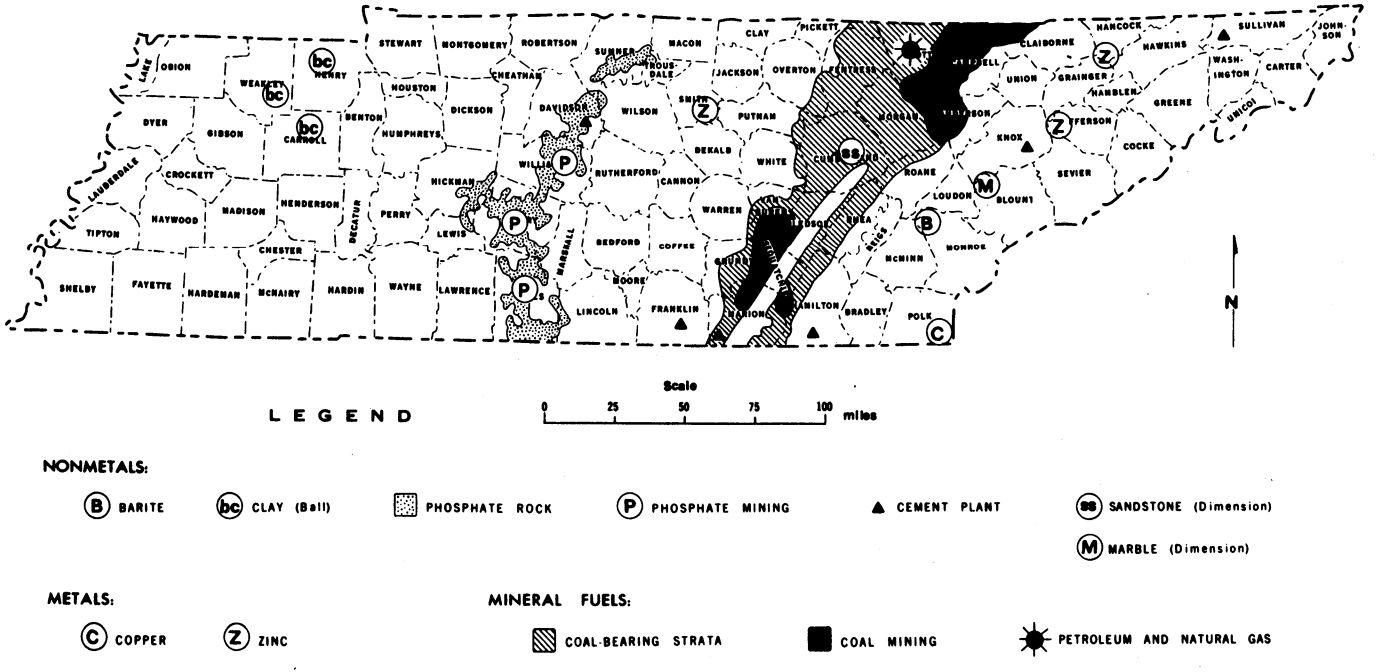

Figure 2.--Generalized map of selected mining areas and industries in Tennessee.

to investigate potential thermal power sites along the Tennessee and Cumberland Rivers. Another investigation began using modifications of oil well logging techniques to study subsurface foundation conditions instead of using drill cores exclusively. The Mineral Resources Section of the Geologic Branch of TVA installed and operated the proton-procession airborne magnetometer purchased in 1971 and flew 4,000 square miles of magnetic coverage on 1-mile spacing in the Upper Cumberland Plateau area of the State. Data were compiled by computer, and the resulting maps will be published by the Tennessee Division of Geology as a cooperative project. An agreement with the USGS was made for this section to participate in the Computerized Resources Information Bank (CRIB). The TVA Office of Tributary Area Development continued its program of cooperation with local governments to remove and dispose of junked automobiles.

The USGS maintained offices in Nashville, Knoxville, and Memphis to conduct cooperative water resource and geologic investigations with State agencies, primarily the Division of Geology and the Division of Water Resources, and during the year a study was begun on the environmental geology of Knox County. The Office of Minerals Exploration of the USGS maintained its regional office in Knoxville and the cooperative topographic quadrangle mapping program continued with support from the State Division of Geology.

Taxes.—Tennessee had a privilege tax on oil of 4.2 cents per barrel and 5% gross value on gas. The state passed a coal severance tax bill in 1972, which levied a tax of 1½% of the market value, not to exceed 10 cents per ton, of coal mined in Tennessee after October 1, 1972.

Table 4.—Worktime and injury experience in the mineral industries

Year and industry	Average men working daily	Days active	Man-days worked (thousands)	Man-hours worked (thousands)	Number of injuries		Injury rates per million man-hours	
					Fatal	Nonfatal	Frequency	Severity
1971:								
Coal	2,116	216	458	3,794	8	110	31.10	NA
Metal	1,741	259	451	3,610	5	97	28.26	12,085
Nonmetal	813	254	206	1,697	—	33	19.45	668
Sand and gravel	614	251	154	1,361	—	36	26.45	918
Stone	2,755	264	726	6,151	3	123	20.49	3,787
Total [1]	8,039	248	1,996	16,612	16	399	24.98	NA
1972: [2]								
Coal	NA	NA	NA	NA	NA	NA	NA	NA
Metal	1,570	259	406	3,245	2	63	20.03	4,606
Nonmetal	485	262	127	1,079	1	41	38.92	6,808
Sand and gravel	455	253	115	1,017	—	36	35.38	963
Stone	2,165	269	583	5,019	2	129	26.10	4,913
Total	NA	NA	NA	NA	NA	NA	NA	NA

NA Not available.
[1] Data may not add to totals shown because of independent rounding.
[2] In 1971 and earlier years, estimates were made of injury and employment data for those active operators who did not file reports; however, no estimates were made for active operators who did not report in 1972. Tabulations were made from data in file as of July 1, 1973, and are preliminary.

REVIEW BY MINERAL COMMODITIES

NONMETALS

Nonmetals accounted for 52% of the total mineral production value in Tennessee, an increase of 11% over that of 1971. The four principal nonmetallic commodities in order of value were stone, cement, sand and gravel, and phosphate rock.

Barite.—Two companies operated open pit mines and two plants in the Sweetwater district of eastern Tennessee. NL Industries, Inc., Baroid Div., shipped all its crushed ore to New Orleans to be ground for use as drilling mud, and B. C. Wood shipped its ore out of State for use as filler in paint and in barium chemicals. Godsey Mines, Inc. ceased production and had no output during 1972. Both produc-

tion and value of barite declined from that of 1971. Permits were issued by the Tennessee Department of Conservation, Division of Surface Mining, allowing 3 acres of land to be disturbed for barite recovery in 1972.

Cement.—Portland cement was produced by four companies at six plants, and masonry cement was produced at five plants. Total value of portland cement production rose to $37 million in 1972, a 10% increase over that of 1971. Masonry cement production was valued at $4.1 million, a 12% increase over that of 1971.

Raw materials used were limestone, clay and shale, sand, gypsum, and iron-bearing materials. About 64% of the portland cement was consumed for ready-mix concrete; 21% was used for concrete products; 7% for building materials; and 8% for contractors and other uses. Types of portland cement shipped included types I and II (general use and moderate heat), type III (high-early-strength), white, slag-pozzolan, expansive, waterproof, and other. Types I and II comprised 99% of all the portland cement produced.

Clays.—Tennessee ranked first in the Nation in the production of ball clay by producing 64% of the U.S. total. The clay industry also produced fire clay, fuller's earth, and miscellaneous clays. Permits were issued allowing 254 acres of land to be disturbed for clay removal in 1972.

Ball clay production was 431,126 short tons valued at $6.4 million. This clay was mined at open pits in Carroll, Henry, and Weakley Counties for use in crockery, other earthenware, electrical porcelain, fine china, dinnerware, firebrick, blocks and shapes, glazes, glass, enamels, kiln furniture, pestisides and related products, pottery, rubber, asphalt emulsion, sanitary ware, asphalt tile, floor and wall tile, quarry tile, and ceramics. Some items such as ceramics, sanitary ware, and floor and wall tile were exported.

Fuller's earth production and value were up from that of 1971 while the price remained constant. This clay was mined in Henry County by open pit methods for use as animal litter, floor absorbents, and pesticides and related products.

Miscellaneous clay production and value were up from that of 1971. Major uses for this clay were for common building and face brick, lightweight aggregate, and cement.

Graphite.—Artificial graphite was produced from petroleum coke by Union Carbide Corp. at its plant near Columbia, Tenn. The graphite was used chiefly in the manufacture of furnace electrodes.

Lime.—Foote Mineral Co. and Williams Lime Mfg. Co. produced lime in Knox County for paper and pulp, water purification, lithium manufacture, and other uses. Output decreased 3% and was 9% below the 1967 record. Total consumption of lime in Tennessee was 136,000 tons.

Mullite.—Electro Minerals Corp. at Greenville produced a small quantity of synthetic mullite in 1972, which was the first time that mullite was produced in the State. All of the product was used for special-duty refractory material.

Perlite.—Chemrock Corp. continued expanding crude perlite at its plant in Nashville. The product was used as filter aids and concrete aggregate.

Phosphate Rock.—Tennessee ranked third in the Nation in phosphate rock production and value. The industry is located in Giles, Hickman, Maury, and Williamson Counties in central Tennessee.

Marketable production was 2,154,428 short tons, a 16% decrease from that of 1971; value decreased 12%. All of the phos-

Table 5.—Tennessee: Ball clay sold or used by producers, by use
(Short tons)

Use	1971	1972
Whiteware, etc.	259,321	276,391
Floor and wall tile	78,600	76,820
Other uses	[1] 39,500	[2] 77,915
Total	377,421	431,126

[1] Includes firebrick and block, kiln furniture, insecticides and fungicides, other filler uses, and other uses.
[2] Includes asphalt emulsion; firebrick, block, and shapes; glazes, glass, and enamels; kiln furniture; pesticides and related products; electrical porcelain; rubber; asphalt tile; and exports.

phate rock mined was used as furnace charge in the manufacture of elemental phosphorus.

Production was by three companies and TVA; all was mined by open pit methods and shipped to plants near the mines. Permits were issued by the State allowing 552 acres of land to be disturbed in 1972 for phosphate rock mining.

The phosphate industry was operating at about 80% of capacity, a somewhat greater percentage than in the last few years, during which a number of electric furnaces were inactive. Monsanto Co. was operating five furnaces with one inactive; Stauffer Chemical Co. was operating three furnaces with two inactive; and Hooker Chemical Corp. operated two furnaces with one inactive. Mobil Chemical Co. went out of business by closing down its one furnace. Demand was increasing at yearend, but it was not expected that furnace capacity would be reached before 1975 or 1976.

The Monsanto Co. is building one of the highest earthfill dams in the southeast, about 150 feet high and 3,000 feet long, which will impound a 500-acre lake near Columbia. The lake will serve as a settling basin for phosphate slimes from company washing operations and will furnish water for plant operations in a closed system. Environmental water quality problems resulting from the high clay content of the phosphate ore in the district have plagued the industry for many years. Monsanto Co. is the largest operator in the area, and it is estimated that this basin will serve the company until 1975. The terrain is such that the height of the dam can be increased when necessary.

Pyrite.—Tennessee led the Nation in pyrite output. The only producer was Cities Service Co. at its Copperhill operations. Production tonnage and value both declined slightly from that of last year. Pyrite concentrate recovered by flotation from sulfide ore mined in Polk County was used to produce sulfuric acid, sulfur dioxide, ferric sulfate, and iron sinter. Cities Service Co. sold nearly 1 million tons of sulfuric acid during the year. The company constructed a pelletizing plant at Copperhill, which was essentially completed during 1972, but only trial runs were made late in the year. Plant capacity will be 850,000 to 1 million tons per year. The iron sinter production facilities were closed down during the summer of 1972. Even though the facilities were not dismantled, they were not expected to be used any further. Sinter from the year's production and from accumulated stockpiles were shipped to Alabama for processing.

Sand and Gravel.—Sand and gravel production increased 35% over that of 1971 and value increased 29%.

Shelby County led the State in production in 1972 with 29% of the total produced, followed by Benton County with 13%. Commercial sand and gravel produc-

Table 6.—Tennessee: Sand and gravel sold or used by producers, by county

(Thousand short tons and thousand dollars)

County	1971			1972		
	Number of mines	Quantity	Value	Number of mines	Quantity	Value
Benton	8	1,082	1,828	6	1,426	2,275
Decatur	1	W	W	1	166	265
Fayette	4	139	143	2	W	W
Giles	1	208	208	--	--	--
Grundy	1	W	W	1	208	416
Haywood	2	74	7	1	W	W
Lauderdale	1	122	74	1	W	W
Perry	2	W	W	1	182	182
Polk	1	24	70	1	W	W
Shelby	8	1,914	2,178	7	3,111	4,072
Tipton	2	W	W	1	114	13
Undistributed [1]	r 34	4,456	7,337	29	5,634	8,107
Total [2]	65	8,018	11,845	51	10,839	15,328

r Revised. W Withheld to avoid disclosing individual company confidential data; included in "Undistributed."

[1] Includes Campbell, Cumberland, Franklin, Gibson, Greene, Hamilton, Hardeman, Hardin, Hawkins (1972), Henderson, Humphreys, Knox, Loudon, McMinn, McNairy, Monroe, Obion, Putnam, Sevier, Stewart (1972), Unicoi, Washington, and Wayne Counties, and some sand and gravel that cannot be assigned to specific counties.

[2] Data may not add to totals shown because of independent rounding.

Table 7.—Tennessee: Sand and gravel sold or used by producers, by class of operation and use

(Thousand short tons and thousand dollars)

Class of operation and use	1971		1972	
	Quantity	Value	Quantity	Value
Commercial operations:				
Sand:				
Building	2,420	3,755	3,314	4,580
Fill	W	W	97	96
Molding	W	W	181	640
Paving	876	1,658	1,620	2,561
Other uses [1]	732	1,922	455	1,445
Total [2]	4,029	7,335	5,667	9,322
Gravel:				
Building	1,498	2,175	2,797	3,403
Fill	50	58	93	110
Paving	1,444	1,457	W	W
Miscellaneous	111	113	259	229
Other uses [3]	110	218	1,625	2,093
Total [2]	3,213	4,022	4,775	5,834
Government-and-contractor operations:				
Sand:				
Paving	7	8	2	2
Total	7	8	2	2
Gravel:				
Building	--	--	38	3
Fill	42	42	--	--
Paving	727	438	358	166
Total	769	480	396	169
Total sand and gravel [2]	8,018	11,845	10,839	15,328

W Withheld to avoid disclosing individual company confidential data; included in "Other uses."
[1] Includes fill (1971), railroad ballast (1971), blast (1971), engine, fire or furnace, glass, grinding and polishing (1972), foundry (1972), and other industrial sands
[2] Data may not add to totals shown because of independent rounding
[3] Includes railroad ballast and other uses

tion accounted for 96% of the total, and the remaining 4% was produced by State and county governments for buildings, and paving. Production during the year came from 51 locations, and permits were issued by the State allowing 302 acres of land to be disturbed for the removal of sand and gravel in 1972.

Benton County continued production of industrial unground sand used for glass and molding, nearly all of which was produced by Hardy Sand Co. for the Ford Motor Co. glass plant in Nashville.

Stone.—Stone, second in value in mineral production, supplied 21% of Tennessee's income from mineral products in 1972. Production was 35.9 million tons valued at $55.5 million, increases of 11% and 14%, respectively, over last year's totals. Davidson County led in production followed by Knox County.

Limestone was produced at 114 quarries, dolomite at two, marble at six, sandstone at three, and quartzite at three for a total of 128 production sites in 63 counties. A total of 79 companies were in operation at the above quarries. Of the 128 sites, 83 produced more than 100,000 tons of stone, and six quarries produced more than 100,000 tons of stone, and six quarries produced more than 900,000 tons in 1972.

Limestone continues to be of the greatest significance in terms of tonnage and value of all the stone produced, 99% and 96%, respectively. End uses for limestone were road base stone (35%), concrete aggregate (14%), bituminous aggregate (7%), cement (7%), and numerous miscellaneous uses (37%). About 80% of the dolomite produced was for agricultural uses.

Dimension marble production was 5,383 tons, down 7% from that of 1971. A large percentage of the dimension marble was used as rough blocks, the remainder was used as cut and sawed stone.

The major uses of dimension sandstone were for house stone veneer and rubble; crushed and broken sandstone was used for

Table 8.—Tennessee: Crushed limestone [1] sold or used by producers, by county

(Thousand short tons and thousand dollars)

County	1971			1972		
	Number of quarries	Quantity	Value	Number of quarries	Quantity	Value
Bedford	1	W	420	1	W	W
Campbell	4	700	W	3	W	W
Clay	1	W	W	1	77	118
Davidson	11	4,460	5,491	7	5,030	7,373
De Kalb	1	175	224	1	W	231
Fentress	1	146	201	1	178	262
Franklin	4	1,070	W	4	1,097	W
Grainger	1	80	108	--	--	--
Jefferson	3	673	702	3	826	881
Knox	7	1,815	3,046	7	2,333	4,058
Lawrence	--	--	--	1	88	W
McMinn	1	W	139	2	580	949
Marion	4	W	W	4	1,529	1,644
Moore	1	W	W	1	W	30
Pickett	1	W	71	1	24	36
Rutherford	4	815	940	4	W	W
Smith	1	52	81	1	W	W
Stewart	1	W	W	1	210	261
Union	1	760	1,140	2	W	W
Washington	7	W	W	5	137	240
White	2	W	W	1	164	349
Undistributed [2]	r 67	21,406	34,389	65	23,467	36,866
Total	124	32,152	46,952	116	35,740	[3] 53,297

r Revised. W Withheld to avoid disclosing individual company confidential data; included with "Undistributed."

[1] Limestone used generally to include dolomite.

[2] Includes Anderson, Benton, Blount, Bradley, Cannon, Carter, Claiborne, Cocke (1972), Coffee, Cumberland, Decatur, Dickson, Fayette (1971), Giles, Greene, Grundy, Hamblen, Hamilton, Hancock, Hardin, Hawkins, Humphreys, Johnson, Lincoln, Loudon, Macon, Marshall, Maury, Meigs, Monroe, Montgomery, Overton, Putnam, Rhea, Roane, Robertson, Sequatchie (1971), Sevier, Sullivan, Sumner, Unicoi (1971), Warren, Wayne (1971), Williamson and Wilson Counties, and production for which no county breakdown is available.

[3] Data does not add to total shown because of independent rounding.

Table 9.—Tennessee: Crushed limestone [1] sold or used by producers, by use

(Thousand short tons and thousand dollars)

Use	1971		1972	
	Quantity	Value	Quantity	Value
Bituminous aggregate	3,132	4,908	2,498	3,707
Concrete aggregate	5,131	7,712	5,115	7,478
Dense graded road base stone	12,695	17,372	12,345	18,361
Macadam aggregate	1,875	2,769	2,245	3,285
Surface treatment aggregate	1,413	2,042	1,713	2,566
Unspecified aggregate and roadstone	2,331	3,485	4,715	6,856
Agricultural limestone [2]	1,391	1,907	2,541	3,913
Cement and lime manufacture	2,437	3,645	2,474	3,266
Fill	--	--	50	88
Railroad ballast	W	W	120	W
Riprap and jetty stone	123	206	825	1,262
Stone sand	112	198	85	103
Other uses [3]	1,512	2,709	1,016	2,412
Total [4]	32,152	46,952	35,740	53,297

W Withheld to avoid disclosing individual company confidential data; included with "Other uses."

[1] Limestone used generally to include dolomite.

[2] Data includes poultry grit and other soil conditioners (1971).

[3] Includes fluxing stone, drain fields, other fillers (1972), chemical stone (1971), chemicals (1972), roofing aggregate, filter stone (1971), glass, and uses not specified.

[4] Data may not add to totals shown because of independent rounding.

Table 10.—Tennessee: Mine production (recoverable) of gold, silver, copper and zinc

	1970	1971	1972
Mines producing: Lode	13	13	11
Material sold or treated:			
Ore, thousand short tons	5,837	[1] 5,948	5,285
Copper-zinc, do	1,680	1,704	1,762
Zinc, do	4,157	4,245	3,523
Production (recoverable):			
Quantity:			
Gold, troy ounces	124	192	176
Silver, do	94,770	131,349	83,466
Copper, short tons	15,535	13,916	11,310
Zinc, do	118,260	119,295	101,722
Value:			
Gold, thousands	$5	$8	$10
Silver, do	168	203	141
Copper, do	17,928	14,473	11,581
Zinc, do	36,233	38,413	36,111
Total, do	[1] 54,333	53,097	47,843

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

asphalt fill and production of glass and ferrosilicon. Major uses for quartzite were to produce irregularly shaped stone and house stone veneer.

Vermiculite.—Construction Products Div. of W. R. Grace & Co. at Nashville continued expanding crude vermiculite from Montana and South Carolina. Vermiculite was used for concrete aggregate, plaster aggregate, loose fill aggregate, and horticulture.

METALS

Metals accounted for 18% of the total value of mineral production in 1972. Zinc production accounted for 75% of metal value and copper accounted for most of the remainder. Total value of metal production was down 11% from that of last year.

Aluminum.—Tennessee ranked fifth in the Nation in quantity and value of aluminum produced in 1972. Production was down 12% from that of 1971. The Aluminum Co. of America (Alcoa) in Blount County and Consolidated Aluminum Corp. (Conalco) in Humpherys County produced aluminum metal from alumina imported from outside the State.

During 1972 the capacity of the Alcoa plant was increased from 200,000 to 270,000 tons per year. Environmental control emphasis continued during the year and additional smelting lines were equipped with the high-efficiency Alcoa 398 process for fume control. The process was used on the second 100,000-ton potline.

The rated capacity of Conalco remained the same as in 1971 at 140,000 short tons; however, in 1972 the plant operated at somewhat less than capacity.

Copper.—Cities Service Co., at its Copperhill operations in Polk County, was the only producer of copper in the State. The company recovered copper concentrate from sulfide ore. The copper mining belt is 2 by 6 miles with mining to a depth of 3,400 feet. Production is from four mines, the Cherokee, Boyd, Calloway, and Eureka mines, with hoisting from three shafts and the Eureka slope. The Cherokee is the biggest and the Calloway is being deepened. Mining operations were at capacity throughout the year. Copper metal production in 1972 was 11,310 short tons valued at $11.6 million, a decline of 19% in quantity and 20% in value from the previous year's totals.

Copper concentrates of 20% metal were smelted in the electric furnaces and converters. Blister cakes were made, but about half of the blister was converted to copper shot, which was subsequently converted to copper sulfate by treatment with sulfuric acid.

Gases from the smelter and roasters were treated to make sulfuric acid. Some of the acid was used in the plant and the remainder was sold throughout the Southeast.

The multimillion-dollar expansion and modernization of manufacturing facilities at Copperhill were essentially completed in 1972. The program was designed to improve production and bring the operation within the air quality laws. Mining and milling have increased from 5,000 to 6,900 tons per day of ore. A new electric furnace was in-

stalled to supply matte to two converters; new roasters and a pelletizing plant were constructed near the Copperhill smelter, and a new 1,800-ton-per-day contact sulfuric acid plant was built.

Ferroalloys.—Six companies produced ferroalloys in Marion, Maury, Roane, and Shelby Counties. The plants in Maury County produced ferrophosphorus as a by-product in making phosphorus; the plant in Marion County produced ferrosilicon; the plant in Roane County produced ferromanganese, ferrosilicon, and silico-manganese; and the Shelby County plant produced ferromanganese, ferrosilicon, silicomanganese, ferrochromium, and ferro-chromiumsilicon.

Shipments of ferroalloys in 1972 were 217,000 tons valued at $33.9 million. Value per ton decreased from that of last year by 15%.

During the year, International Utilities Corp. purchased Tennessee Metallurgical Co., which had production of about 30,000 tons of ferrosilicon per year and some silicon metal. Headquarters were in Chattanooga and the plant was located at Kimball in Marion County.

Gold.—Gold recovered at out-of-State refineries was a byproduct of refined copper from the Cities Service Co. Copperhill operations. The yield decreased from 192 troy ounces to 176 troy ounces in 1972; however, with the increase in the price of gold during the year, the production value increasd from $7,920 in 1971 to $10,314 in 1972.

Magnesium.—Tennessee Die Casting Corp. at Ripley expanded its facilities to produce magnesium die castings. The company planned to expand its Ripley, Tenn., facilities by 8,000 square feet.

Manganese.—Foote Mineral Co. made production improvements during the year at its electrolytic manganese plant in New Johnsonville. The improvements partially offset increased labor, raw material, and power costs. Sales of electrolytic manganese in chip form and in the form of manganese-aluminum briquets increased moderately over 1971 levels.

Silver.—Silver recovered at out-of-State refineries was a byproduct of refining copper from the Cities Services Co. Copperhill operations. Quantity and value of silver produced both decreased from that of last year—quantity declined 36% to 83,466 troy ounces and value declined 31% to $140,640.

Titanium.—E. I. duPont de Nemours and Co., Inc., continued production of titanium dioxide pigments from concentrates from Florida, Georgia, New Jersey, and Australia. Capacity of the New Johnsonville plant was increased by 45,000 tons per year during the first quarter of 1972, which brought the annual capacity of the plant to 141,000 tons. Further expansion is underway for another 55,000 tons per year with expected completion for 18,000 tons planned for midyear 1973 and 37,000 tons by yearend 1973. In order to dispose of the effluent (aqueous solution of ferric chloride) produced, three deep waste disposal holes have been drilled into the Knox Dolomite since 1967. Initially 250 to 300 gallons per minute were being injected into the subsurface below 3,000 feet. Except for short shut-down periods, injection of this effluent at about the same rate has continued over the approximate 5 year period. Hole 1 has been abandoned. Holes 2 and number 3 are presently operative. Plans are being made to drill Hole 4.

Zinc.—Tennessee led the Nation in zinc production for the 15th consecutive year with 101,722 short tons, 21% of the zinc produced in the United States. Value of zinc produced was $36.1 million which ranked fourth in all the minerals produced in the State for 1972.

Three companies mined zinc ore from seven mines in Hancock, Jefferson, and Knox Counties in eastern Tennessee. Cities Service Co. Copperhill operations also produced zinc concentrates from its plant in Polk County.

The American Smelting and Refining Company (ASARCO) temporarily closed its Coy mine near Jefferson City in August. This mine went into full production in January 1959, but output decreased gradually over the last few years. The Mascot Mill, which has operated since 1913, is being replaced by a new mill with 20% more capacity at the Young mine. Scheduled completion date for the new mill will be mid-1974. This mill will process ore from the Young, Coy, and Immel mines. The ore from the New Market mine was processed at its own mill. Zinc reserves at ASARCO Tennessee mines have been estimated at over 77 million tons of ore averaging 3% to 4% zinc. Two valuable mill products are marketed by ASARCO American Limestone Co. The tailings were used for agricul-

tural limestone and the sink-float reject was sold for gravel.

The New Jersey Zinc Co. closed the Flat Gap mine in Hancock County near Treadway on October 1, 1972. This mine had been in operation since 1959. The company reported that all equipment, including the mill would be moved to its new Elmwood mine near Carthage. The company had been exploring the Elmwood ore body by underground methods for more than a year and development work was continuing. The production shaft was more than 450 feet in depth. The shaft is 16 feet in diameter and will be concrete lined to a depth of 1,550 feet. Underground development work from the exploration shaft continued and underground rail haulage was being developed. Production was planned to begin about mid-1974 at the rate of about 2,000 tons per day. The announcement of this discovery several years ago touched off widespread exploration activity in Tennessee with more than 1.5 million acres under lease at one time in the middle Tennessee area.

The Jefferson City mine of New Jersey Zinc Co. and the Zinc Mine Works of United States Steel Corp. in east Tennessee operated throughout the year.

Ball Metal and Chemical Div. of Ball Corp., Greeneville, Tenn., began operation of what was reported to be one of the worlds' largest zinc rolling mills. This plant was planned to consume 25,000 to 30,000 tons of zinc annually and produce dry cell battery cans and photoengraving plates.

MINERAL FUELS

Mineral fuels accounted for 30% of the total value of mineral production in 1972. Value of production was up 35% from that of 1971 and coal accounted for most of the output.

Coal (Bituminous).—For the second consecutive year, coal was the major mineral commodity produced in Tennessee in terms of value with 11 million short tons valued at $81 million in 1972. Quantity and value increased 21% and 37%, respectively, over last year's totals. Production was from 211 mines in 18 counties in the Cumberland Plateau region of east-central Tennessee. Underground mining accounted for 52% of the total production, strip mining for 45%, and auger mining for the remaining 3%.

During the year, 21.4 million tons of coal, of which 10.4 million tons were imported, were distributed as follows: 88% to electrical

Table 11.—Tennessee: Bituminous coal production, by type of mine and county
(Excludes mines producing less than 1,000 short tons annually)

County	Number of mines				Production (thousand short tons)				Value (thousands)
	Underground	Strip	Auger	Total	Underground	Strip	Auger	Total [1]	
Anderson	25	22	5	52	1,348	1,318	120	2,786	$20,616
Bledsoe	--	2	--	2	--	W	--	W	W
Campbell	20	13	2	35	885	935	135	1,956	14,587
Claiborne	5	10	--	15	1,471	907	--	2,378	16,837
Cumberland	2	3	--	5	11	17	--	28	197
Fentress	2	7	--	9	25	387	--	412	2,617
Grundy	--	6	--	6	--	182	--	182	1,327
Hamilton	2	1	--	3	W	W	--	W	W
Marion	17	3	--	20	644	33	--	676	4,662
Morgan	6	8	1	15	88	407	12	507	3,602
Overton	--	1	--	1	--	W	--	W	W
Putnam	1	--	--	1	W	--	--	W	W
Rhea	2	--	--	2	W	--	--	W	W
Roane	--	1	--	1	--	W	--	W	W
Scott	18	14	1	33	991	440	14	1,445	11,020
Sequatchie	5	1	--	6	W	W	--	W	W
Van Buren	1	2	--	3	W	W	--	W	W
White	2	--	--	2	95	--	--	95	745
Undistributed	--	--	--	--	307	488	--	795	5,176
Total [1]	108	94	9	211	5,866	5,113	281	11,260	81,386

W Withheld to avoid disclosing individual company confidential data; included with "Undistributed."
[1] Data may not add to totals shown because of independent rounding.

utilities, 1% to coke and gas plants, 2% to retail dealers, and 9% to others.

Permits were issued by the State of Tennessee allowing 4,709 acres of land to be disturbed for coal strip mining in 1972.

Coke.—Chattanooga Coke and Chemicals Div. of Woodward Co., The Mead Corp. produced all the State's coke and breeze at its plant at Alton Park. Other commodities produced were ammonium sulfate, crude coal tar, crude light oil, benzene, toluene, and xylene. The coal used for production of coke and byproducts was from Pennsylvania, Virginia, and West Virginia.

Natural Gas.—Standard Explorations Co. and Pemberton Oil and Lumber Co., Inc., both of Oneida, Tenn., were the leading producers of natural gas in 1972. Natural gas sold in 1972 totaled 24.6 million cubic feet, all from Scott and Morgan Counties, a 73% decrease from that of last year.

Petroleum.—Crude oil production for 1972 was 198,234 barrels, down about 200,000 barrels from that of 1971. The Oneida West field in Scott County produced 165,874 barrels from a total of 37 wells in 1972, and cumulative production totaled 868,923 barrels by yearend. By July 1972, monthly production had declined to about 10,500 barrels, but by December had increased to 18,000 barrels from 32 wells.

Tennessee had a total of 94 oil and gas test wells drilled in 1972, down 45% from that of 1971. Seventeen counties had one or more wells, but most of the activity was in Scott, Morgan, Fentress, Overton, and Clay Counties. These five counties had a total of 80 wells, of which 55 were exploratory. Only three test wells were drilled west of the axis of the Nashville dome. Total footage for all tests was 107,970 feet, of which 80,288 feet was exploratory.

New regulations pertaining to oil and gas operations in Tennessee became effective November 15, 1972.

Three oil fields and one gas field were discovered in 1972. Except for one small Ordovician field in Clay County, all exploratory successes were in Scott, Morgan, and Fentress Counties, and all were completed in Mississippian carbonates.

The most significant find was in the Fort Payne Formation at the Honey Creek South field in Scott County. By yearend five oil wells had been completed on 40-acre spacings and nearly 12,000 barrels of oil had been sold from the lease. The field is about 5 miles southwest of the Oneida West field and pay depth and geology of the fields were similar.

Table 12.—Tennessee: Oil and gas well drilling completions, by county

	Proved field wells [1]			Exploratory wells			Total	
	Oil	Gas	Dry	Oil	Gas	Dry	Number of wells	Footage
Clay	1	--	2	1	--	13	17	13,479
Cumberland	--	--	--	--	--	1	1	1,900
Fentress	1	--	--	--	4	9	14	13,167
Hamilton	--	--	--	--	--	2	2	1,557
Henry	--	--	--	--	--	1	1	6,500
Hickman	--	--	--	--	--	1	1	805
Jackson	--	--	1	--	--	--	1	506
Lewis	--	--	--	--	--	1	1	743
Lincoln	--	--	--	--	--	1	1	142
Macon	--	--	1	--	--	1	2	1,805
Morgan	--	--	2	2	1	4	9	12,755
Overton	1	--	7	--	--	6	14	10,931
Putnam	--	--	--	--	--	1	1	600
Scott	7	2	2	1	2	12	26	42,021
Smith	--	--	--	--	--	1	1	232
White	--	--	--	--	--	1	1	427
Wilson	--	--	--	--	--	1	1	400
Total	10	2	15	4	7	56	94	107,970

[1] Development wells as defined by American Petroleum Institute.

Source: American Petroleum Institute.

Table 13.—Principal producers

Commodity and company	Address	Type of activity	County
Aluminum smelters:			
Aluminum Co. of America	P.O. Box 158 Alcoa, Tenn. 37701	Plant	Blount.
Consolidated Aluminum Corp. New Johnsonville.	1102 Richmond St. Jackson, Tenn. 38301	----do	Humphreys.
Barite:			
NL Industries, Inc., Baroid Division.	Box 187 Sweetwater, Tenn. 37874	2 open pit mines and plant.	Monroe.
B. C. Wood	Box 284 Sweetwater, Tenn. 37874	Open pit mine and plant.	Loudon.
Cement:			
General Portland Inc., Signal Mountain Division.	1300 American National Bank Bldg. Chattanooga, Tenn. 37402	Plant	Hamilton.
Ideal Cement Co	P.O. Box 6238 Knoxville, Tenn. 37914	----do	Knox.
Marquette Cement Mfg. Co	P.O. Box 1242 Nashville, Tenn. 37202	----do	Davidson.
	P.O. Box 157 Cowan, Tenn. 37318	Open pit mine and plant.	Franklin.
Penn-Dixie Cement Corp	Richard City, Tenn. 37371	Plant	Marion.
	Kingsport, Tenn. 37662	----do	Sullivan.
Clay:			
Ball:			
Bell Clay Co	Gleason, Tenn. 38229	4 open pit mines and plant.	Weakley.
Kentucky-Tennessee Clay Co.	Box 449 Mayfield, Ky. 42066	13 open pit mines and plant.	Carroll, Gibson, Henry, Weakley.
H. C. Spinks Clay Co., Inc	Box 820 Paris, Tenn. 38242	16 open pit mines and plants.	Carroll, Henry, Weakley.
United Sierra, Div. Cyprus Mines Corp.	P.O. Box 111 Gleason, Tenn. 38229	7 open pit mines and plant.	Carroll and Weakley.
Fuller's earth:			
Southern Clay, Inc. (Subsidiary of Lowe's Inc.)	Box 819 Paris, Tenn. 38242	Open pit mine and plant.	Henry.
Miscellaneous:			
General Portland Cement Co	1300 American National Bank Bldg. Chattanooga, Tenn. 37402	----do	Hamilton.
General Shale Products Corp	Box 3547 C.R.S. Johnson City, Tenn. 37601	6 open pit mines and plants.	Hamilton, Knox, Sullivan, Washington.
Shalite Corp	Box 441 Knoxville, Tenn. 37901	Open pit mine and plant.	Knox.
Tennlite, Inc	Box 340 Greenbrier, Tenn. 37073	----do	Davidson.
Coal:			
Consolidation Coal Co	Box 460 Middlesboro, Ky. 40965	1 underground mine and plant.	Claiborne.
Howard Ensley Coal Co., Inc	Rt. 1, Box 49B Newcomb, Tenn. 37819	1 strip mine	Scott.
Farrell Mining Co	Box 7 Elk Valley, Tenn. 37734	1 auger and 2 strip mines.	Campbell.
Grundy Mining Co., Inc	P.O. Box 878 Jasper, Tenn. 37347	1 underground mine.	Marion.
Oliver Springs Mining Co., Inc	Box 350 Oliver Springs, Tenn. 37840	3 underground mines.	Anderson.
Volunteer Mining Corp	Cody, Ky. 41808	Underground mine.	Do.
Coke:			
Chattanooga Coke and Chemicals Div. of Woodward Co., The Mead Corp.	4800 Central Ave. Chattanooga, Tenn. 37410	Plant	Hamilton.
Copper:			
Cities Service Co., Copperhill Operations.	Copperhill, Tenn. 37317	4 underground mines, mill, smelter, chemical plant.	Polk.
Ferroalloys:			
Chromium Mining and Smelting Co.	P.O. Box 28538 Memphis, Tenn. 38128	Plant	Shelby.
Hooker Chemical Corp	P.O. Box 591 Columbia, Tenn. 38401	----do	Maury.
Monsanto Co	Columbia, Tenn. 38401	----do	Do.
Roane Electric Furnace, Woodward Co., Div. The Mead Corp.	Box 298 Rockwood, Tenn. 37854	----do	Roane.
Stauffer Chemical Co	P.O. Box 472 (Furnace Plant) Mt. Pleasant, Tenn. 38474	----do	Maury.

Table 13.—Principal producers—Continued

Commodity and company	Address	Type of activity	County
Graphite, artificial:			
Union Carbide Corp	P.O. Box 513 Columbia, Tenn. 38401	Plant	Maury
Lime, primary:			
Foote Mineral Co	Rt. 8, Asbury Rd. Knoxville, Tenn. 37914	Lime kiln	Knox.
Williams Lime Mfg. Co	Box 2286 Knoxville, Tenn. 37901	do	Do.
Perlite, expanded:			
Chemrock Corp	Osage St. Nashville, Tenn. 37208	Plant	Davidson.
Petroleum:			
E. J. Clowes & William Ray	P.O. Box 199 Oneida, Tenn. 37841	2 wells	Scott.
C. G. Collins	P.O. Box 370 Greenburg, Ky. 42743	3 wells	Do.
Green River Gas Co	P.O. Box 420 Oneida, Tenn. 37841	4 wells	Do.
Tenexco Co	P.O. Box 290 Oneida, Tenn. 37841	3 wells	Do.
Irvin Vawter	Box 223 Albany, Ky. 42602	5 wells	Do.
Petroleum Refinery:			
Delta Refinery Co. Div. of Earth Resources Co.	543 W. Mallory Ave. Memphis, Tenn. 38106	Refinery	Shelby.
Phosphate rock:			
Hooker Chemical Corp	Box 591 Columbia, Tenn. 38401	Open pit mines and plant.	Hickman and Maury.
Monsanto Co	800 North Lindbergh Blvd. Columbia, Tenn. 38401	do	Giles, Maury, Williamson.
Stauffer Chemical Co	P.O. Box 89 Mt. Pleasant, Tenn. 38474	do	Giles and Maury.
Tennessee Valley Authority	P.O. Box 73 Columbia, Tenn. 38401	do	Maury and Williamson.
Pyrite:			
Cities Service Co., Copperhill Operations.	Copperhill, Tenn. 37317	*See* copper	Polk.
Sand and gravel:			
Camden Gravel Co	P.O. Box 207 Camden, Tenn. 38320	Open pit	Benton.
Dixie Sand & Gravel Co	515 River St. Chattanooga, Tenn. 37402	Open pit and dredge.	Hamilton.
Fischer Concrete Co., Inc	P.O. Box 37 Memphis, Tenn. 38126	3 open pits	Shelby.
W. S. Jordan & Sons Sand & Gravel Inc.	Box 16142 Memphis, Tenn. 38116	do	Do.
Memphis Stone & Gravel Co	Box 269 Germantown, Tenn. 38138	2 open pits	Benton and Shelby.
Clyde Owen Sand and Gravel Inc	10636 Shelton Road Collierville, Tenn. 38017	Open pit	Shelby.
Tennessee Valley Sand and Gravel Co.	Box 520 Sheffield, Ala. 35660	Dredge	Hardin.
Silver:			
Cities Service Co., Copperhill Operations.	Copperhill, Tenn. 37317	*See* Copper	Polk.
Stone:			
Dolomite:			
Agricultural Lime Co. Inc	R.F.D. 9 Greeneville, Tenn. 37743	Open quarry	Greene.
New Jersey Zinc Co. (Gulf Western Industries Inc.)	Jefferson City, Tenn. 37760	Underground mine.	Jefferson.
Limestone, crushed:			
American Smelting & Refining Co.	Watauga, Tenn. 37694	Open quarry	Carter.
Dalton Rock Prod. Co	P.O. Box 1352 Cleveland, Tenn. 37311	do	Bradley.
Hoover Co	Box 7201 Nashville, Tenn. 37210	5 quarries	Cumberland, Davidson, Franklin, Robertson, Rutherford.
Ralph Rogers & Co	720 Argyle Ave. Nashville, Tenn. 37203	2 open quarries and 1 underground mine.	Anderson, Coffee, Sumner.
The Stone Man, Inc	P.O. Box 2098 3814 Tennessee Ave. Chattanooga, Tenn. 37409	5 open quarries	Bedford, Hamilton, Moore, Rutherford, Warren.

Table 13.—Principal producers—Continued

Commodity and company	Address	Type of activity	County
Stone:—Continued			
Limestone, crushed—Continued			
Vulcan Materials Co	Box 7 Knoxville, Tenn. 37901	25 open quarries	Anderson, Benton, Blount, Davidson, Decatur, Hamblem, Hamilton, Hardin, Hawkins, Humphreys, Knox, Loudon, Marion, Roane, Rutherford, Sevier, Sullivan, Sumner, Wayne, Williamson.
Marble:			
John J. Craig Co	681 Maryville Pike SW Knoxville, Tenn. 37920	2 open quarries	Blount.
Georgia Marble Co	Riverside Drive Knoxville, Tenn. 37914	Open quarry	Union.
Imperial Black Marble Corp	Thorn Hill, Tenn. 37881	----do	Grainger.
Quartzite:			
Ross L. Brown Cut Stone Co., Inc.	Crab Orchard, Tenn. 37723	----do	Cumberland.
Crab Orchard Stone Co., Inc	P.O. Drawer J. Crossville, Tenn. 38555	----do	Do.
Crossville Stone Co	Box 426 Crossville, Tenn. 38555	----do	Fentress.
Sandstone:			
Crab Orchard Stone Co., Inc	P.O. Drawer J. Crossville, Tenn. 38555	----do	Cumberland.
Turner Bros. Stone Co., Inc	P.O. Box 297 Crossville, Tenn. 38555	----do	Do.
White Silica Sand Co., Inc	Rt. 2 Caryville, Tenn. 37714	----do	Campbell.
Vermiculite, exfoliated:			
W. R. Grace & Co., Construction Products Div.	4061 Powell Ave. Nashville, Tenn. 37204	Plant	Davidson.
Zinc:			
American Smelting & Refining Co	Mascot, Tenn. 37806	4 underground mines and mill.	Jefferson and Knox.
Cities Service Co., Copperhill Operations.	Copperhill, Tenn. 37317	*See* copper	Polk.
New Jersey Zinc Co., (Gulf & Western Industries, Inc.)	Jefferson City, Tenn. 37760	Underground mine and mill.	Jefferson.
United States Steel Corp	Jefferson City, Tenn. 37760	----do	Do.