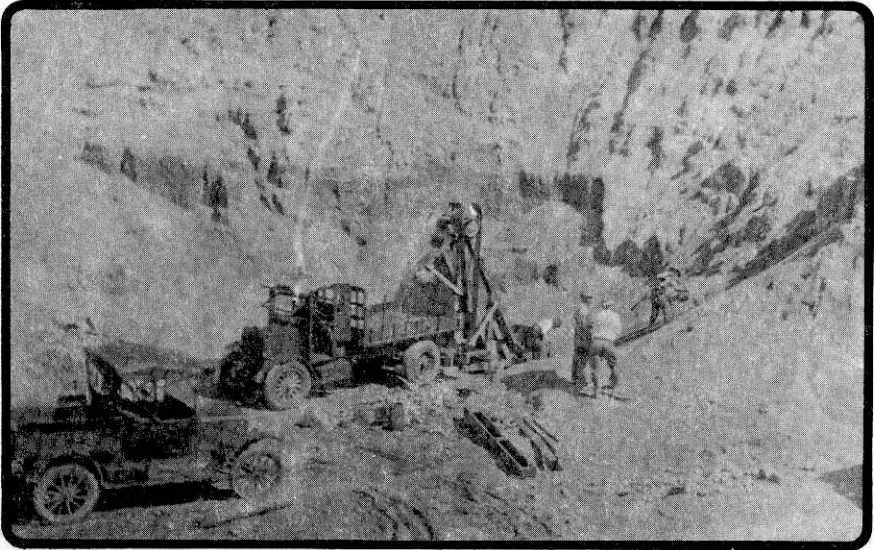


MINERALS REPORT 25

The Mineral Industry of South Dakota 1978-79

By James H. Aase, Wanda J. West, and Fred V. Steece



DEPARTMENT OF
WATER AND NATURAL RESOURCES
SOUTH DAKOTA GEOLOGICAL SURVEY
VERMILLION, SOUTH DAKOTA - 1981

The Mineral Industry of South Dakota

This chapter has been prepared under a Memorandum of Understanding between the Bureau of Mines, U.S. Department of the Interior, and the South Dakota Geological Survey for collecting information on all nonfuel minerals.

By James H. Aase,¹ Wanda J. West,² and Fred V. Steece³



UNITED STATES DEPARTMENT OF THE INTERIOR • James G. Watt, Secretary

BUREAU OF MINES

This publication is a chapter from the current Bureau of Mines Minerals Yearbook, comprising *Volume I, Metals and Minerals; Volume II, Area Reports: Domestic; Volume III, Area Reports: International*. The separate volumes of the Yearbook are sold by the Superintendent of Documents, Washington, D.C. 20402.

The value of nonfuel mineral production in South Dakota for 1978 and 1979 was \$114.8 million and \$148.7 million, respectively, setting records each year.

The State's nonfuel mineral output was derived from three metallic and nine non-metallic mineral commodities. Gold continued as the leading commodity in terms of value during the biennium 1978-79, accounting for approximately half of the State

total. Other principal mineral commodities produced, in descending order of value, included cement, stone, and sand and gravel.

Nationally, South Dakota ranked 38th among the States in value of nonfuel mineral production in 1978. The State led the Nation in gold production in 1978 and was second, following Utah, in 1979.

Although the quantity of gold produced in

Table 1.—Nonfuel mineral production in South Dakota¹

Mineral	1977		1978		1979	
	Quantity	Value (thousands)	Quantity	Value (thousands)	Quantity	Value (thousands)
Cement:						
Masonry --- thousand short tons---	W	W	W	W	7	\$434
Portland ----- do -----	W	W	W	W	670	31,273
Clays ----- do -----	¹ 197	² \$233	² 216	² \$268	205	292
Gem stones ----- do -----	NA	40	NA	50	NA	50
Gold (recoverable content of ores, etc.)						
----- thousand short tons -----	304,846	45,212	285,512	55,261	245,912	75,618
----- troy ounces -----	(³)	5	(³)	4	(³)	2
Mica, scrap ----- thousand short tons -----	6,043	9,815	6,404	11,100	6,001	10,119
Sand and gravel ----- do -----						
Silver (recoverable content of ores, etc.)						
----- thousand troy ounces -----	69	317	53	287	58	643
Stone:						
Crushed ----- thousand short tons -----	3,377	7,477	3,693	8,376	3,891	10,317
Dimension ----- do -----	35	11,404	36	11,859	36	13,268
Combined value of beryllium concentrate (1977), clays (bentonite, 1977-78), feldspar, gypsum, iron ore (1978-79), lime, and values indicated by symbol W -----	XX	28,282	XX	27,554	XX	6,670
Total -----	XX	102,785	XX	114,759	XX	148,686

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

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

²Excludes bentonite; value included in "Combined value" figure.

³Less than 1/2 unit.

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

(Thousands)

County	1977	1978	Minerals produced in 1978 in order of value
Aurora	\$35	—	
Beadle	23	\$17	Sand and gravel.
Bon Homme	50	—	
Brookings	825	946	Sand and gravel.
Brown	221	508	Do.
Butte	W	W	Clays, sand and gravel.
Campbell	100	W	Sand and gravel.
Charles Mix	236	224	Do.
Clark	83	99	Do.
Clay	24	21	Do.
Codington	W	W	Do.
Corson	55	W	Do.
Custer	W	W	Stone, feldspar.
Davison	62	59	Sand and gravel.
Day	113	221	Do.
Deuel	83	119	Do.
Dewey	54	54	Do.
Douglas	W	W	Do.
Fall River	W	W	Sand and gravel, stone.
Faulk	100	76	Sand and gravel.
Grant	W	W	Stone, sand and gravel.
Gregory	216	65	Sand and gravel.
Haakon	18	18	Do.
Hamlin	52	W	Do.
Hand	W	W	Do.
Hanson	W	W	Stone, sand and gravel.
Harding	—	18	Sand and gravel.
Hughes	—	93	Do.
Hutchinson	99	101	Do.
Hyde	114	113	Do.
Jerauld	109	74	Do.
Jones	59	50	Do.
Kingsbury	22	22	Do.
Lake	W	W	Do.
Lawrence	W	56,264	Gold, sand and gravel, silver, iron ore, stone.
Lincoln	105	32	Sand and gravel.
Lyman	42	78	Do.
McCook	W	W	Do.
McPherson	134	W	Do.
Marshall	W	W	Do.
Meade	W	W	Sand and gravel, gypsum.
Miner	35	37	Sand and gravel.
Minnehaha	W	W	Stone, sand and gravel.
Moody	178	160	Sand and gravel.
Pennington	30,518	W	Cement, stone, lime, sand and gravel, clays, mica.
Perkins	W	462	Sand and gravel.
Potter	60	W	Do.
Roberts	W	W	Do.
Sanborn	—	W	Do.
Spink	149	217	Do.
Sully	42	68	Do.
Tripp	42	35	Stone.
Turner	—	W	Sand and gravel.
Union	64	112	Do.
Walworth	W	132	Do.
Washabaugh	—	164	Do.
Yankton	W	W	Sand and gravel, stone.
Ziebach	W	W	Sand and gravel.
Undistributed ²	68,666	54,107	
Total ³	102,785	114,759	

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

¹The following counties are not listed because no nonfuel mineral production was reported: Bennett, Brule, Buffalo, Edmunds, Jackson, Mellette, Shannon, Stanley, and Todd.

²Includes gem stones, sand and gravel that cannot be assigned to specific counties, and values indicated by symbol W.

³Data may not add to totals shown because of independent rounding.

the State decreased in each year of the biennium from that of the previous year, the total value of produced gold increased. Major advances in the price of gold during the biennium raised the average value to

approximately \$194 per troy ounce in 1978 and \$308 per troy ounce in 1979, and were the principal factors contributing to the State's record high value of nonfuel mineral production set each year.

Nonfuel mineral production during the biennium was from approximately 150 firms and various governmental agencies operating out of 170 sites in 57 of the State's 67 counties. Lawrence County, followed by Pennington County, continued as the State's leading counties in terms of value of nonfuel mineral output. Production valued in excess of \$1 million each year of the biennium was recorded in four counties.

One of the State's oldest mineral-processing facilities, the brick plant of Black Hills Clay Products Co. in Butte County, terminated its operation near yearend 1978. The plant, with a reported capacity of 7.2 million bricks per year, went into operation in 1927, and has been the sole producer of clay brick in the State during the past two decades. Salvageable equipment will be utilized by an affiliate company plant in North Dakota, where better fuel efficiency in processing reportedly can be attained.

In June 1979, a new 3-year contract was signed between management of the Homestake gold mine at Lead and its miners' union, 1,350 workers of United Steel-

workers of America, Local 7044. Under terms of the contract, workers will receive an 8% annual wage increase in each of the contract's 3 years; a 7-cent-per-hour increase in wages for every \$5-increase in the price of gold above the \$275-per-ounce level, up to a maximum of 80 cents per hour; and a reduction in the workday from 8 1/2 hours to 8 hours, plus a one-time bonus of \$1,000 for miners, and between \$250 and \$300 for surface workers, to compensate them for the reduction in the workweek.

South Dakota and much of the Nation experienced a serious cement shortage in 1978. At midyear 1978, a policy decision was made by the South Dakota Cement Commission to halt sales of cement from the State-owned plant in Rapid City to out-of-State customers. Continued mechanical problems encountered during shakedown operations of a new kiln installed to double plant capacity, together with increased in-State demand, intensified the situation. This policy raised protests from customers in neighboring States, and the matter was taken to court. After a series of lower court rulings, the Eighth U.S. Circuit Court of Appeals

Table 3.—Indicators of South Dakota business activity

	1977	1978	1979 ^P	1978-79 percent change
Employment and labor force, annual average:				
Total civilian labor force	317.0	328.0	338.0	+3.0
Unemployment	10.0	10.0	12.0	+20.0
Employment (nonagricultural):				
Mining ¹	2.6	2.8	2.8	—
Manufacturing	23.4	24.9	26.9	+8.0
Contract construction	12.4	13.6	12.3	-9.6
Transportation and public utilities	12.6	13.4	13.7	+2.2
Wholesale and retail trade	62.3	65.2	66.6	+2.1
Finance, insurance, real estate	10.1	10.6	11.0	+3.8
Services	46.6	48.0	48.8	+1.7
Government	56.6	58.1	58.1	—
Total nonagricultural employment ¹	226.6	236.6	240.2	+1.5
Personal income:				
Total	\$4,028	\$4,541	\$5,053	+11.3
Per capita	\$5,859	\$6,585	\$7,334	+11.4
Construction activity:				
Number of private and public residential units authorized	5,983	25,287	4,288	-18.9
Value of nonresidential construction	\$77.1	\$57.1	\$99.7	+74.6
Value of State road contract awards	\$45.0	\$39.0	\$78.0	+100.0
Shipments of portland and masonry cement to and within the State	380	354	419	+18.4
Nonfuel mineral production value:				
Total crude mineral value	\$102.8	\$114.8	\$148.7	+29.5
Value per capita, resident population	\$149	\$166	\$216	+30.1
Value per square mile	\$1,334	\$1,489	\$1,930	+29.6

^PPreliminary.

¹Includes oil and gas extraction.

²Series 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.

ruled in favor of the South Dakota Cement Commission policy. In May 1979, the U.S. Supreme Court, after an appeal from an out-of-State customer, sent the case back to the Eighth Circuit Court for further consideration. The Eighth Circuit Court stood by its earlier ruling. Near yearend 1979, a second petition was made to the U.S. Supreme Court to override the most recent decision and to have it hear the case. Until the Supreme Court decides either to hear the case or to deny the appeal, the Eighth Circuit Court of Appeals ruling will stand, which allows South Dakota the right to favor its own residents over others in the sale of its State-produced cement.

In 1979, by Executive Order of the Governor, the State's Department of Natural Resource Development and the Department of Environmental Protection were combined into a new Department of Water and Natural Resources.

On July 1, 1978, the deadline date was reached for holders of severed mineral

rights on lands in the State to file with the appropriate county registrar a description of their interest, under provision of a law enacted in 1976. Failure to file by the deadline allows the surface owner to file claim to sole possession of property and rights described and to obtain ownership of the mineral estate involved.

The South Dakota Geological Survey continued basic research projects involving mineral and water resources of the State during the biennium. County ground water and mineral resource studies were conducted in cooperation with the U.S. Geological Survey, the County Commissioners, and the Conservancy Subdistricts. Typically, a county study presented the details of sand and gravel deposits of an area, including the thickness, distribution, and character of the deposits.

The State Geological Survey participated in a project during 1978-79 to evaluate the uranium resources of the Lemmon and Hot Springs 2° quadrangle sheets.

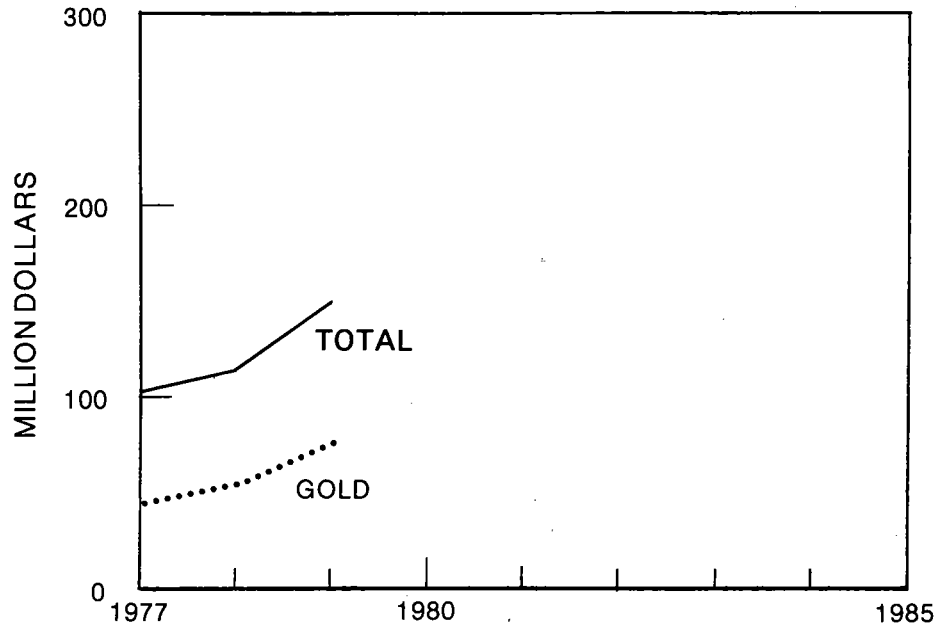


Figure 1.—Value of mine production of gold and total value of nonfuel mineral production in South Dakota.

Legislation and Government Programs.—During the 1978 and 1979 sessions of the South Dakota Legislature, a number of bills of interest to the mineral industry were enacted into law. Among the laws passed during the 1978 legislative session were measures which set additional standards for surface mining and exploration (included seismic holes in the definition of exploration drilling and required a performance bond on all holes for exploration purposes) and detailed plugging methods for borings and information filing requirements; transferred the administration and enforcement responsibility for mineral exploration, except oil and gas, from the Department of Natural Resource Development to the Department of Agriculture, Division of Conservation; and established new rules for mineral exploration on State lands, including lands in which the State

has a mineral interest.

Laws enacted during the 1979 legislative session included measures which required additional surface restoration bonds to insure agreements between operators and landowners or lessees regarding surface damage resulting from drilling operations; broadened severance tax liability to include operators, and defined operators; and prohibited foreign ownership of agricultural land in the State in excess of 160 acres, but did not include any royalty interest or other mineral interest or any lease, option, or easement relating thereto.

On December 4, 1979, the South Dakota School of Mines and Technology was designated by the Secretary of the Interior as a State Mining and Mineral Resources Research Institute pursuant to Title III of Public Law 95-87.

REVIEW BY NONFUEL MINERAL COMMODITIES

METALS

tion in 1978.

Gold.—Gold prices continued to advance during the biennium, rising an average of \$45 per troy ounce in 1978 and another \$115 per troy ounce in 1979. South Dakota accounted for slightly more than one-quarter of the Nation's gold output during 1978-79, with production coming solely from the Homestake Mining Co.'s lode mine at Lead. Recovery of gold from the lode mine ore produced in the State decreased to 0.17 ounce per ton in 1979 from 0.18 ounce per

Near yearend 1979, Homestake Mining Co. rebuilt various components of its gold mine at Lead. A new main drum shaft weighing 40 tons and measuring 40 feet in length by 30 inches in diameter was installed on the hoist at the Ross shaft, and the clutch spider, clutch ring, and brake ring were rebuilt. At the No. 6 hoist, six new lift ropes and three new tail ropes were installed, together with new liners on the hoist drum and crosshead.

Table 4.—South Dakota: Lode mine production (recoverable) of gold and silver

	1977	1978	1979
Mines producing: Lode	1	1	1
Material sold or treated: Gold ore	1,432	1,442	1,297
Production:			
Quantity:			
Gold	304,766	285,512	245,912
Silver	68,717	53,099	57,973
Value:			
Gold	\$45,200	\$55,261	\$75,618
Silver	\$317	\$287	\$643
Total	\$45,517	\$55,548	\$76,261

Table 5.—South Dakota: Homestake mine ore milled and receipts for gold produced

Year	Ore milled (thousand metric tons)	Receipts for gold produced	
		Total (thousands)	Per ton
1975	1,336	\$49,244	\$36.86
1976	1,504	39,916	26.54
1977	1,432	45,200	31.56
1978	1,442	55,261	38.32
1979	1,297	75,618	58.30

Iron Ore.—Pete Lien & Sons, Inc., operated a small open pit mine near Nemo in Lawrence County during 1978 and 1979. The entire output was shipped to the State-owned cement plant in Rapid City for use in the manufacture of cement.

Silver.—Production of silver in 1979 increased slightly in quantity and significantly in value over that of the previous year. The average value of the silver produced during 1979 was \$11.09 per troy ounce, compared with \$5.40 per troy ounce in 1978. The silver was obtained as a coproduct with the gold produced at the Homestake mine in Lead.

NONMETALS

Cement.—Cement manufactured in 1978 and 1979 came from the State-owned plant at Rapid City, in Pennington County. Three types of portland cement and a prepared masonry cement were manufactured at the facility. The plant, with a rated production capacity of 3,300 tons per 24 hours, used three wet-process kilns of 375-foot length and one dry-process kiln of 220-foot length in its production line. Ready-mix companies were the largest users of the portland cement produced, consuming more than half of the output in recent years. Over three-fourths of the cement shipped from the plant was handled by truck in bulk form. Approximately 1 3/4 tons of mineral raw material mined in the State were used in each ton of cement produced.

Clays.—American Colloid Co. continued to operate the State's only bentonite processing plant, near Belle Fourche in Butte County, during the biennium. In 1978, the plant used crude material obtained from deposits within the State and Wyoming. During 1979, all crude material processed was obtained from out-of-State sources. The bentonite was used principally in oil and gas drilling muds, foundry sands, animal feeds, and waterproofing sealants. Bentonite accounted for the largest part of the total value of clay produced in South Dakota during 1978.

Black Hills Clay Products Co. produced common clay for use at its brickmaking facility in Belle Fourche until near yearend 1978, when it permanently terminated the operation. The plant, established in 1927, was the only producer of clay brick in the State.

The South Dakota Cement Commission and Dakota Block Co. obtained common clay and shale from pits in Pennington County for use in cement and lightweight aggregate manufacturing, respectively.

Feldspar.—In 1978 and 1979, feldspar was produced at several small mines located in the southern Black Hills area of Custer County. The bulk of the hand-cobbed feldspar recovered was processed through a grinding mill operated by Pacer Corp. in Custer.

Gem Stones.—Gem stones were recovered only by mineral collectors and other hobbyists.

Gypsum.—The South Dakota Cement Commission operated an open pit gypsum mine in Meade County. The entire output was used by the Commission in the manufacture of portland and masonry cement at its Rapid City plant.

Lime.—The State's entire production of lime during 1978-79 was from the Pete Lien & Sons, Inc., plant in Rapid City, Pennington County. In 1979, a plant improvement program was initiated by the company to reduce fuel consumption and to increase production capacity. A three-bay preheater and a 14-inch-diameter contact cooler were installed on the kiln, and a conversion was made in processing fuel from gas to coal.

Consumption of quicklime and hydrated lime in South Dakota, obtained from both in- and out-of-State sources, was 30,000 tons in 1979 compared with 22,000 tons the previous year.

Mica.—In 1978 and 1979, the Pendleton Mining Co. produced hand-cobbed mica from a pegmatite deposit near Keystone in Pennington County.

Sand and Gravel.—Sand and gravel production in recent years has accounted for slightly less than 10% of the value of all nonfuel minerals produced in the State.

During the biennium, South Dakota's sand and gravel industry operated pits scattered throughout the State that ranged widely in their individual production. In 1978, 118 firms and government agencies

produced sand and gravel from 131 deposits located in 54 counties. Production from the individual deposits ranged from less than 25,000 tons to 400,000 tons, with 46% reporting output of less than 25,000 tons; 38% between 25,000 and 100,000 tons; 11% between 100,000 and 200,000 tons; and the remainder between 200,000 and 400,000 tons.

Table 6.—South Dakota: Construction sand and gravel sold or used, by major use category

Use	1977			1978			1979		
	Quantity (thousand short tons)	Value (thou- sands)	Value per ton	Quantity (thousand short tons)	Value (thou- sands)	Value per ton	Quantity (thousand short tons)	Value (thou- sands)	Value per ton
Concrete aggregate	1,219	\$2,611	\$2.14	1,466	\$3,357	\$2.29	1,329	\$3,305	\$2.49
Plaster and gunite	NA	NA	NA	4	13	3.38	W	W	3.24
sands	208	476	2.29	63	126	1.99	W	W	2.01
Concrete products	909	1,521	1.67	919	1,534	1.67	605	934	1.55
Asphaltic concrete									
Roadbase and coverings	2,046	3,379	1.65	3,219	5,200	1.62	3,110	4,660	1.50
Fill	1,593	1,747	1.10	681	704	1.17	853	1,030	1.21
Snow and ice control	NA	NA	NA	50	63	1.26	42	55	1.29
Railroad ballast	1	4	3.00						
Other uses	67	78	1.16	3	16	4.92	7	16	2.32
Total ¹ or average	6,043	9,815	1.62	6,404	11,100	1.73	6,001	10,119	1.69

NA Not available. W Withheld to avoid disclosing company proprietary data; included in "Total."
¹Data may not add to totals shown because of independent rounding.

Table 7.—South Dakota: Construction sand and gravel sold or used by producers

	1977			1978			1979		
	Quantity (thousand short tons)	Value (thou- sands)	Value per ton	Quantity (thousand short tons)	Value (thou- sands)	Value per ton	Quantity (thousand short tons)	Value (thou- sands)	Value per ton
Sand	1,358	\$2,352	\$1.73	1,838	\$3,336	\$1.81	1,441	\$2,750	\$1.91
Gravel	4,685	7,463	1.59	4,566	7,767	1.70	4,560	7,369	1.62
Total or average	6,043	9,815	1.62	6,404	11,100	1.73	6,001	10,119	1.69

¹Data do not add to total shown because of independent rounding.

Table 8.—South Dakota: Construction sand and gravel 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
Aurora	1	35	35	--	--	--	--	--	--
Beadle	1	15	23	1	10	17	1	32	43
Bon Homme	1	50	50	--	--	--	--	--	--
Brookings	5	503	825	6	591	946	5	433	718
Brown	4	132	221	7	263	508	8	278	461
Campbell	3	43	100	2	W	W	2	W	W
Charles Mix	6	166	236	5	149	224	4	146	216
Clark	1	53	83	1	60	99	1	W	W

See footnotes at end of table.

Table 8.—South Dakota: Construction sand and gravel sold or used by producers, by county —Continued

(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
Clay	1	21	24	1	13	21	1	35	44
Codington	2	W	W	2	W	W	3	201	498
Corson	1	55	55	1	W	W	1	7	11
Custer	1	14	14				1	17	17
Davison	3	35	62	3	42	59	4	88	101
Day	3	95	113	4	140	221	4	108	121
Deuel	2	W	83	2	76	119	2	W	W
Dewey	1	36	54	1	36	54	1	36	54
Fall River	3	270	473	3	236	476	3	200	527
Faulk	1	100	100	1	46	76	1	50	75
Gregory	3	139	216	3	39	65	3	32	51
Haakon	1	12	18	1	12	18	1	12	18
Hamlin	1	52	52	2	W	W	2	W	W
Hanson	1	22	22	1	W	W	1	W	W
Harding				2	10	18			
Hughes				2	38	93	2	28	W
Hutchinson	5	68	99	5	44	101	5	86	92
Hyde	1	60	114	1	75	113	1	60	150
Jerauld	3	70	109	2	44	74	2	43	54
Jones	1	30	59	1	W	50	1	35	35
Kingsbury	4	17	22	4	17	22	4	17	22
Lincoln	3	61	105	2	20	32			
Lyman	1	33	42	1	W	78	1	29	44
McPherson	1	100	134	2	W	W	2	W	W
Miner	1	35	35	1	23	37	1	17	19
Minnehaha	10	749	1,137	11	1,028	1,460	11	993	1,399
Moody	4	140	178	3	118	160	3	123	159
Pennington	6	321	556	6	365	821	7	302	800
Perkins	2	W	W	3	133	462	3	79	230
Potter	1	60	60	1	W	W	1	70	113
Spink	3	125	149	2	192	217	2	W	133
Sully	1	26	42	1	53	68	1	32	34
Union	4	54	64	4	83	112	4	112	156
Walworth	2	61	W	2	78	132	2	106	106
Washabaugh				1	W	164	(¹)	(¹)	(¹)
Yankton	4	313	562	4	169	284	5	246	429
Ziebach	1	132	W	1	W	W	1	W	W
Undistributed ²	20	1,741	3,492	22	2,149	3,705	24	1,948	3,194
Total ³	124	6,043	9,815	131	6,404	11,100	132	6,001	10,119

¹W Withheld to avoid disclosing company proprietary data; included with "Undistributed."

²Washabaugh County merged with Jackson County on January 1, 1979, and will be known hereafter as Jackson County.

³Includes Brule (1979), Butte, Douglas, Grant, Hand, Lake, Lawrence, McCook, Marshall, Meade, Roberts, Sanborn (1978-79), and Turner (1978-79) Counties, sand and gravel that cannot be assigned to specific counties, and data indicated by symbol W.

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

Stone.—Granite, limestone, and sandstone were produced in the State during 1978-79. Stone ranked first in terms of value of all nonmetallic minerals produced in South Dakota, accounting for nearly one-fifth of the total State value during the biennium.

Stone output was greater in quantity and value in both years than in the previous respective years. In 1979, production was recorded from 19 quarries, operated by 14 firms located in 8 counties. Pennington County was the leader in crushed stone production; all dimension stone output was from Grant County.

Output of limestone exceeded that of any other type of rock. Limestone from seven deposits in Custer, Fall River, Lawrence,

and Pennington Counties was crushed and used most extensively as a concrete aggregate.

Granite was quarried by six companies at eight quarries near Milbank in Grant County. Most of the dimension granite was used in making monuments. Crushed granite was utilized as aggregate.

Sandstone was produced by four companies at four sites in Hanson, Minnehaha, and Tripp Counties. Principal usage was as an aggregate for concrete, with lesser amounts used as bituminous aggregate, railroad ballast, and riprap.

More than half of the State's total stone output in 1979 was from the operations of two firms. Production from individual quarry operations throughout the State ranged

from less than 25,000 tons to more than 900,000 tons per year. In 1979, nine quarries produced less than 25,000 tons; one quarry between 75,000 and 100,000 tons; seven quarries between 100,000 and 500,000 tons; and two quarries more than 900,000 tons. Sixty-two percent of the crushed stone was

shipped by truck, and virtually all of the remainder was handled by rail.

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Table 9.—South Dakota: 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
Concrete aggregate	1,403	3,487	1,514	4,168	1,576	5,612
Bituminous aggregate	314	818	237	606	251	658
Macadam aggregate	2	3				
Dense-graded roadbase stone	188	366	W	W	W	W
Surface treatment aggregate	53	121	75	143	80	169
Other construction aggregate and roadstone	113	140	182	331	131	160
Riprap and jetty stone	38	97	112	445	113	452
Railroad ballast	333	868	284	675	284	674
Cement manufacture	612	971	756	1,005	W	W
Lime manufacture	265	475	302	528	310	589
Other uses ²	56	132	231	475	1,145	2,002
Total ³	3,377	7,477	3,693	8,376	3,891	10,317

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

¹Includes granite, limestone, and sandstone.

²Includes stone used for agricultural limestone (1977-78), unspecified uses, and data indicated by symbol W.

³Data may not add to totals shown because of independent rounding.

Table 10.—South Dakota: Stone sold or used by producers, by kind

(Thousand short tons and thousand dollars)

Kind of stone	1977		1978		1979	
	Quantity	Value	Quantity	Value	Quantity	Value
Dimension stone, total ¹	35	11,404	36	11,859	36	13,268
Crushed and broken:						
Granite	77	77	77	77	77	77
Limestone	2,276	4,249	2,584	4,702	2,789	6,640
Sandstone	1,024	3,151	1,031	3,598	1,025	3,600
Total ²	3,412	18,881	3,729	20,236	3,926	23,585

¹Data represent granite.

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

Table 11.—Principal producers

Commodity and company	Address	Type of activity	County
Cement:			
South Dakota Cement Commission	Box 360 Rapid City, SD 57709	Four rotary kilns	Pennington.
Clays:			
American Colloid Co	Box 160 Belle Fourche, SD 57717	Open pit mine and plant	Butte.
Black Hills Clay Products Co	1516 Mill St. Belle Fourche, SD 57717	Open pit mine and brick plant	Do.
Dakota Block Co	Box 2920 Rapid City, SD 57709	Open pit mine and plant	Pennington.
South Dakota Cement Commission	Box 360 Rapid City, SD 57709	Open pit mine	Do.
Feldspar:			
Pacer Corp	Box 311 Custer, SD 57730	Open pit mines and dry-grinding plant.	Custer.
Gold:			
Homestake Mining Co	Lead, SD 57754	Underground mine, cyanidation mill, and refinery.	Lawrence.

Table 11.—Principal producers —Continued

Commodity and company	Address	Type of activity	County
Gypsum:			
South Dakota Cement Commission.	Box 360 Rapid City, SD 57709	Open pit mine	Meade.
Iron ore:			
Pete Lien & Sons, Inc.	Box 440 Rapid City, SD 57709	do	Lawrence.
Lime:			
Pete Lien & Sons, Inc.	do	1 rotary kiln, 1 vertical kiln, continuous-hydrator plant.	Pennington.
Mica:			
Pendleton Mining Co.	Box 286 Keystone, SD 57751	Mine	Do.
Sand and gravel:			
W. E. Bartholow & Sons Construction Co.	Box 3 Huron, SD 57350	Pits and plants	Various.
Birdsall Sand & Gravel Co., Inc.	Box 767 Rapid City, SD 57709	do	Fall River and Pennington.
Harold Borgen	Renner, SD 57055	Pit and plant	Minnehaha.
Concrete Materials Co.	302 Paulton Bldg. Sioux Falls, SD 57102	Pits and plant	Minnehaha and Roberts.
L. G. Everist, Inc.	Sioux Falls, SD 57102	Pits and plants	Brookings and Yankton.
Fodness Gravel	Route 5 Sioux Falls, SD 57101	Pit and plant	Minnehaha.
Hallett Construction Co.	Box 90 St. Peter, MN 56082	do	Codington.
Vyrl H. Norman	Route 1 Belle Fourche, SD 57717	Pit	Butte.
Reynolds Construction Co.	Box 689 Sioux Falls, SD 57101	Pit and plant	Minnehaha.
Silver:			
Homestake Mining Co.	Lead, SD 57754	See Gold	Lawrence.
Stone:			
Granite:			
Cold Spring Granite Co.	Cold Spring, MN 56320	2 quarries	Grant.
Dakota Granite Co.	Box 1351 Milbank, SD 57252	do	Do.
Delano Granite Works, Inc.	Delano, MN 55328	Quarry	Do.
Robert Hunter Granite Co., Inc.	501 East Drake St. Milbank, SD 57252	do	Do.
Sequoia Granite Co.	Box 1033 Milbank, SD 57252	do	Do.
Steiner-Rausch Granite Co.	Route 2, Box 36 Ortonville, MN 56278	do	Do.
Limestone:			
Pete Lien & Sons, Inc.	Box 440 Rapid City, SD 57709	2 quarries and plants	Custer and Pennington.
Northwestern Engineering Co.	Box 1392 Rapid City, SD 57709	do	Fall River and Pennington.
South Dakota Cement Commission.	Box 360 Rapid City, SD 57709	Quarry and plant	Pennington.
Sandstone:			
Concrete Materials Co.	100 South Dakota Ave. Sioux Falls, SD 57102	do	Minnehaha.
L. G. Everist, Inc.	302 Paulton Bldg. Sioux Falls, SD 57102	do	Do.
Spencer Quarries, Inc.	Spencer, SD 57374	Quarry	Hanson.