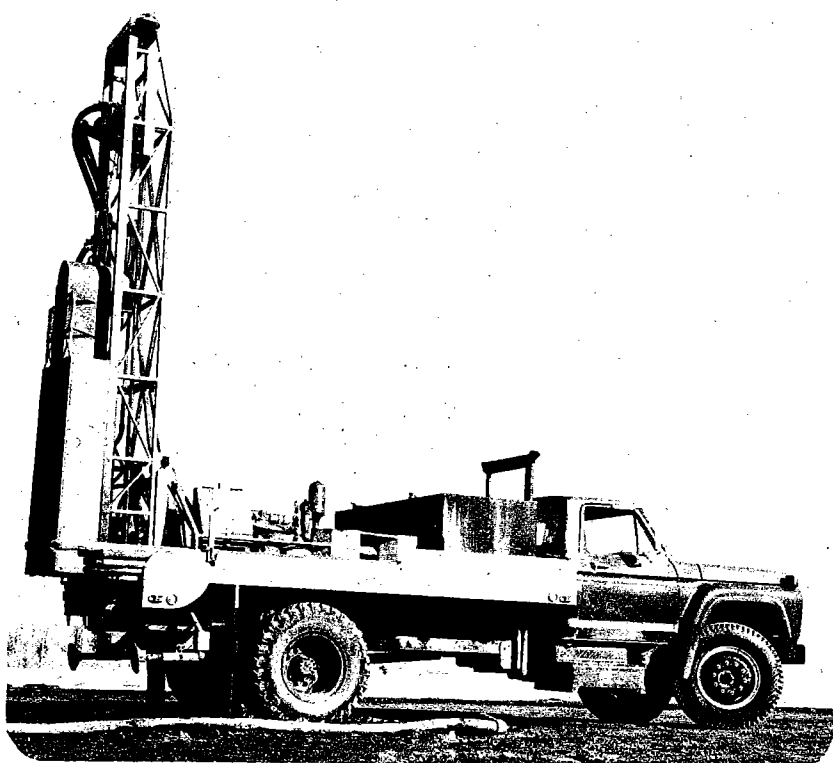


MINERALS REPORT 16A
THE MINERAL INDUSTRY OF
SOUTH DAKOTA IN 1969

by M. Clair Smith and Charles Koch

March, 1976



DEPARTMENT OF NATURAL RESOURCE
DEVELOPMENT
SOUTH DAKOTA GEOLOGICAL SURVEY
VERMILLION, SOUTH DAKOTA 57069

Preprint from the 1969

BUREAU OF MINES MINERALS YEARBOOK

The Mineral Industry of South Dakota



UNITED STATES DEPARTMENT OF THE INTERIOR



UNITED STATES DEPARTMENT OF THE INTERIOR • Walter J. Hickel, Secretary
BUREAU OF MINES • Elburt F. Osborn, Director

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The Mineral Industry of South Dakota

This chapter has been prepared under a cooperative agreement between the Bureau of Mines, U.S. Department of the Interior, and the South Dakota State Geological Survey for collecting information on all minerals except fuels.

By M. Clair Smith¹ and Charles Koch²

Value of mineral production in South Dakota for 1969 totaled \$54.9 million, 2 percent more than that in 1968. The value has been relatively stable, for the past 7 years, ranging from \$50 to \$55 million. The value of mineral production in 1969 was distributed as follows: Nonmetals, \$29.6 million; metals, \$25.0 million; and fuels, \$362,000. The value of metals increased 5 percent while the value of nonmetals and fuels decreased 1 percent and 10 percent respectively. Minerals obtained

from pegmatites in Pennington and Custer Counties decreased 22 percent in value.

Sand and gravel, stone, and cement comprised 93 percent of the nonmetals value; gold represented nearly 99 percent of the metals total. These commodities represented 95 percent of the total value of mineral production in the State.

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²Petroleum engineer, Bureau of Mines, Denver, Colo.

Table 1.—Mineral production in South Dakota¹

Mineral	1968		1969	
	Quantity	Value (thousands)	Quantity	Value (thousands)
Beryllium concentrate.....short tons..	75	\$35	46	\$23
Cement:				
Masonry.....thousand 280-pound barrels..	54	180	49	181
Portland.....thousand 376-pound barrels..	1,826	6,228	1,556	5,715
Clays.....thousand short tons..	226	1,119	187	1,171
Feldspar.....long tons..	39,077	264	29,434	194
Gem stones.....	NA	34	NA	36
Gold (recoverable content of ores, etc.).....troy ounces..	593,052	2 23,283	593,146	2 24,621
Gypsum.....thousand short tons..	16	65	11	46
Lead (recoverable content of ores, etc.).....short tons..	-----	-----	1	(³)
Mica (scrap).....do..	W	W	423	20
Petroleum (crude).....thousand 42-gallon barrels..	187	401	158	362
Sand and gravel.....thousand short tons..	11,558	11,578	11,158	10,807
Silver (recoverable content of ores, etc.).....thousand troy ounces..	138	295	124	223
Stone.....thousand short tons..	1,860	9,687	2,092	10,839
Value of items that cannot be disclosed:				
Coal (lignite, 1968), columbium-tantalum concentrate (1969), lime, lithium minerals, uranium ⁴ (recoverable content U ₃ O ₈), tin (1969), and value indicated by symbol W.....	XX	939	XX	633
Total.....	XX	54,108	XX	54,921
Total 1967 constant dollars.....	XX	49,132	XX	50,322

^p Preliminary. ^r Revised. NA Not available. 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 Based on average U.S. Treasury price (\$35.00) through Mar. 15, 1968, and Engelhard selling quotations Mar. 20, 1968, through 1969.

³ Less than 1/2 unit.

⁴ Value estimated based on \$8.00 (1968) per pound for sales to the Atomic Energy Commission and an assumed price of \$6.50 (1968) and \$6.10 (1969) per pound for commercial sales.

Table 2.—Value of mineral production in South Dakota, by counties¹
 (Thousands)

County	1968	1969	Minerals produced in 1969 in order of value
Aurora.....	\$97	\$67	Sand and gravel.
Beadle.....	126	249	Do.
Bon Homme.....	185	45	Do.
Brookings.....	101	259	Sand and gravel, stone.
Brown.....	346	265	Sand and gravel.
Brule.....	140	196	Do.
Buffalo.....	20	6	Do.
Butte.....	W	W	Clays, sand and gravel.
Campbell.....	83	154	Sand and gravel, stone.
Charles Mix.....	206	194	Sand and gravel.
Clark.....	223	72	Do.
Clay.....	99	27	Do.
Codington.....	W	501	Do.
Corson.....	55	50	Do.
Custer.....	437	967	Sand and gravel, feldspar, stone, lime, petroleum, lithium minerals, beryllium concentrate, mica (scrap), columbium-tantalum concentrate.
			Sand and gravel.
Davison.....	263	266	Do.
Day.....	179	325	Do.
Deuel.....	117	106	Do.
Dewey.....	W	13	Do.
Douglas.....	225	196	Do.
Edmunds.....	122	89	Do.
Fall River.....	W	W	Uranium, sand and gravel.
Faulk.....	148	148	Sand and gravel.
Grant.....	6,639	7,845	Stone, sand and gravel.
Gregory.....	119	204	Sand and gravel.
Haakon.....	143	---	
Hamlin.....	178	139	Sand and gravel.
Hand.....	185	122	Do.
Hanson.....	W	536	Stone.
Harding.....	482	402	Petroleum, sand and gravel.
Hughes.....	132	83	Sand and gravel.
Hutchinson.....	251	96	Do.
Hyde.....	92	389	Do.
Jackson.....	817	291	Do.
Jerauld.....	37	114	Do.
Jones.....	41	14	Do.
Kingsbury.....	102	114	Do.
Lake.....	147	203	Do.
Lawrence.....	23,725	24,939	Gold, silver, stone, sand and gravel, lead.
Lincoln.....	166	146	Sand and gravel.
Lyman.....	307	322	Do.
Marshall.....	198	166	Sand and gravel.
McCook.....	64	75	Do.
McPherson.....	128	44	Do.
Meade.....	369	176	Sand and gravel, gypsum.
Mellette.....	229	23	Sand and gravel.
Miner.....	---	54	Do.
Minnehaha.....	1,245	W	Stone, sand and gravel.
Moody.....	398	184	Sand and gravel.
Pennington.....	10,625	8,329	Cement, stone, sand and gravel, lime, clays, tin, beryllium concentrate, mica (scrap), columbium-tantalum concentrate, feldspar, lithium minerals.
			Sand and gravel.
Perkins.....	101	248	Do.
Potter.....	196	88	Do.
Roberts.....	87	88	Do.
Sanborn.....	61	70	Do.
Shannon.....	64	94	Do.
Spink.....	89	418	Do.
Stanley.....	W	150	Do.
Sully.....	79	135	Do.
Todd.....	115	3	Do.
Tripp.....	94	W	Stone.
Turner.....	174	424	Sand and gravel.
Union.....	53	79	Do.
Walworth.....	W	70	Do.
Washabaugh.....	111	70	Do.
Yankton.....	18	86	Do.
Ziebach.....	68	285	Do.
Undistributed ²	2,785	3,408	
Total.....	54,086	54,921	

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

¹ Bennett County not listed because no production was reported.

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

Table 3.—Indicators of South Dakota business activity

	1968	1969 ^P	Change, percent
Employment and labor force, annual average:			
Total labor force..... thousands..	267.2	269.8	+1.0
Employment..... do.....	259.3	262.1	+1.1
Unemployment..... do.....	7.9	7.7	-2.5
Agricultural employment..... do.....	61.4	61.2	-0.3
Nonagricultural employment..... do.....	197.9	200.9	+1.5
Mining..... do.....	2.2	2.2	---
Construction..... do.....	8.5	8.0	-5.9
Manufacturing..... do.....	15.4	15.9	+3.2
Government..... do.....	50.0	50.9	+1.8
All other..... do.....	121.8	123.9	+1.7
Payroll data:			
Agriculture..... millions..	\$396.0	\$422.1	+6.6
Mining..... do.....	\$4.4	\$4.7	+6.3
Construction..... do.....	\$61.2	\$65.2	+6.5
Manufacturing..... do.....	\$107.7	\$114.8	+6.6
Government..... do.....	\$291.2	\$310.3	+6.6
All other..... do.....	\$595.5	\$634.6	+6.6
Personal income:			
Total..... millions..	\$1,887.0	\$2,011.0	+6.6
Per capita..... do.....	\$2,838	\$3,051	+7.5
Construction activity:			
Highway construction contracts awarded..... do.....	\$32.1	\$48.3	+50.5
Cement shipments to and within the State..... thousand 376-pound barrels..	1,560.0	1,375.0	-11.9
Value of building permits..... millions..	\$42.4	\$45.9	+8.3
Residential..... do.....	\$14.8	\$17.0	+14.9
Nonresidential..... do.....	\$27.6	\$28.9	+4.7
Business receipts:			
Retail sales..... millions..	\$1,065.2	\$1,129.6	+6.0
Farm marketing receipts..... do.....	\$958.0	\$1,033.4	+7.9
Mineral production..... do.....	\$54.1	\$54.9	+1.5
Utility production and consumption:			
Production of electric energy..... million kilowatt hours..	6,137.0	6,881.1	+12.1
Natural gas consumption..... billion cubic feet....	24.8	33.8	+36.3

^P Preliminary.

Sources: Business Research Bureau, University of South Dakota, Vermillion, S. Dak.; Engineering News-Record, v. 184, No. 16, Apr. 30, 1970, pp. 12-13; U.S. Bureau of Mines.

South Dakota was again the leading gold producing State in the Nation, yielding 593,146 ounces valued at \$24.6 million. Nearly all of this output was from Home-stake Mining Co.'s mine at Lead, which was operated at capacity throughout the year. The company and Local 7044, United Steel Workers of America, AFL-CIO, signed a 3-year contract in December. Governor Farrer acted as mediator after the contract negotiations became deadlocked.

The properties and assets of Northwest Beryllium Corp., which consisted of several mining claims in Custer, Pennington, and Lawrence Counties and a processing plant located at Keystone, were sold in May.

Construction of a pilot plant for developing a process to convert lignite coal to a pipeline gas for commercial purposes was started. Ground breaking ceremonies were held August 18, 1969, at Rapid City. Ground preparation at a location southeast of the city began in October, with construction of the plant scheduled for 1970. The U.S. Department of the Interior has allotted funds for this project.

Highway construction contracts awarded during the year amounted to \$48.3 million, \$27.3 million of the total being allotted to the Interstate Highway System.³

Several publications were prepared by U.S. Bureau of Mines and U.S. Geological Survey personnel or under cooperative agreements with these agencies.⁴

³ Engineering News-Record, State Highway Departments' Construction Contracting Plans for 1970 and Budgets for Maintenance. Apr. 30, 1970, v. 184, No. 16, pp. 12-13.

⁴ Bayley, R. W. Structure and Mineralization of Precambrian Rocks in the Galena-Roubaix District, Black Hills, S. Dak. U.S. Geol. Survey Bull. 1312-E, 1970, 15 pp.

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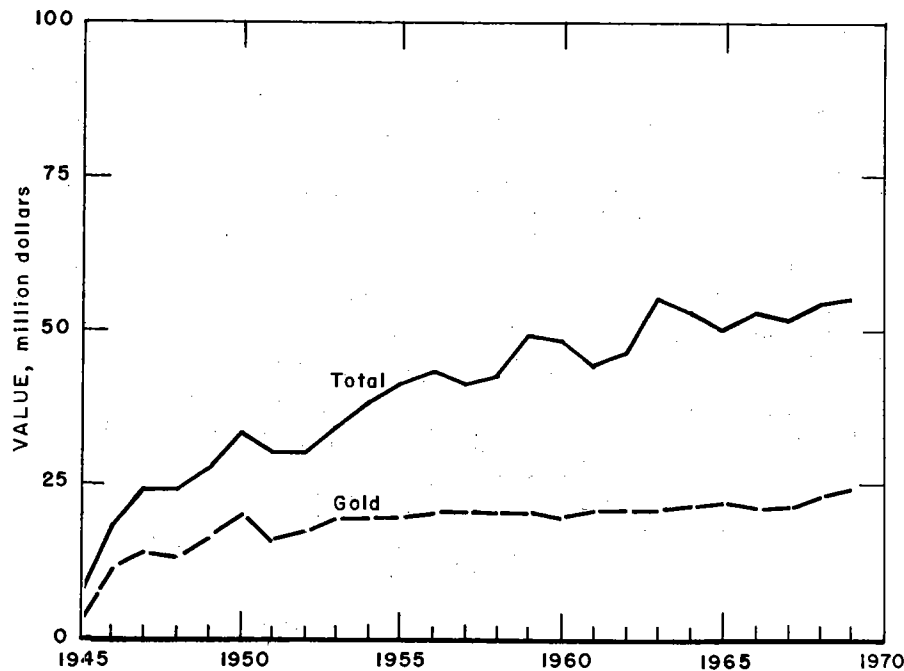


Figure 1.—Value of mine production of gold, and total value of mineral production in South Dakota.

Employment and Injuries.—The extent of employment and injuries in the mineral industry, exclusive of the petroleum industry, is presented in table 4.

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
1968:								
Coal.....	3	156	(0)	4	2	118	30.35	4,152
Metal.....	1,608	302	494	3,953	1	7	24.22	18,846
Nonmetal.....	214	191	41	330	1	23	21.93	730
Sand and gravel.....	737	153	116	1,049	1	14	15.23	283
Stone.....	469	231	108	919	1	14	15.23	283
Total ²	3,026	248	760	6,256	3	162	26.37	3,783
1969:^p								
Coal.....	5	170	1	4	2	87	21.31	4,505
Metal.....	1,675	311	522	4,176	1	10	34.90	19,860
Nonmetal.....	175	211	37	315	1	26	21.86	581
Sand and gravel.....	760	172	130	1,190	1	19	20.32	8,140
Stone.....	495	234	116	984	1	19	20.32	8,140
Total ²	3,105	259	805	6,669	4	142	21.89	5,065

^p Preliminary.

¹ Less than ½ unit.

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

REVIEW BY MINERAL COMMODITIES

NONMETALS

Cement.—The South Dakota Cement Commission, from its Rapid City plant, shipped 49,000 barrels (280-pound) of masonry cement, 5,000 barrels less than the previous year, and 1.6 million barrels (376-pound) of portland cement, 270,000 barrels less than last year. Twenty-two percent of the output was used in highway construction. About 75 percent of the shipments were made by truck.

The plant required 304,128 tons of limestone, 58,073 tons of shale, 22,497 tons of sand, 12,443 tons of gypsum, and 7,803 tons of iron ore for the 1969 cement production.

Clays.—The total tonnage—186,929 short tons—of bentonite and those clays used in manufacturing brick, cement, and lightweight aggregate was 39,000 short tons, 17 percent, less than that in 1968; the value, however, was greater because of the price increase of clay for brick manufacture. American Colloid Co., the only company presently processing bentonite in South Dakota, obtained its raw materials from South Dakota and Wyoming.

Feldspar.—Production of feldspar was down about 25 percent to 29,434 long tons, or nearly 10,000 long tons less than in 1968. International Minerals & Chemical Corp. increased the price paid to individual suppliers. The company is also offering a bonus to producers who supply 1,200 tons or more of acceptable feldspar per year to its grinding plant at Custer. The

plant ground 33,419 long tons of the company's own production and 3,235 long tons purchased. The majority of ground feldspar was shipped to 19 States, Canada, and Mexico, where it was used in glass, pottery, enamel, and porcelain.

Gypsum.—The total gypsum production obtained in Meade County was used in the manufacture of cement.

Lime.—Since the erection of kilns at Rapid City by Pete Lien & Sons in 1964, lime production has steadily increased. About 75 percent of the output from this plant is used for soil stabilization in the highway construction programs of South Dakota and neighboring States. Black Hills Lime Co. at Pringle prepares a metallurgical grade of lime.

Lithium Minerals.—Lithium production consisted of handsorted lepidolite and amblygonite. The amount shipped was 14 times greater than that shipped in 1968.

Mica.—Scrap mica production was only one-sixth that of last year, with only four mines contributing to the output.

Sand and Gravel.—Sand and gravel was produced in all but four counties. Of the total output of 11.1 million tons, 7.9 million (71 percent) was produced for governmental agencies. Ninety-two commercial respondents operated at 144 locations; the 71 agency crews operated at 220 locations. The total amount consisted of 1.7 million tons of sand and 9.4 million tons of gravel. Custer, Codington, Pennington, and Spink Counties supplied 2.1 million tons, 19 percent of the State total.

Stone.—Stone production of 2 million tons was obtained from granite, quartzite, limestone, sandstone, quartz, traprock, and miscellaneous stone. The value of granite, mostly prepared for monumental and architectural purposes, amounted to \$7.6 million or 70 percent of the \$10.8 million to-

tal. Limestone and quartzite production was valued at \$3 million.

Output of monumental and architectural granite came from five companies operating in Grant County in the northeast corner of the State.

Table 5.—Sand and gravel sold or used by producers, by counties
(Thousand short tons and thousand dollars)

County	1968		1969	
	Quantity	Value	Quantity	Value
Aurora	92	\$97	72	\$67
Beadle	126	126	245	249
Bon Homme	184	185	81	45
Brookings	101	101	232	251
Brown	315	346	315	265
Brule	137	140	191	196
Buffalo	24	20	4	6
Butte	367	368	157	81
Campbell	100	83	138	154
Charles Mix	200	200	193	194
Clark	223	223	72	72
Clay	88	99	58	27
Codington	300	315	545	501
Corson	94	55	81	50
Custer	90	86	693	672
Davison	240	263	296	266
Day	163	179	312	325
Deuel	107	117	106	106
Dewey	64	43	14	13
Douglas	205	225	179	196
Edmunds	113	122	90	89
Fall River	206	160	47	48
Faulk	148	148	164	148
Grant	113	120	224	225
Gregory	104	119	210	204
Haakon	143	143		
Hamlin	152	178	113	139
Hand	216	185	109	122
Hanson	82	82		
Harding	107	107	59	59
Hughes	143	132	83	83
Hutchinson	251	251	130	96
Hyde	92	92	387	389
Jackson	817	817	291	291
Jerauld	37	37	111	114
Jones	53	41	14	14
Kingsbury	102	102	114	114
Lake	145	147	274	203
Lawrence	W	W	41	42
Lincoln	152	166	184	146
Lyman	312	307	340	322
McCook	63	64	125	75
McPherson	125	128	41	44
Marshall	188	198	152	166
Meade	303	304	140	130
Mellette	229	229	23	23
Minnehaha	548	558	713	686
Miner			52	54
Moody	373	398	171	184
Pennington	1,689	1,526	446	553
Perkins	79	101	207	248
Pottor	187	196	88	88
Roberts	80	87	95	88
Sanborn	59	61	86	70
Shannon	66	64	92	94
Spink	88	89	438	413
Stanley	W	W	131	150
Sully	79	79	175	135
Todd	120	115	7	3
Tripp	39	39		
Turner	159	174	385	424
Union	53	53	95	79
Walworth	W	W	101	70
Washabaugh	111	111	70	70
Yankton	18	18	88	86
Ziebach	68	68	295	285
Undistributed	154	191		
Total ¹	11,558	11,578	11,158	10,807

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

Table 6.—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	1968		1969	
	Quantity	Value	Quantity	Value
Commercial operations:				
Sand:				
Construction:				
Building	456	\$498	485	\$529
Paving	113	139	148	207
Fill	58	65	68	54
Total	627	702	701	790
Gravel:				
Construction:				
Building	220	319	217	313
Paving	1,795	1,803	2,282	2,188
Fill	139	110	43	38
Miscellaneous	43	54	9	8
Total ¹	2,197	2,286	2,551	2,548
Total sand and gravel	2,824	2,988	3,252	3,338
Government-and-contractor operations:				
Sand:				
Building	1	1	5	4
Paving	1,738	1,736	1,015	982
Fill	1	1	1	1
Other	11	6	21	12
Total ¹	1,751	1,744	1,041	999
Gravel:				
Building			624	629
Paving	6,983	6,847	6,222	5,822
Fill			19	18
Total ¹	6,983	6,847	6,864	6,470
Total sand and gravel ¹	8,734	8,587	7,906	7,469
All operations:				
Sand	2,378	2,446	1,742	1,789
Gravel	9,180	9,133	9,416	9,018
Total ¹	11,558	11,578	11,158	10,807

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

Table 7.—Stone sold or used by producers, by kind
(Thousand short tons and thousand dollars)

Kind of stone	1965		1966		1967		1968		1969	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Dolomite					(¹)	\$1				
Granite	20	\$2,945	24	\$4,067	48	6,160	38	\$6,519	44	\$7,620
Limestone	869	1,412	1,101	1,793	2,882	2,1,399	2,1,082	2,1,694	989	1,207
Quartz, quartzite, and sandstone	651	1,007	984	1,997	2,781	2,1,623	676	1,402	1,055	2,004
Quartz and quartzite	NA	NA	NA	NA	NA	NA	563	1,193	1,046	1,962
Sandstone	NA	NA	NA	NA	NA	NA	113	209	W	W
Traprock									3	8
Other stone	14	24	78	137	155	512	64	71	(¹)	(¹)
Total ²	1,554	5,387	2,186	7,995	1,866	9,694	1,860	9,687	2,092	10,839

NA Not available. W Withheld to avoid disclosing individual company confidential data.

¹ Less than 1/2 unit.

² Excludes dimension stone; included with "Other stone."

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

Table 8.—Stone sold or used by producers, by use

Use	1968		1969	
	Quantity	Value (thousands)	Quantity	Value (thousands)
Dimension stone:				
Rough construction and rubble..... short tons.....	11,986	W	3,463	W
Dressed architectural..... cubic feet.....	205,685	W	145,395	W
Rough monumental..... do.....	151,852	\$3,269	349,282	\$4,969
Dressed monumental..... do.....	W	W	W	W
Curbing and flagging..... do.....	W	W	W	W
Total (approximate)..... short tons.....	47,400	6,535	44,200	7,622
Crushed and broken stone:				
Refractory..... short tons.....	W	W	35,000	96
Riprap..... do.....	76,779	81	61,853	90
Railroad ballast..... do.....	286,245	435	320,893	511
Road aggregates..... do.....	W	W	714,147	1,108
Concrete aggregate..... do.....	335,447	785	523,867	1,004
Cement..... do.....	388,911	W	304,128	222
Other..... do.....	694,891	1,117	288,166	2185
Total ¹ do.....	1,812,273	3,152	2,048,054	3,217
Total stone (approximate)..... do.....	1,859,700	9,687	2,092,300	10,839

W Withheld to avoid disclosing individual company confidential data; included in "Totals."

¹ Includes stone used for abrasives, agricultural limestone, bituminous aggregate, dense graded road base, flux, lime, other fillers, stone sand, surface treatment aggregates, and terrazzo and exposed aggregate.

² Includes stone used for abrasives, lime, roofing aggregates, and stone sand.

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

METALS

Beryllium.—Beryl production, most of which was sold to Beryl Ores Co. of Arvada, Colo., was about two-thirds of that of 1968.

Columbium and Tantalum.—The small shipment of columbium and tantalum made in 1969 was a collection of material produced from several mines in the Custer-Keystone area.

Gold and Silver.—Gold production, all from Lawrence County, was almost the same amount as 1968 production; the value, however, was \$1.3 million greater. Silver production decreased 10 percent in quantity and \$72,000 in value below that of 1968.

Table 9.—Mine production of gold and silver in terms of recoverable metals

Year	Mines producing		Material sold or treated ¹ (thousand short tons)	Gold (lode and placer)		Silver (lode and placer)	
	Lode	Placer		Troy ounces	Value (thousands)	Troy ounces	Value (thousands)
1965.....	1	-----	2,032	628,259	\$21,989	129	\$167
1966.....	1	-----	2,002	606,467	21,226	110	142
1967.....	1	1	1,896	601,785	21,062	121	135
1968.....	1	2	1,922	593,052	23,283	135	295
1969.....	2	1	1,935	593,146	24,621	124	223
1876-1969.....	NA	NA	NA	33,602,342	964,066	12,631	10,134

NA Not available.

¹ Excludes placer gravel.

Homestake Mining Co. was the principal producer; some silver was also produced by Silver Queen Mine Co.

The directors of Homestake Mining Co. authorized a deep-level development program with an inside shaft from the 4,850- to the 6,800-foot level, near the Ross shaft. This new shaft, with the levels served by it, will be used to develop ore bodies in the west part of the mine.

Lead.—A small amount of lead was recovered as a byproduct of silver ore by Silver Queen Mine Co., operating in Lawrence County.

Tin.—A shipment of cassiterite concentrates was made by Northwest Beryllium Corp. in 1969 from stockpiles.

Table 10.—Homestake mine ore milled and receipts for bullion¹

Year	Ore milled (thousand short tons)	Receipts for bullion products	
		Total (thousands)	Per ton
1965.....	2,032	\$22,094	\$10.88
1966.....	2,002	21,309	10.64
1967.....	1,896	21,200	11.18
1968.....	1,922	22,064	11.48
1969.....	1,935	24,570	12.70

¹ From 1876 to 1969 inclusive, this mine yielded bullion and concentrates that brought a net return of \$892.4 million.

Source: Homestake Mining Co. Annual Report 1969, p. 22.

Uranium.—With the start of mining of newly discovered uranium ore bodies by Susquehanna-Western, Inc., a subsidiary of The Susquehanna Corp., uranium production nearly equaled that of 1968. After a temporary shutdown the Edgemont mill operated by Mines Development, Inc., also a subsidiary of The Susquehanna Corp., resumed production in the fourth quarter of 1969.

Vanadium.—No vanadium was produced in 1969.

Table 11.—Oil and gas well drilling, by county

County	Dry ¹	Total	Footage
1968:			
Exploratory completions (no development wells):			
Butte.....	4	4	11,951
Fall River.....	13	13	31,866
Harding.....	6	6	32,950
Total.....	23	23	76,767
1969:			
Exploratory completions:			
Butte.....	6	6	22,141
Corson.....	10	10	35,800
Fall River.....	18	18	40,559
Harding.....	19	19	82,341
Meade.....	4	4	12,842
Perkins.....	3	3	13,129
Total.....	60	60	206,812
Development completions:			
Harding.....	1	1	8,805
Total all drilling.....	61	61	215,617

¹ None of the exploratory or development wells were completed as producers.

Sources: Petroleum Information Corp., 1968 and 1969 Resumes, Oil and Gas Operations in the Rocky Mountain Region.

MINERAL FUELS

Coal (Lignite).—The Firesteel strip mine, operated in Dewey County in 1968, was not productive in 1969.

Petroleum.—Output of petroleum decreased 16 percent. The 24-well Buffalo field yielded 149,832 barrels; the 2-well Barker Dome field yielded 8,356 barrels.

The drilling of 61 exploratory wells set a new drilling record with the Muddy formation (Cretaceous) as the main objective; none of the wells were completed as producers. Harding County in the northwest part of the State led in drilling with 19 exploratory wells. Next was Fall River County with 18 wells, followed by Corson County with 10 wells. Oil shows were found in two wells. One was a Red River formation (Ordovician) test 8 miles northeast of the Buffalo field; the other well was a Mission Canyon formation (Mississippian) test 50 miles south of the Buffalo field.

Two oil and gas lease sales were held in 1969—on May 14 and on November 19. At

the May 14 sale, 53,417.66 acres were leased for a total bonus of \$59,225, with a high bid of \$3.81 per acre and an average bid of \$1.11 per acre. A total of 141,455.51 acres was sold at a bonus of \$55,588 at the November 19 sale. High bid was \$11.25 per acre for a parcel of land in Harding County; bids averaged about 39 cents an acre. Most of the leased land was in the northwest part of the State.

Table 12.—Principal producers

Commodity and company	Address	Type of activity	County
Beryllium:			
L. W. Judson	Hermosa, S. Dak. 57744	See Mica	Pennington.
Northwest Beryllium Corp.	218-219 American National Bank Bldg. Rapid City, S. Dak. 57701	Stockpile	Do.
Cement:			
South Dakota Cement Commission.	Drawer 351 Rapid City, S. Dak. 57701	Wet-process, 3-rotary-kiln plant.	Do.
Clays:			
American Colloid Co.	5100 Suffield Court Skokie, Ill. 60076	Open pit mine and plant.	Butte.
Light Aggregates, Inc.	Box 1922 Rapid City, S. Dak. 57701	do	Pennington.
South Dakota Cement Commission.	Drawer 351 Rapid City, S. Dak. 57701	Open pit mine	Do.
Columbium and tantalum:			
Walter Clifford	Box 823 Custer, S. Dak. 57730	Stockpile	Custer.
Northwest Beryllium Corp.	218-219 American National Bank Bldg. Rapid City, S. Dak. 57701	do	Pennington.
Feldspar:			
George Bland	Custer, S. Dak. 57730	2 open pit mines	Custer.
International Minerals & Chemical Corp., Industrial Minerals Division.	Administration Center Old Orchard Road Skokie, Ill. 60079	4 open pit mines and dry-grinding plant.	Do.
Gold:			
Homestake Mining Co.	Lead, S. Dak. 57754	Underground mine, amalgamation-cyanidation mill, and refinery.	Lawrence.
Gypsum:			
South Dakota Cement Commission.	Drawer 351 Rapid City, S. Dak. 57701	Open pit mine	Meade.
Lime:			
Pete Lien & Sons	Box 3124, P.O. Annex Rapid City, S. Dak. 57703	1-rotary-kiln, 1-vertical-kiln, continuous-hydrator plant.	Pennington.
Mica (scrap):			
L. W. Judson	Hermosa, S. Dak. 57744	Open pit mine	Do.
Northwest Beryllium Corp.	218-219 American National Bank Bldg. Rapid City, S. Dak. 57701	Stockpile	Do.
Petroleum:			
The Ozark Corp.	Box 2491 Casper, Wyo. 82601	Crude oil wells	Custer (Barker Dome field).
Pennzoil United, Inc.	900 Southwest Tower Houston, Tex. 77002	do	Harding (Buffalo field).
Phillips Petroleum Co.	Frank Phillips Bldg. Bartlesville, Okla. 74003	do	Do.
Sand and gravel (commercial):			
Aggregates, Inc.	Selby, S. Dak. 57472	Pit and plant	Butte.
		Pit	Deuel.
		Pit	Lyman.
		Pit	Pennington.
		Pit and 2 plants	Minnehaha.
Concrete Materials Co.	3000 West Madison Street Sioux Falls, S. Dak. 57104	do	Codington.
F. J. McLaughlin Co.	Watertown, S. Dak. 57201	Pit	Aurora.
Floyd Oberg & Sons Construction Co.	Colton, S. Dak. 57018	Pit and plant	Codington.
		Pit	Edmunds.
		Pit	Minnehaha.
		Pit	Spink.
Hallett Construction Co.	Crosby, Minn. 56441	2 pits and plants	Codington.
Hogan Construction Co.	Rock Rapids, Iowa 51246	Pit and plant	Charles Mix.
		Pit	Lincoln.
		Pit	Union.
L. G. Everist, Inc.	302 Paulton Bldg. Sioux Falls, S. Dak. 57102	Pit and plant	Brookings.
Moeckly & Olson, Inc.	Amherst, S. Dak. 57421	do	Pennington.
		Pit and plant	Day.
		Pit	Edmunds.
		Pit	Roberts.
		2 pits	Walworth.
Pickus Construction Co.	Box 1414 Aberdeen, S. Dak. 57401	Pit and plant	Brown.
Tom Luke Construction	Kimball, S. Dak. 57335	3 pits	Brule.
		3 pits and plant	Davison.
		2 pits	Douglas.
		3 pits	Lyman.
Silver:			
Homestake Mining Co.	Lead, S. Dak. 57754	See Gold	Lawrence.

Table 12.—Principal producers—Continued

Commodity and company	Address	Type of activity	County
Stone:			
Cold Spring Granite Co.	Cold Spring, Minn. 56320	2 quarries	Grant.
Concrete Materials Co.	3000 West Madison Street Sioux Falls, S. Dak. 57104	Quarry and plant	Minnehaha.
Dakota Granite Co.	Box 269 Milbank, S. Dak. 57252	2 quarries	Grant.
Delano Granite Works, Inc.	Delano, Minn. 55328	Quarry	Do.
Hills Materials Co.	Box 1392 Rapid City, S. Dak. 57701	Quarry and plant	Pennington.
L. G. Everist, Inc.	302 Paulton Bldg. Sioux Falls, S. Dak. 57102	do	Minnehaha.
Pete Lien & Sons	Box 3124, P.O. Annex Rapid City, S. Dak. 57703	do	Pennington.
		do	Do.
Robert Hunter Granite Co., Inc.	Milbank, S. Dak. 57252	Quarry	Grant.
South Dakota Cement Commission.	Drawer 351 Rapid City, S. Dak. 57701	Quarry and plant	Pennington.
Spencer Quarries, Inc.	Spencer, S. Dak. 57374	Quarry	Hanson.
Steiner-Rausch Granite Co., Inc.	Ortonville, Minn. 56278	do	Grant.
Tin:			
Northwest Beryllium Corp.	218-219 American National Bank Bldg. Rapid City, S. Dak. 57701	Stockpile	Pennington.
Uranium:			
Susquehanna-Western, Inc.	Edgemont, S. Dak. 57735	Underground mine	Fall River.
Mines Development, Inc.	do	Acid-leach mill	Do.