

STONE.

By A. T. COONS.

INTRODUCTION.

The stone industry for 1908 was marked by a decrease of \$5,393,306 in value of output as compared with 1907. Contributing to this decrease was the noticeably smaller demand for furnace flux and for crushed stone for concrete. Each variety of stone, except granite, showed a decreased value of output.

In 1908 the total value of the Vermont stone output was greater than that for any other State. In previous years Pennsylvania has held first rank.

In compiling for 1908 the statistics of the various kinds of stone produced in the United States, the United States Geological Survey has had the cooperation of the following state surveys: Georgia, Illinois, Iowa, Kentucky, Maryland, Missouri, New Jersey, New York, North Carolina, and Virginia.

The figures presented in the following report, as in previous years, have to do with the stone produced and sold by the quarrymen and include only such manufactured product as is put on the market by the quarrymen themselves. This applies especially to dressed building stone, dressed monumental stone, crushed stone, flagstone, curbstone, and paving blocks. The value given to this manufactured product is the price received by the producer, free on board at point of shipment, and includes therefore the cost of labor necessary to dress the stone. The stone reported as sold rough includes stone sold as rough stock to monumental works, and to cut-stone contractors for building purposes; stone sold as riprap, rubble, and flux; and includes the value of only such labor as is required to get the stone out of the quarry in the shape required by the purchaser. The value given to this stone is the price received by the quarryman free on board at point of shipment. In case the stone is sold to local trade the value is given as the quarryman sells the material, generally at the quarry, but in some cases delivered, if this is done by the producer. In some instances a long haul to market or to the railroad increases the cost of the material, and therefore of the selling price. This is especially true in some of the Western States, where stone for furnaces and sugar factories has to be hauled over rough roads and sometimes for long distances.

UNIT OF MEASUREMENT.

Owing to the variety of uses to which stone is put there is no regular unit of measurement employed by the quarrymen, the stone being sold by the cubic yard, the cubic foot, the ton, cord, perch, rod, square foot, square yard, square, etc. Building and monumental stone, especially the dressed product, is usually sold by the cubic foot or the cubic yard, although this unit varies with the class of stone and with the locality; a large quantity of the rough stone is sold by the perch, cord, and ton. Rubble and riprap, including stone for heavy masonry, such as breakwater and jetty work, are generally sold by the cord and ton. Fluxing stone and stone for chemical purposes—as for alkali works, sugar factories, carbonic acid plants, paper mills, etc.—are sold by the long ton. Flagstone and curbstone are sold by the square yard and the square foot, the thickness being variable and depending on the order received by the quarrymen. Paving blocks are sold invariably by number of blocks, and as such have been tabulated and published for several years; these blocks, however, are not of uniform size, the value depending on the size and amount of labor necessary to cut the block into desired shape. Crushed stone is reported as sold by the cubic yard or ton, the short ton being more generally used. The weight of a cubic yard varies from 2,300 to 3,000 pounds, the average weight being 2,500 pounds. In certain localities this crushed stone is sold by the "square" of 100 square feet by 1 foot or 100 cubic feet to a square. It is also of interest to note the selling of crushed stone by the bushel, $21\frac{1}{2}$ bushels representing a cubic yard of about 2,700 pounds. As most of the crushed-stone producers report the quantity according to some unit, it has been possible to convert the crushed stone into short tons, which unit represents the larger number of producers and is the most convenient.

The cards showing the production of building stone, monumental stone, rubble, and riprap, do not always report the quantity, and Vermont is as yet the only State for which the quantity as well as the value has been published.

DISTRIBUTION OF BUILDING STONE IN THE UNITED STATES.

The distribution of the various kinds of rock over the country is very unequal. This statement also applies to the demand for stone, both for building and for other purposes; and although one section of the country may contain material equally valuable for rock construction work as another, it is in the most thickly settled regions, the regions nearest to cheap transportation and to the markets of large cities, that the deposits of stone have been worked to supply other than small local trade. Where deposits have become well known, stone from them has been shipped all over the country, even into the markets and almost into the quarry centers of other equally well-known stone. In some cases this is on account of the greater fitness of outside stone for the purpose desired, but in many cases the outside stone is specified on account of taste in color, from a desire for stone other than that obtainable in the local market, and sometimes by preference given by builder or contractor on account

of personal relations with the quarry section. The demand for stone, other than for local use, from regions not well known or regularly operated, is chiefly caused by special work in these sections, due to the building of locks, dams, breakwaters, the ballasting of tracks, making of roads, etc., where the necessity exists for a time only and the deposit fails to become a regular source of material from lack of market, transportation facilities, or necessary capital for development. To show the wide distribution of the various kinds of building stone and the localities where the different varieties of stone are now being quarried or may be quarried in the future, George P. Merrill, curator of geology in the United States National Museum, has compiled the following table giving the distribution of building stone by States:^a

Alabama.....	Marble, limestone, granite, sandstone.
Arizona.....	Onyx marble, limestone, granite, trappean and volcanic rocks, and sandstones.
Arkansas.....	Marble, limestone, syenite, slate.
California.....	Serpentine (verdantique marble), onyx marble, marble, limestone, granite, volcanic rocks and tuffs, sandstone, slate.
Colorado.....	Marble, limestone, granite, trappean and volcanic rocks, sandstone, quartzite, rhyolite tuff.
Connecticut.....	Soapstone, serpentine (verdantique marble), marble, granite and gneiss, diabase, sandstone.
Delaware.....	Marble, gneiss.
Florida.....	Shell and oolitic limestone.
Georgia.....	Marble, granite, gneiss, sandstone, slate.
Idaho.....	Limestone, marble, granite, trappean and volcanic rocks, sandstone.
Illinois.....	Limestone and dolomite, sandstone.
Indiana.....	Limestone and dolomite, sandstone.
Iowa.....	Gypsum, limestone, dolomite, sandstone.
Kansas.....	Limestone, dolomite, sandstone.
Kentucky.....	Limestone, dolomite, sandstone, onyx marble.
Louisiana.....	Limestone, sandstone.
Maine.....	Soapstone, serpentine (verdantique marble), granite, gneiss, diabase, norite, gabbro, quartz, porphyry, sandstone, slate.
Maryland.....	Soapstone, serpentine (verdantique marble), marble, granite, sandstone, slate.
Massachusetts.....	Soapstone, serpentine (verdantique marble), marble, granite, gneiss, quartz porphyry, sandstone.
Michigan.....	Limestone, dolomite, granite, gneiss, sandstone, slate.
Minnesota.....	Limestone, dolomite, granite, gneiss, sandstone, slate.
Mississippi.....	Limestone, sandstone.
Missouri.....	Limestone, dolomite, granite, diabase, quartz porphyry, sandstone.
Montana.....	Limestone, dolomite, granite, gneiss, trappean and volcanic rocks, sandstone.
Nebraska.....	Limestone, dolomite, sandstone.
Nevada.....	Limestone, dolomite, granite, trappean and volcanic rocks, sandstone.
New Hampshire ..	Soapstone, limestone, granite, slate.
New Jersey.....	Serpentine, limestone, dolomite, marble, granite, gneiss, diabase, sandstone, slate.
New Mexico.....	Serpentine (ricolite) limestone, marble, trappean and volcanic rocks, sandstone, granite.
New York.....	Soapstone, serpentine (verdantique marble), limestone, dolomite, marble, granite, gneiss, norite, sandstone, slate.
North Carolina....	Soapstone, serpentine, limestone, dolomite, marble, granite, gneiss, diabase, norite, sandstone.
North Dakota.....	Limestone, dolomite, sandstone.
Ohio.....	Limestone, dolomite, sandstone.
Oklahoma.....	Limestone, dolomite, sandstone, granite.
Oregon.....	Limestone, dolomite, granite, trappean and volcanic rocks, sandstone.

^a Merrill, Geo. P., *Stones for Building and Decoration*, pp. 15-16.

Pennsylvania.....	Soapstone, serpentine, limestone, dolomite, marble, granite, gneiss, diabase, quartz porphyry, sandstone, conglomerate, slate.
Rhode Island.....	Limestone, dolomite, granite, gneiss.
South Carolina.....	Limestone, granite, gneiss.
South Dakota.....	Limestone, sandstone, quartzite.
Tennessee.....	Limestone, marble, granite, diorite, sandstone.
Texas.....	Limestone, marble, granite, trappean and volcanic rocks, sandstone.
Utah.....	Limestone, marble, granite, trappean and volcanic rocks, sandstone.
Vermont.....	Soapstone, serpentine (verdantique marble), marble, granite, gneiss, slate.
Virginia.....	Soapstone, limestone, marble, granite, gneiss, diabase, sandstone, slate.
Washington.....	Limestone, marble, granite, trappean and volcanic rocks, sandstone.
West Virginia.....	Limestone, sandstone.
Wisconsin.....	Dolomite, granite, gneiss, quartz porphyry, sandstone.
Wyoming.....	Limestone, granite, trappean and volcanic rocks, sandstone.

PRODUCTION.

For simplicity of treatment the kinds of stone covered by the figures in this report are classified as granite, trap rock, sandstone, bluestone, limestone, and marble.

Granite includes true granites and other igneous rocks, as gneiss, mica schist, andesite, syenite, trachyte, quartz porphyry, lava, tufa, diabase, trap rock, basalt, diorite, gabbro, and a small quantity of serpentine. Rocks of these kinds are as a rule quarried commercially in quantities too small to permit their being tabulated separately, but the trap-rock output for California, Massachusetts, New York, New Jersey, and Pennsylvania represents an important industry, and it is therefore considered advisable to show the value of this stone separately. The trap rock from California includes a considerable quantity of basalt.

Sandstone includes the quartzites of South Dakota and Minnesota and the fine-grained sandstones of New York and Pennsylvania, known to trade as bluestone. As the bluestone is a product of a separate industry, its production is also shown apart from that of the other sandstone. Bluestone is also quarried in New Jersey and West Virginia, but this product is small and is not separated from sandstone. In Kentucky most of the sandstone quarried and sold is known locally as freestone. The figures given for sandstone do not include the value of the grindstones, whetstones, and pulpstones made from sandstones quarried in Michigan, Ohio, and West Virginia. Neither does the total sandstone value include sandstone crushed into sand and used in the manufacture of glass and as molding sand.

Limestone does not include limestone burned into lime, bituminous limestone, nor limestone entering into the manufacture of Portland cement. It includes, however, a small quantity of stone sold locally as marble, and also in the crushed stone a quantity of material known as "chats," or the tailings from the zinc mines of Missouri, and some chert from Alabama.

Marble includes a small quantity of serpentine quarried and sold as marble in Georgia and Pennsylvania, and also a small quantity of the so-called "onyx" marble or travertine obtained from caves and other deposits.

Note:

The following table shows the value of the different kinds of stone produced in the United States from 1899 to 1908, inclusive:

Value of the different kinds of stone produced in the United States, 1899-1908.

Year.	Granite.	Trap rock.	Sandstone.	Bluestone.	Marble.	Limestone.	Total.
1899.....	\$10,343,298	\$1,275,041	\$4,910,111	\$815,284	\$4,011,681	\$13,889,302	\$35,244,717
1900.....	10,969,417	1,706,200	5,272,865	1,198,519	4,267,253	13,556,523	36,970,777
1901.....	14,266,104	1,710,857	6,974,199	1,164,481	4,965,699	18,202,843	47,284,183
1902.....	16,083,475	2,181,157	9,430,958	1,163,525	5,044,182	20,895,385	54,798,682
1903.....	15,703,793	2,732,294	9,482,802	1,779,457	5,362,686	22,372,109	57,433,141
1904.....	17,191,479	2,823,546	8,482,162	1,791,729	6,297,835	22,178,964	58,765,715
1905.....	17,563,139	3,074,554	8,075,149	1,931,625	7,129,071	26,025,210	63,798,748
1906.....	18,562,806	3,736,571	7,147,439	2,021,898	7,582,938	27,327,142	66,378,794
1907.....	18,064,708	4,594,103	6,753,762	2,117,916	7,837,685	31,737,631	71,105,805
1908.....	18,420,080	4,282,406	5,831,231	1,762,860	7,733,920	27,682,002	65,712,499

From this table it will be seen that the stone output of the United States decreased \$5,393,306 in value in 1908, or from \$71,105,805 in 1907 to \$65,712,499 in 1908. This decrease is easily explained by the unsettled financial conditions which affected trades, manufactures, and industries of all kinds during 1907 and 1908, and was not confined to stone alone; in fact, the greatest part of the decreased stone output was caused by the shutting down or decreased operation of iron furnaces using limestone for flux. Crushed stone, which for the last ten years has increased steadily, showed a considerable decrease in 1908, this decrease being confined to the stone crushed and sold for concrete. Stone used for various other purposes also decreased, but the decrease was not so marked as in the cases of furnace flux and crushed stone. In 1908, as in 1907, there was a noticeable decrease in the number of producers of stone, many of the small operators being idle and reporting the use of cheaper concrete instead of stone for local work. Most of the large operators, except those having special contracts, had decreased outputs. In 1908 granite was the only variety of stone showing an increased output, trap rock, sandstone, bluestone, and marble decreasing less than \$1,000,000, while limestone fell off over \$4,000,000, a loss due chiefly to decreased output of furnace flux.

Granite.—Granite represented 28.03 per cent of the total stone output in 1908. The increase in value was from \$18,064,708 in 1907 to \$18,420,080 in 1908, or \$355,372. While granite for monumental work, paving blocks, curbing, flagging, and rubble increased somewhat in value, the decided increase was in the value of riprap, which included stone for breakwater and jetty work, an especially large increase being shown in the State of Washington.

Trap rock.—Trap rock decreased in value from \$4,594,103 in 1907 to \$4,282,406 in 1908, or \$311,697. This stone represented 6.52 per cent of the total stone output in 1908. The trap-rock output is chiefly crushed stone.

Sandstone.—Sandstone, including bluestone, represented 11.56 per cent of the total output, and decreased in value from \$8,871,678 in 1907 to \$7,594,091 in 1908, a loss of \$1,277,587. Bluestone produced in New York and Pennsylvania decreased in value from \$2,117,916 in 1907 to \$1,762,860 in 1908, or \$355,056. Sandstone, exclusive of bluestone, decreased \$922,531, or from \$6,753,762 in 1907 to \$5,831,231 in 1908.

Marble.—Marble, valued at \$7,733,920 in 1908, represented 11.77 per cent of the total output and decreased in value but slightly in 1908 as compared with 1907, the decrease being \$103,765 from \$7,837,685, the value in 1907.

Limestone.—Limestone represented 42.12 per cent of the total stone production in 1908, the value being \$27,682,002, as against \$31,737,631 in 1907, a loss for 1908 of \$4,055,629. This loss was chiefly in the value of furnace flux and crushed stone.

The following table shows the value of the various kinds of stone produced in 1907 and 1908, by States and Territories.

Value of various kinds of stone produced in 1907 and 1908, by States and Territories.

1907.

State or Territory.	Granite.	Trap rock.	Sandstone.	Marble.	Limestone.	Total value.
Alabama.....			\$48,673	\$85,475	\$694,699	\$828,847
Alaska.....				38,110		38,110
Arizona.....	\$13,700		158,435		64,975	237,110
Arkansas.....	168,996		94,275		52,207	315,478
California.....	1,306,324	\$1,029,749	437,738	183,285	177,333	3,134,429
Colorado.....	67,134		299,443		502,751	869,328
Connecticut.....	591,153	459,953	(a)		1,476	1,052,582
Delaware.....	158,192					158,192
Florida.....					15,000	15,000
Georgia.....	858,603			864,757	22,278	1,745,638
Hawaii.....	19,599					19,599
Idaho.....	25,942		24,001	(b)	15,900	65,843
Illinois.....			14,996		3,774,346	3,789,342
Indiana.....			15,425		3,624,126	3,639,551
Iowa.....			3,542		560,582	564,124
Kansas.....			46,831		813,748	860,579
Kentucky.....			98,450	12,500	891,500	1,002,450
Maine.....	2,146,420				1,350	2,147,770
Maryland.....	1,183,753		13,859	98,918	142,825	1,439,355
Massachusetts.....	2,328,777	432,604	243,323	212,438	1,837	3,218,979
Michigan.....			53,003		760,333	813,336
Minnesota.....	546,603		300,204		735,319	1,582,126
Missouri.....	136,405		35,289	(c)	2,153,917	2,325,611
Montana.....	102,050		39,216		124,690	265,956
Nebraska.....			11,609		312,630	324,239
New Hampshire.....	647,721					647,721
New Jersey.....	75,757	995,436	177,667		274,452	1,523,312
New Mexico.....	167,294		12,450	d 7,535	193,732	381,011
New York.....	289,722	915,395	e f 1,978,117	911,951	2,898,520	6,993,705
North Carolina.....	906,476		4,105		22,328	932,909
North Dakota.....			3,260			3,260
Ohio.....			1,591,148		3,566,822	5,157,970
Oklahoma.....	24,550		43,403	16,805	189,568	274,326
Oregon.....	117,625		3,904		5,750	127,279
Pennsylvania.....	366,670	760,966	f 2,064,913	118,539	5,821,275	9,132,372
Rhode Island.....	674,148				750	674,898
South Carolina.....	129,377					129,377
South Dakota.....	690		143,585		11,600	155,875
Tennessee.....			16,523	688,148	385,450	1,090,121
Texas.....	122,158		108,047		267,757	497,962
Utah.....	5,240		24,298	2,500	306,344	338,382
Vermont.....	2,693,889			4,596,724	23,126	7,313,739
Virginia.....	398,426		(g)		362,062	760,488
Washington.....	562,352		295,585	(h)	62,317	920,254
West Virginia.....			i 197,926		855,941	1,053,867
Wisconsin.....	1,228,863		236,183		1,027,095	2,492,141
Wyoming.....	90		32,252		18,920	51,262
	j 18,064,708	4,594,103	f 8,871,678	7,837,685	31,737,631	71,105,805

a Small value included with New York.

b Small value included with New Mexico.

c Included in Missouri limestone.

d Includes small values for Idaho and Washington.

e Includes small value for Connecticut.

f Includes bluestone.

g Small value included with West Virginia.

h Small value included with New Mexico.

i Includes small value for Virginia.

j Includes small value for trap and other igneous rocks.

Value of various kinds of stone produced in 1907 and 1908, by States and Territories—
Continued.

1908.

State or Territory.	Granite.	Trap rock.	Sandstone.	Marble.	Limestone	Total value.
Alabama.....			\$34,099	^a \$118,580	\$479,730	^a \$632,409
Alaska.....				^a 103,888		^a 103,888
Arizona.....	88,544		396,358		^b 50,130	^b 455,032
Arkansas.....	152,567		42,463		61,971	257,001
California.....	1,684,504	\$979,139	330,214	60,408	237,320	3,291,585
Colorado.....	121,282		181,051	(^a)	378,822	^a 681,155
Connecticut.....	592,904	473,219	55,949		^b 3,727	^b 1,125,799
Delaware.....	195,761					195,761
Florida.....					41,910	41,910
Georgia.....	970,832			916,281	8,495	1,895,608
Hawaii.....	81,219					81,219
Idaho.....			33,394		36,000	69,394
Illinois.....			12,218		3,122,552	3,134,770
Indiana.....			3,342		3,643,261	3,646,603
Iowa.....			2,337		530,945	533,282
Kansas.....			67,950		403,176	471,126
Kentucky.....			78,732	(^a)	810,090	^a 888,822
Maine.....	2,027,508				(^b)	^b 2,027,508
Maryland.....	762,442		6,262	^a 79,317	128,591	^a 976,612
Massachusetts.....	2,027,463	508,672	241,462	175,648	1,950	2,955,195
Michigan.....			59,103		669,017	708,120
Minnesota.....	629,427		197,184		667,095	1,493,706
Missouri.....	157,968		17,954	(^a)	2,130,136	^a 2,306,058
Montana.....			51,564		134,595	186,159
Nebraska.....			^c 15,815		330,570	^c 346,385
Nevada.....			(^c)		(^c)	(^c)
New Hampshire.....	867,028					867,028
New Jersey.....	125,804	1,079,514	154,422		172,000	1,531,740
New Mexico.....			^c 10,410	(^a)	(^b)	^a ^b ^c 10,410
New York.....	367,066	723,953	^d 1,774,843	706,858	2,584,559	^d 6,157,279
North Carolina.....	764,272		^c 12,266	(^a)	(^b)	^a ^b ^c 770,538
North Dakota.....			(^c)		(^c)	(^c)
Ohio.....			1,244,752		3,519,557	4,764,309
Oklahoma.....	23,239		57,124		257,066	337,429
Oregon.....	271,869		(^c)		6,230	^c 278,099
Pennsylvania.....	324,241	517,909	^d 1,368,784	102,747	4,057,471	^d 6,371,152
Rhode Island.....	556,474				(^b)	^b 556,474
South Carolina.....	297,874					297,874
South Dakota.....			128,554		(^b)	^b 128,554
Tennessee.....			(^c)	790,233	^b 535,882	^b ^c 1,326,115
Texas.....	190,055		154,948		314,571	659,574
Utah.....	5,229		25,097	(^a)	253,088	^a 283,414
Vermont.....	2,451,933			4,679,960	20,731	7,152,624
Virginia.....	321,530		(^c)		280,542	^c 602,072
Washington.....	870,944		464,587		31,660	1,367,191
West Virginia.....			127,149		645,385	772,534
Wisconsin.....	1,529,781		219,130		1,102,009	2,850,920
Wyoming.....			44,574		^b 31,168	^b 75,742
Other States.....	40,320					40,320
	^e 18,420,080	4,282,406	7,594,091	7,733,920	27,682,002	65,712,499

^a To prevent disclosure of individual production: Alabama includes Kentucky and Missouri; Alaska includes Colorado, New Mexico, and Utah; Maryland includes North Carolina.

^b Arizona includes New Mexico; Connecticut includes Maine and Rhode Island; Tennessee includes North Carolina; Wyoming includes South Dakota.

^c Nebraska includes North Dakota and Oregon; Nevada is included with New Mexico; North Carolina includes Tennessee and Virginia.

^d Includes bluestone.

^e Includes a small value for trap, basalt, and other igneous rocks.

The following table shows the rank of States and Territories in 1907 and 1908, according to value of production, and the percentage of the total produced by each State or Territory:

Rank of States and Territories in 1907 and 1908, according to value of production, and percentage of total produced by each State or Territory.

Rank of State.	1907.			Rank of State.	1908.		
	State or Territory.	Total value.	Percentage of total.		State or Territory.	Total value.	Percentage of total.
1	Pennsylvania.....	\$9,132,372	12.84	1	Vermont.....	\$7,152,624	10.88
2	Vermont.....	7,313,739	10.29	2	Pennsylvania.....	6,371,152	9.70
3	New York ^a	6,993,705	9.84	3	New York.....	6,157,279	9.37
4	Ohio.....	5,157,970	7.25	4	Ohio.....	4,764,309	7.25
5	Illinois.....	3,789,342	5.33	5	Indiana.....	3,646,603	5.55
6	Indiana.....	3,639,551	5.12	6	California.....	3,291,585	5.01
7	Massachusetts.....	3,218,979	4.53	7	Illinois.....	3,134,770	4.77
8	California.....	3,134,429	4.41	8	Massachusetts.....	2,955,195	4.50
9	Wisconsin.....	2,492,141	3.51	9	Wisconsin.....	2,850,920	4.34
10	Missouri.....	2,325,611	3.27	10	Missouri.....	2,306,058	3.51
11	Maine.....	2,147,770	3.02	11	Maine.....	2,027,508	3.09
12	Georgia.....	1,745,638	2.46	12	Georgia.....	1,895,608	2.88
13	Minnesota.....	1,582,126	2.23	13	New Jersey.....	1,531,740	2.33
14	New Jersey.....	1,523,312	2.14	14	Minnesota.....	1,493,706	2.27
15	Maryland.....	1,439,355	2.02	15	Washington.....	1,367,191	2.08
16	Tennessee.....	1,090,121	1.53	16	Tennessee.....	1,310,651	1.99
17	West Virginia ^b	1,053,867	1.48	17	Connecticut.....	1,125,799	1.71
18	Connecticut ^c	1,052,582	1.48	18	Maryland.....	968,437	1.47
19	Kentucky.....	1,002,450	1.41	19	Kentucky.....	893,447	1.36
20	North Carolina.....	932,909	1.31	20	New Hampshire.....	867,028	1.32
21	Washington ^d	920,254	1.29	21	North Carolina.....	800,177	1.22
22	Colorado.....	869,328	1.22	22	West Virginia.....	772,534	1.18
23	Kansas.....	860,579	1.21	23	Colorado.....	740,253	1.13
24	Alabama.....	828,847	1.17	24	Michigan.....	708,120	1.08
25	Michigan.....	813,336	1.14	25	Texas.....	659,574	1.00
26	Virginia ^e	760,488	1.07	26	Alabama.....	627,011	.95
27	Rhode Island.....	674,898	.95	27	Virginia.....	602,072	.92
28	New Hampshire.....	647,721	.91	28	Rhode Island.....	556,474	.85
29	Iowa.....	564,124	.79	29	Iowa.....	533,282	.81
30	Texas.....	497,962	.70	30	Kansas.....	471,126	.72
31	New Mexico ^f	381,011	.54	31	Arizona.....	451,832	.69
32	Utah.....	338,382	.48	32	Nebraska.....	338,070	.51
33	Nebraska.....	324,239	.46	33	Oklahoma.....	337,429	.51
34	Arkansas.....	315,478	.44	34	South Carolina.....	297,874	.45
35	Oklahoma.....	274,326	.39	35	Utah.....	286,414	.44
36	Montana.....	265,956	.37	36	Oregon.....	286,414	.44
37	Arizona.....	237,110	.33	37	Arkansas.....	257,001	.39
38	Delaware.....	158,192	.22	38	Montana.....	225,709	.34
39	South Dakota.....	155,875	.22	39	Delaware.....	195,761	.30
40	South Carolina.....	129,377	.18	40	South Dakota.....	131,994	.20
41	Oregon.....	127,279	.18	41	Hawaii.....	81,219	.12
42	Idaho ^g	65,843	.09	42	Wyoming.....	72,947	.11
43	Wyoming.....	51,262	.07	43	Idaho.....	69,394	.11
44	Alaska.....	38,110	.05	44	Florida.....	41,910	.06
45	Hawaii.....	19,599	.03	45	Alaska.....	40,343	.06
46	Florida.....	15,000	.02	46	New Mexico.....	15,955	.02
47	North Dakota.....	3,260	.00	47	Nevada.....	(h)	.00
				48	North Dakota.....	(h)	.00
		71,105,805	100.00			65,712,499	100.00

^a Includes a small output of sandstone from Connecticut.

^b Includes a small value of sandstone for Virginia.

^c Exclusive of a small value for sandstone included with New York.

^d Exclusive of a small value for marble included with New Mexico.

^e Exclusive of a small value for sandstone included with West Virginia.

^f Includes small values of marble for Idaho and Washington.

^g Exclusive of a small value of marble included with New Mexico.

^h To prevent disclosure of individual production, Alaska includes a small value for Nevada; Colorado for Missouri; Connecticut for Maine and Rhode Island; Montana for Idaho and Michigan; Oregon for North Dakota; and Tennessee for Virginia.

From this table it will be seen that the four ranking States in the production of stone are Vermont, Pennsylvania, New York, and Ohio. Prior to 1908 Pennsylvania had ranked first, followed by

Vermont, New York, and Ohio. For 1908, however, Pennsylvania and Vermont changed places, both decreasing in the total value of output, but Pennsylvania much more than Vermont. This was on account of the decreased production of crushed stone and of limestone for furnace flux in Pennsylvania. Vermont furnishes very little material of this class, and the production of this State, chiefly building and monumental stone, did not suffer so great a change. In 1907 Pennsylvania produced 12.84 per cent of the entire output and Vermont 10.29 per cent; in 1908 Vermont produced 10.88 per cent and Pennsylvania 9.70 per cent. New York and Ohio kept the same relative position, New York leading; but it is noticeable that while New York decreased in percentage of output Ohio remained exactly the same, although the total value for this State decreased somewhat.

Of the other leading States Illinois went from fifth place in 1907 to seventh place in 1908, Indiana from sixth to fifth, Massachusetts from seventh to eighth, and California from eighth to sixth. A noteworthy change in rank of production is that of Washington from twenty-first place in 1907 to fifteenth in 1908, a change caused by the large quantity of rock reported for use in rivers and harbors for jetty and breakwater work and the large demand in 1908 for paving blocks for the cities of Seattle and Tacoma.

The following table is given to show the values of the stone used for various purposes in 1907 and 1908. Only those values are given which are for uses common to two or more varieties of stone.

Value of granite, trap rock, sandstone, limestone, and marble used for various purposes in 1907 and 1908.

1907.

Kind.	Building (rough and dressed).	Monumental (rough and dressed).	Flagstone.	Curbstone.	Paving stone.	Crushed stone.
Granite.....	\$6,033,362	\$4,338,819	\$69,854	\$819,621	\$1,928,308	\$3,110,762
Trap rock.....	48,203				182,490	4,280,554
Sandstone.....	3,154,783		1,185,879	1,380,516	884,843	987,528
Limestone.....	4,580,226		84,076	378,853	545,300	13,675,453
Marble.....	2,859,237	2,640,130				
	16,675,811	6,978,949	1,339,809	2,578,990	3,540,941	22,054,297

1908.

Kind.	Building (rough and dressed).	Monumental (rough and dressed).	Flagstone.	Curbstone.	Paving stone.	Crushed stone.
Granite.....	\$5,751,258	\$4,551,061	\$70,744	\$942,722	\$2,420,554	\$2,445,268
Trap rock.....	40,543				184,125	4,002,220
Sandstone.....	2,605,381		1,067,334	1,025,259	654,896	906,317
Limestone.....	4,566,522		79,081	237,579	276,637	12,908,207
Marble.....	3,076,926	2,397,780				
	16,040,630	6,948,841	1,217,159	2,205,560	3,536,212	20,262,012

From this table may be seen more clearly than from the tables showing the separate productions of the various stones the setback to the stone industry in 1908.

The value of stone sold for building purposes decreased from \$16,675,811 in 1907 to \$16,040,630 in 1908, or \$635,181. This decrease

was for all varieties of stone, except marble, which showed a somewhat increased value for this purpose. This decrease of building stone output in 1908 was, however, small compared with the decrease for 1907, which was \$4,005,814 as compared with the total for 1906. In 1908 granite represented 35.86 per cent of this building stone, limestone 28.47 per cent, marble 19.18 per cent, and sandstone 16.24 per cent, the percentage for marble being greater than for sandstone, which was not the case heretofore.

Monumental stone decreased \$30,108 in value in 1908. Of the monumental stone 65.49 per cent was granite and 34.51 per cent marble in 1908, granite increasing and marble decreasing slightly as compared with 1907.

Flagstone decreased \$122,650 in value in 1908. Sandstone represented 87.69 per cent of the total output, and 59.18 per cent of the sandstone used for flagging was bluestone from New York and Pennsylvania.

Curbstone decreased \$373,430 in value in 1908. Sandstone represented 46.49 per cent of this output, granite 42.74 per cent, and limestone 10.77 per cent. Bluestone from New York and Pennsylvania constituted 19.47 per cent of the curbstone.

Paving stone decreased in value \$4,729 in 1908. Limestone and sandstone decreased largely in the paving-stone output, while granite increased largely, producing 68.45 per cent of the total output in 1908 as against 54.46 per cent in 1907. Trap rock also showed a slight gain in the paving-block output.

Crushed stone lost \$1,792,285 in 1908. In 1907 the increase over the 1906 output, which was valued at \$17,467,486, amounted to \$4,586,811. This remarkable decrease followed upon a steady increase in the crushed-stone industry for the last ten years and was due to the financial depression, the decrease being in value of stone used for concrete and railroad ballast, while roadmaking, less influenced by the money market, showed an increase in demand. The beginning of the crushed-stone industry was practically about ten or fifteen years ago, when the demand for good roads in the north-eastern States and the convenience of good material for this purpose in the trap-rock deposits in the New England and Middle Atlantic States led to the use of this material in larger quantities and for other purposes than on roads and in railroad ballasting.

The steady increase in value of crushed stone for the last ten years is well shown in the following table, which gives a comparison between this material and stone used for building purposes. The building stone shows more or less fluctuation, while, until 1908, the crushed stone had shown a steady increase.

Value of building stone and of crushed stone, 1899-1908.

7.B.

Year.	Building stone (rough and dressed).	(Crushed stone.)	Year.	Building stone (rough and dressed).	(Crushed stone.)
1899.....	^a \$10,741,927	\$4,692,343	1904.....	\$18,883,455	\$15,530,122
1900.....	10,672,598	6,525,368	1905.....	20,240,809	16,419,614
1901.....	15,112,600	8,560,432	1906.....	20,681,625	17,467,486
1902.....	20,790,341	11,480,959	1907.....	16,675,811	22,054,297
1903.....	19,795,491	13,188,938	1908.....	16,040,630	20,262,012

^a Does not include stone sold rough for building.

The following table shows the quantity and value of crushed stone produced in the United States in 1907 and 1908, by States and Territories and by uses:

Production of crushed stone in 1907 and 1908, by States and Territories and by uses, in short tons.

1907.

State or Territory.	Road making.		Railroad ballast.		Concrete.		Total.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Alabama.....	10,000	\$5,000	.....	.....	45,164	\$21,287	55,164	\$26,287
Arizona.....	.....	.....	.....	.....	25,062	41,645	25,062	41,645
Arkansas.....	6,537	6,983	5,000	\$5,000	164,956	179,617	176,493	191,600
California.....	849,869	629,114	265,038	96,214	525,938	479,592	1,640,845	1,204,920
Colorado.....	1,000	900	23,978	21,580	41,342	20,715	66,320	43,195
Connecticut.....	393,842	222,206	149,321	74,660	283,110	148,435	826,273	445,301
Delaware.....	60,535	40,298	58,153	36,668	51,610	41,628	170,298	118,594
Florida.....	6,000	15,000	.....	.....	.....	.....	6,000	15,000
Georgia.....	39,027	25,407	310,969	152,847	82,078	61,051	432,074	239,305
Hawaii.....	.....	.....	.....	.....	9,850	7,599	9,850	7,599
Idaho.....	11,631	17,392	.....	.....	.....	.....	11,631	17,392
Illinois.....	1,517,425	958,032	788,894	499,204	1,576,256	1,118,919	3,882,575	2,576,155
Indiana.....	972,695	476,711	323,650	134,932	120,289	60,918	1,416,634	672,561
Iowa.....	101,696	69,817	158,651	77,571	186,636	118,682	446,983	266,070
Kansas.....	87,208	76,420	733,511	357,820	122,903	55,469	943,622	489,709
Kentucky.....	417,823	292,241	691,405	292,714	76,718	54,917	1,185,946	639,872
Maine.....	1,688	1,511	.....	.....	33,437	19,926	35,875	21,762
Maryland.....	366,910	348,875	164,800	103,147	429,598	499,337	961,308	951,359
Massachusetts.....	423,905	315,221	85,920	42,860	394,005	326,864	903,830	684,945
Michigan.....	225,522	131,708	90,279	46,516	191,167	97,762	506,968	275,986
Minnesota.....	183,021	156,026	42,592	36,398	182,224	153,937	407,837	346,361
Missouri.....	673,659	444,685	532,050	284,158	549,972	454,433	1,755,681	1,183,276
Nebraska.....	63,221	55,824	65,148	53,584	146,757	121,027	274,126	230,435
New Hampshire.....	5,300	3,975	.....	.....	21,887	14,349	27,187	18,324
New Jersey.....	735,681	578,640	323,682	210,247	304,168	235,129	1,363,531	1,024,016
New Mexico.....	375	300	783,961	342,546	.....	.....	784,336	342,846
New York.....	2,500,143	1,827,416	958,506	466,890	956,080	601,605	4,414,729	2,895,911
North Carolina.....	97,907	62,939	364,369	175,847	145,014	106,497	601,290	345,283
Ohio.....	2,367,125	1,245,296	975,735	414,653	666,757	306,277	4,009,617	1,966,226
Oklahoma.....	4,600	4,000	243,137	146,747	26,335	16,405	274,072	167,152
Oregon.....	101,484	80,205	5,888	1,744	5,110	7,450	112,482	89,399
Pennsylvania.....	1,236,037	785,445	1,701,152	1,075,160	1,136,540	693,354	4,073,729	2,553,959
Rhode Island.....	22,040	25,480	.....	.....	5,500	5,550	27,540	31,030
South Carolina.....	26,097	25,887	10	17	6,250	4,500	32,357	30,404
South Dakota.....	28,000	14,000	.....	.....	10,500	10,500	38,500	24,500
Tennessee.....	26,250	13,994	270,923	118,911	69,498	41,530	366,671	174,455
Texas.....	103,915	64,318	171,927	79,843	47,267	48,858	323,109	193,019
Vermont.....	8,558	7,688	.....	.....	4,050	4,850	12,608	12,538
Virginia.....	126,775	96,937	138,221	63,073	214,021	200,286	479,017	360,296
Washington.....	10,550	17,930	1,000	500	.....	.....	11,550	18,430
West Virginia.....	36,048	18,406	573,454	272,887	70,565	49,012	680,067	340,305
Wisconsin.....	763,383	506,957	73,006	36,026	417,405	233,477	1,253,794	776,460
Wyoming.....	100	60	.....	.....	450	375	550	435
	14,607,582	9,669,244	11,075,080	5,721,289	9,345,469	6,663,764	35,028,131	22,654,297

Production of crushed stone in 1907 and 1908, by States and Territories and by uses, in short tons—Continued.

1908.

State or Territory.	Road making.		Railroad ballast.		Concrete.		Total.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Alabama.....	99,330	\$43,028	3,250	\$1,500	21,446	\$16,651	124,026	\$61,179
Arizona.....	200	100	5,000	2,500	4,726	4,220	9,926	6,820
Arkansas.....	11,779	9,123	.....	.....	124,450	109,171	136,229	118,294
California.....	983,644	719,362	260,440	200,751	622,290	502,947	1,866,374	1,423,060
Colorado.....	.....	.....	4,000	2,000	8,541	6,210	12,541	8,210
Connecticut.....	370,735	201,540	200,000	100,000	317,702	156,840	888,437	458,380
Delaware.....	80,235	69,462	52,377	37,065	29,904	25,922	162,516	132,449
Florida.....	10,733	9,660	.....	.....	.....	.....	10,733	9,660
Georgia.....	4,396	3,291	28,832	11,443	68,647	52,666	101,875	67,400
Hawaii.....	28,269	22,035	.....	.....	42,814	49,219	71,083	71,254
Illinois.....	1,284,812	729,217	771,430	384,827	1,716,912	851,889	3,773,154	1,965,933
Indiana.....	1,177,435	622,726	262,819	95,165	159,211	77,011	1,599,465	794,902
Iowa.....	107,211	75,806	42,545	28,687	266,628	181,708	416,384	286,201
Kansas.....	68,100	48,550	168,789	99,306	107,006	78,540	343,895	226,396
Kentucky.....	469,818	350,577	525,055	235,802	57,035	35,928	1,051,908	622,307
Maine.....	3,517	2,557	300	150	11,285	9,818	15,002	12,525
Maryland.....	280,189	268,821	115,772	68,267	137,719	161,107	533,680	498,195
Massachusetts.....	587,338	456,413	76,800	39,963	310,494	248,330	974,632	744,706
Michigan.....	324,842	188,910	82,000	33,900	162,234	75,600	569,076	298,410
Minnesota.....	87,014	66,609	56,355	44,793	156,306	125,536	299,675	236,938
Missouri.....	1,275,926	732,823	232,777	130,296	459,668	357,509	1,968,371	1,220,628
Montana.....	.....	.....	1,511	756	.....	.....	1,511	756
Nebraska.....	56,037	51,007	17,651	16,010	195,669	173,449	269,357	240,466
Nevada.....	1,415	218	.....	.....	.....	.....	1,415	218
New Hampshire.....	5,219	6,329	.....	.....	13,235	10,126	18,454	16,455
New Jersey.....	774,764	609,324	482,644	254,550	360,536	266,874	1,617,944	1,130,748
New Mexico.....	570	385	.....	.....	500	350	1,070	735
New York.....	2,929,488	1,647,210	518,981	282,133	1,085,679	643,822	4,534,148	2,573,165
North Carolina.....	146,436	123,954	52,433	33,612	32,560	27,333	231,429	184,899
Ohio.....	2,834,076	1,477,429	826,649	354,505	557,045	285,316	4,217,770	2,117,250
Oklahoma.....	4,000	2,000	206,111	107,574	204,483	132,101	414,594	241,675
Oregon.....	175,058	158,051	.....	.....	4,815	6,718	179,873	164,769
Pennsylvania.....	1,414,652	930,812	1,055,043	579,480	909,745	604,137	3,379,440	2,114,429
Rhode Island.....	25,618	27,476	.....	.....	3,433	3,838	29,051	31,514
South Carolina.....	35,000	30,300	35,000	27,500	38,000	35,000	106,000	92,800
South Dakota.....	7,500	6,000	.....	.....	3,000	2,500	10,500	8,500
Tennessee.....	322,213	202,416	131,794	56,439	107,278	60,350	561,285	319,205
Texas.....	115,732	110,058	207,180	122,360	17,402	13,066	340,314	245,484
Utah.....	59	14	250	125	150	263	459	402
Vermont.....	15,775	17,916	1,250	1,000	2,070	2,535	19,095	21,451
Virginia.....	81,420	51,829	222,921	117,245	183,215	129,540	487,556	298,614
Washington.....	37,129	29,616	.....	.....	2,849	2,280	39,978	31,896
West Virginia.....	145,393	73,979	408,268	199,899	62,341	35,152	616,002	309,030
Wisconsin.....	787,823	541,048	72,335	47,363	401,492	263,063	1,261,650	851,474
Wyoming.....	.....	.....	.....	.....	3,225	2,430	3,225	2,430
	17,170,900	10,717,981	7,126,562	3,716,966	8,973,740	5,827,065	33,271,202	20,262,012

Graphs { From this table it will be seen that New York, producing 12.70 per cent; Ohio, 10.45 per cent; Pennsylvania, 10.44 per cent; Illinois, 9.70 per cent; California, 7.03 per cent; Missouri, 6.02 per cent; and New Jersey, 5.59 per cent of the total crushed-stone output of the United States, were the principal crushed-stone producing States in 1908. Each of these had an output valued at more than \$1,000,000.

In 1907 the rank and percentage was as follows: New York, 13.13 per cent; Illinois, 11.68 per cent; Pennsylvania, 11.58 per cent; Ohio, 8.92 per cent; California, 5.46 per cent; Missouri, 5.37 per cent; and New Jersey, 4.64 per cent.

In 1908 these States, except California, Missouri, and New Jersey, showed a decreased percentage of the total output, Illinois changing from second place to fourth.

The following table shows the quantity and value of crushed stone produced in the United States in 1907 and 1908, by uses and kinds of stone:

Quantity and value of crushed stone produced in the United States in 1907 and 1908, by kinds and uses, in short tons.

1907.

Kind.	Road making.		Railroad ballast.		Concrete.		Total.		Average per ton.
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	
Granite.....	1,262,069	\$1,060,658	1,447,406	\$714,574	1,375,973	\$1,335,530	4,085,448	\$3,110,762	\$0.76
Trap rock...	3,265,249	2,435,152	1,181,260	680,897	1,626,963	1,164,505	6,073,472	4,280,554	.70
Limestone...	9,619,178	5,860,977	8,122,342	4,144,345	5,791,377	3,670,131	23,532,897	13,675,453	.58
Sandstone...	461,086	312,457	324,072	181,473	551,156	493,598	1,336,314	987,528	.74
Total...	14,607,582	9,669,244	11,075,080	5,721,289	9,345,469	6,663,764	35,028,131	22,054,297	.....
Average price.....	.....	.66	.....	.52	.....	.71	.....	.63	.....

1908.

Granite.....	1,429,814	\$1,207,666	693,020	\$384,215	976,808	\$853,387	3,099,642	\$2,445,268	\$0.79
Trap rock...	3,386,415	2,313,693	1,121,769	682,875	1,550,010	1,005,652	6,058,194	4,002,220	.66
Limestone...	11,910,760	6,880,893	5,095,109	2,530,738	5,907,625	3,496,576	22,913,494	12,908,207	.56
Sandstone...	443,911	315,729	216,664	119,138	539,297	471,450	1,199,872	906,317	.76
Total...	17,170,900	10,717,981	7,126,562	3,716,966	8,973,740	5,827,065	33,271,202	20,262,012	.....
Average price.....	.....	.62	.....	.52	.....	.65	.....	.61	.....

As shown by this table the quantity and value of the crushed stone output in 1908 was 33,271,202 short tons, valued at \$20,262,012, a decrease of 1,756,929 tons in quantity and of \$1,792,285 in value from the output of 1907. The average price per ton declined from 63 cents in 1907 to 61 cents in 1908. The decrease for 1908 was in marked contrast to the increase of 5,488,279 tons in quantity and of \$4,586,811 in value for 1907 over 1906, when the output was 29,539,852 short tons, valued at \$17,467,486. Crushed granite decreased 985,806 tons in quantity and \$665,494 in value. The average price per ton advanced from 76 cents in 1907 to 79 cents in 1908.

Crushed trap rock fell off 15,278 short tons and \$278,334. The average price per ton declined from 70 cents in 1907 to 66 cents in 1908.

Crushed limestone lost 619,403 short tons and \$767,246. The average price per ton declined from 58 cents in 1907 to 56 cents in 1908.

Crushed sandstone decreased 136,442 short tons and \$81,211. The average price per ton was 74 cents in 1907 and 76 cents in 1908.

Crushed stone used for road making increased 2,563,318 short tons in quantity and \$1,048,737 in value. The average price per ton, however, declined from 66 cents in 1907 to 62 cents in 1908. The only increase in crushed-stone product in 1908 was in the stone used for road making, and in 1907 the largest increase in crushed-stone output was for road making.

Crushed stone for railroad ballast decreased 3,948,518 short tons in quantity and \$2,004,323 in value. The average price per ton was the same in 1907 as in 1908, 52 cents.

Crushed stone for concrete decreased 371,729 short tons in quantity and \$836,699 in value. The average price per ton declined from 71 cents per ton in 1907 to 65 cents per ton in 1908.

EXPORTS AND IMPORTS.

The following figures, compiled from statistics furnished by the Bureau of Statistics of the Department of Commerce and Labor, give the value of the exports and imports of stone for the calendar years 1907 and 1908:

Exports of stone from the United States in 1907 and 1908.

Kind.	1907.	1908.
Marble and stone, unmanufactured.....	\$407,193	\$249,184
All others.....	681,798	754,067
	1,088,991	1,003,251

Imports of stone into the United States in 1907 and 1908.

Kind.	1907.	1908.	Kind.	1907.	1908.
Marble:			Granite:		
In block, rough, etc....	\$1,040,333	\$831,099	Dressed.....	\$166,524	\$187,229
Sawed or dressed.....	1,132	2,428	Rough.....	8,779	6,384
Slabs or paving tiles....	50,718	89,371	Total.....	175,303	193,613
All other manufac-			Stone (other):		
tures.....	257,456	180,751	Dressed.....	26,003	12,345
Mosaic cubes.....	49,893	35,053	Rough.....	38,761	56,565
Total.....	1,399,532	1,138,702	Total.....	64,764	68,910
Onyx:			Grand total.....	1,705,072	1,483,026
In block, rough, etc....	57,795	71,979			
All other manufac-					
tures.....	7,678	9,822			
Total.....	65,473	81,801			

These tables show a decrease of \$85,740 in the value of the exports of stone during 1908, and a decrease also in the value of imports of \$222,046.

The value of the exports decreased in 1907 also in comparison with 1906, but imports increased in value.

GRANITE.

Total production.—The figures given in this report as representing the value of the granite production in the United States include also the values of small quantities of gneiss, mica schist, lava, tuff, trachyte, andesite, syenite, quartz porphyry, trap, basalt, and allied igneous rocks. The quantities of these allied rocks quarried are too small to tabulate separately. Trap rock in the States of California, Connecticut, Massachusetts, New Jersey, New York, and Pennsylvania, however, represents an industry sufficient by itself to make it advisable to tabulate this stone separately, and its value is not included in the grand total of granite.

The value of the granite output in the United States was in 1908 \$18,420,080; in 1907 the value was \$18,064,708, an increase for 1908 of \$355,372. As noted previously, granite is the only variety of stone showing an increased value of output in 1908. In 1907, as compared with 1906, when the output was valued at \$18,562,806, there was a decrease of \$498,098. This decrease being practically the same as the increase for 1908, the granite industry would appear to be in about the same condition as before the business troubles of 1907 and 1908.

Granite for monumental stone, curbstone, flagging, rubble, and crushed stone for road making increased slightly in value; but granite for paving blocks and for riprap showed considerable increase. Building stone decreased somewhat in value, and crushed stone for concrete and for railroad ballast showed a marked decrease.

In 1907 the rank in output of States producing granite to the value of \$500,000 or more was Vermont, Massachusetts, Maine, California, Wisconsin, Maryland, North Carolina, Georgia, Rhode Island, New Hampshire, Connecticut, Washington, and Minnesota; in 1908, Vermont, Maine, Massachusetts, California, Wisconsin, Georgia, Washington, New Hampshire, North Carolina, Maryland, Minnesota, Connecticut, and Rhode Island. Of these States, California, Wisconsin, Georgia, Washington, New Hampshire, Minnesota, and Connecticut showed an increased output; and Vermont, Maine, Massachusetts, North Carolina, Maryland, and Rhode Island decreased in value of production.

In 1907 there were six States with an output valued at over \$1,000,000. In 1908 Maryland dropped below \$1,000,000, and Maine exchanged places with Massachusetts, although the production was almost identical for the two States. Washington showed a remarkable increase in output, occasioned by the large quantities of stone used for breakwater, jetty, and harbor repair work. A large quantity of this stone is basalt. Although remaining in fifth place, Wisconsin reported a large increase in paving-block output. New Hampshire increased in value of monumental, building, and paving stone. Georgia increased in the output of curbstone and flagstone. Maine increased in building stone and paving blocks, but decreased in monumental stone. Vermont decreased in value of dressed building stone. Massachusetts decreased in value of building and paving stone and increased somewhat in value of monumental stone. The decreased output of Maryland was due to a considerable loss in value of crushed stone for concrete. The decrease in value for North Carolina was due to decrease in dressed building stone. Of the other States, Colorado, Delaware, Hawaii, Missouri, New Jersey, New York, Oregon, South Carolina, and Texas increased in value of output, and Arizona, Arkansas, Idaho, Montana, New Mexico, Oklahoma, Pennsylvania, Utah, and Virginia decreased. Arizona, Colorado, Hawaii, Oregon, Utah, and Washington include some basalt and volcanic rock, and trappean rocks in their production; other States, notably Delaware, Georgia, Maryland, Pennsylvania, and Virginia, include some gneiss, trap rock, syenite, mica schist, diabase, etc.

Building stone.—Granite used as building stone, including rough and dressed stone as sold by producers, was valued at \$5,751,258 in 1908, a decrease of \$282,104, as compared with 1907. In 1907 the

decrease from 1906, when the total output was \$8,430,022, was \$2,396,660. In 1906, the increase over 1905, when the total output was \$7,243,219, was \$1,186,803.

The rough building stone sold by the granite quarrymen was valued at \$1,379,106 in 1908, and at \$1,280,769 in 1907, an increase of \$98,337 in this class of material. Maine, Pennsylvania, Massachusetts, Maryland, and North Carolina reported the greatest values for rough building stone sold, all these States reporting a decreased output except Maryland and North Carolina, which increased in value for this product.

The dressed stone sold for building by the quarrymen was valued at \$4,372,152 in 1908 and at \$4,752,593 in 1907, a decrease of \$380,441. In 1907 the decrease was \$1,906,511 compared with 1906. In 1907 for this output the report was as follows: Vermont, \$1,009,353; Maine, \$1,007,572; Massachusetts, \$907,119; California, \$485,778. There was therefore, in 1908, an increase of \$48,417 for Maine and of \$234,055 for California, and a loss of \$333,286 for Vermont and of \$186,323 for Massachusetts.

Monumental stone.—Granite sold for monumental purposes by quarrymen, including rough and dressed stone, was valued at \$4,551,061 in 1908 and at \$4,338,819 in 1907, a gain of \$212,242. Of the total, \$2,226,619 was the value of the rough stock and \$2,324,442 the value of the dressed stone sold by the producers. In 1907 the rough stock sold was valued at \$2,239,327, and the dressed stone at \$2,099,492, a decrease for 1908 of \$12,708 for rough stock and an increase of \$224,950 for the finished stone. Vermont was the largest producer of both rough and dressed stone. Massachusetts ranked next in production of rough stock, followed by Rhode Island and New Hampshire. In 1908 Minnesota showed an increased output of dressed monumental stone and ranked after Vermont and was followed by Wisconsin and Rhode Island.

Paving blocks.—The paving-block industry increased in value from \$1,928,308 in 1907 to \$2,420,555 in 1908, a gain of \$492,247. Wisconsin, Maine, and Massachusetts were the largest producers of this class of material.

Curbstone.—Granite curbing in 1908 was valued at \$942,722, and in 1907 at \$819,621, a gain of \$123,101 for 1908. Georgia, California, North Carolina, Massachusetts, and Maine were the largest curbstone-producing States in 1908.

Flagstone.—Granite used for flagging was principally from Georgia in 1908. The total output was valued at \$70,744 in 1908 and at \$69,854 in 1907.

Rubble.—Granite reported as used for rubble was valued at \$718,120 in 1908, practically the same value as for 1907, which was \$717,998.

Riprap.—Granite sold for riprap increased in value from \$620,033 in 1907 to \$1,232,684 in 1908, a gain of \$612,651. Washington, California, Connecticut, South Carolina, and Texas showed the largest output of this stone, which was used in riprap and in construction of breakwaters and jetty work in various rivers and harbors.

Crushed stone.—The total granite crushed-stone output was valued at \$2,445,268 in 1908, as against \$3,110,762 in 1907, a decrease in 1908 of \$665,494. These figures represent an output of 3,099,642 short tons in 1908 and of 4,085,448 short tons in 1907, a loss in 1908 of

985,806 short tons. Of the total 1908 output 1,429,814 tons, valued at \$1,207,666, was for road making; 693,020 tons, valued at \$384,215, for railroad ballast; and 976,808 tons, valued at \$853,387, for concrete. These figures for 1907 were as follows: 1,262,069 tons, valued at \$1,060,658, for road making; 1,447,406 tons, valued at \$714,574, for railroad ballast; and 1,375,973 tons, valued at \$1,335,530, for concrete—an increase of 167,745 tons in quantity and of \$147,008 in value for road making; a decrease of 754,386 tons in quantity and of \$330,359 in value for railroad ballast; and a decrease of 399,165 tons in quantity and of \$482,143 in value for concrete. The total average price per ton was 76 cents in 1907 and 79 cents in 1908. The average price per ton for road making was 84 cents in 1908 and 84 cents in 1907; for railroad ballast it was 55 cents in 1908 and 49 cents in 1907; for concrete 87 cents in 1908 and 97 cents in 1907. Maryland, California, Virginia, and North Carolina had the largest values for crushed granite in 1908, Maryland reporting the greatest value for road making and concrete, and New Jersey the greatest value for railroad ballast.

The following table shows the value of the production of granite, including a small output of igneous rocks, in the United States from 1904 to 1908, inclusive:

Value of granite, etc., produced in the United States, by States and Territories, 1904-1908.

State or Territory.	1904.	1905.	1906.	1907.	1908.
Arizona.....	\$2,500	\$3,700	\$32,042	\$13,700	\$8,544
Arkansas.....	52,616	90,312	118,903	168,996	152,567
California.....	1,180,415	1,161,330	740,784	1,306,324	1,684,504
Colorado.....	91,132	73,802	65,402	67,134	121,282
Connecticut.....	558,334	636,364	974,024	591,153	592,904
Delaware.....	245,272	178,428	146,346	158,192	195,761
Georgia.....	942,466	971,207	792,315	858,603	970,832
Hawaii.....	22,042	33,550	23,346	19,599	81,219
Idaho.....		1,500	400	25,942	(a)
Indian Territory.....	5,152	1,800			
Maine.....	2,400,509	2,713,795	2,560,021	2,146,420	2,027,508
Maryland.....	815,471	957,048	883,881	1,183,753	762,442
Massachusetts.....	2,554,748	2,251,319	3,327,416	2,328,777	2,027,463
Minnesota.....	405,956	481,908	626,069	546,603	629,427
Missouri.....	155,716	180,579	150,009	136,405	157,968
Montana.....	33,890	126,430	114,005	102,050	(a)
Nevada.....	1,200				
New Hampshire.....	927,487	838,371	818,131	647,721	867,028
New Jersey.....	37,197	76,758	101,224	75,757	125,804
New Mexico.....				167,294	
New York.....	196,685	134,425	304,048	289,722	367,066
North Carolina.....	297,749	564,578	778,847	889,976	764,272
Oklahoma.....	26,930	18,920	18,847	24,550	23,239
Oregon.....	235,213	85,330	58,961	117,625	271,869
Pennsylvania.....	471,528	450,619	349,453	366,679	324,241
Rhode Island.....	684,952	556,364	622,812	674,148	556,474
South Carolina.....	382,428	297,284	247,998	129,377	297,874
South Dakota.....	900			690	(a)
Texas.....	348,317	132,193	168,061	122,158	190,055
Utah.....	7,980	13,630	4,948	5,240	5,229
Vermont.....	2,447,979	2,571,850	2,934,825	2,093,889	2,451,933
Virginia.....	510,788	452,390	340,900	398,426	321,530
Washington.....	422,508	681,730	459,975	562,352	870,944
Wisconsin.....	724,422	825,625	798,213	1,228,863	1,529,781
Wyoming.....	557		600	90	(a)
Other States.....	440				40,320
Total.....	17,191,479	17,563,139	18,562,806	18,064,708	18,420,080

^a Included in other States.

The following table shows the value of the granite, including small values for trap and other igneous rocks, produced in the United States in 1907 and 1908, by States and Territories and by uses.

Value of granite and other igneous rocks produced in the United States in 1907 and 1908, by States and Territories and uses.

1907.

State or Territory.	Sold in the rough.			Dressed for building.	Dressed for monumental work.	Made into paving blocks.	Curbing.	Flagging.
	Building.	Monumental.	Other.					
Arizona.....	\$700				\$3,000			
Arkansas.....							\$10,973	
California.....	35,322	\$49,216	\$6,018	\$485,778	80,397	\$133,013	107,138	\$2,018
Colorado.....	10,516	18,041		1,490	34,937		2,150	
Connecticut.....	31,928	26,302	838	110,600	112,393	37,666	24,551	2,357
Delaware.....	1,649	45		1,470		12,763	8,004	450
Georgia.....	89,675	31,100	17,050	76,252	1,000	151,181	215,758	5,515
Hawaii.....								
Idaho.....		1,800			5,000		1,750	
Maine.....	318,816	60,263	23,482	1,007,572	166,789	355,462	139,148	18,742
Maryland.....	107,694	13,657	240	55,781	8,928	56,585	23,279	13,406
Massachusetts.....	267,984	337,016	39,327	907,119	66,578	319,037	87,898	4,632
Minnesota.....	8,829	69,936	1,200	52,248	264,333	20,741	22,991	3,768
Missouri.....	342	34,530		8,550	16,675	15,966		
Montana.....	2,000	2,000		51,000	13,000	700	4,700	2,000
New Hampshire.....	49,831	90,352	36	224,269	133,601	74,978	43,944	2,865
New Jersey.....	4,858	105	500	8,075	300	1,456		
New Mexico.....								
New York.....	6,800	4,000		31,567	7,089		1,686	
North Carolina.....	50,062	16,010	50	319,821	41,120	65,379	63,061	4,236
Oklahoma.....	4,750	6,000	500	7,000	700		150	
Oregon.....	3,910	3,100	120	1,250	9,200	8,600	1,510	18
Pennsylvania.....	189,837	8,846	1,256	60,863		21,310	7,086	
Rhode Island.....	8,125	172,396	642	172,041	200,573	85,091	50	
South Carolina.....	9,425	50,515		900		5,253	18,491	25
South Dakota.....				690				
Texas.....	8,739	15,447		14,747	44,460	25	780	
Utah.....	782	1,658	2,000		800			
Vermont.....	29,764	1,122,063	6,334	1,009,353	515,859	5,330	2,721	
Virginia.....	19,350	8,039		13,275	9,787	18,072	6,000	
Washington.....	7,660	34,145	16,750	126,782	1,677	917	25,802	
Wisconsin.....	11,331	62,745	70,753	4,100	361,296	538,783		9,822
Wyoming.....	90							
	1,280,769	2,239,327	187,096	4,752,593	2,099,492	1,928,308	819,621	69,854

State or Territory.	Rubble.	Riprap.	Crushed stone.			Other.	Total.
			Road making.	Railroad ballast.	Concrete.		
Arizona.....	\$200					\$9,800	\$13,700
Arkansas.....	25,271	\$13,160	\$6,000		\$113,592		168,996
California.....	191,996	36,991	79,254	\$5,220	40,713	53,250	1,306,324
Colorado.....							67,134
Connecticut.....	114,178	118,830	7,000		3,510	1,000	591,153
Delaware.....	3,033	12,184	40,298	36,668	41,628		158,192
Georgia.....	26,954	925	25,000	152,297	60,896	5,000	858,603
Hawaii.....					7,599	12,000	19,599
Idaho.....			17,392				25,942
Maine.....	17,025	2,998	1,511	325	19,926	14,361	2,146,420
Maryland.....	77,901	7,266	282,310	41,266	490,378	5,062	1,183,753
Massachusetts.....	118,308	43,900	70,585	1,086	63,297	2,010	2,328,777
Minnesota.....	15,379	16,700	8,373	14,000	48,105		546,603
Missouri.....		8,375	16,424	100	35,443		136,405
Montana.....	20,650	6,000					102,050
New Hampshire.....	5,572	3,949	3,975		14,349		647,721
New Jersey.....	500		11,890	45,880	2,193		75,757
New Mexico.....				167,294			167,294
New York.....	762	4,900	70,750	19,300	35,591	107,277	289,722
North Carolina.....	6,823	2,941	53,939	175,847	106,497	690	906,476
Oklahoma.....	650	3,600			1,200		24,550
Oregon.....	614		80,103	1,744	7,450	6	117,625
Pennsylvania.....	19,801	100	28,117	2,726	9,711	17,026	366,679
Rhode Island.....	448	1,002	25,480		5,550	2,750	674,148
South Carolina.....	13,939	25	25,887	17	4,500	400	129,377
South Dakota.....							690
Texas.....		10,600	16,000		11,360		122,153
Utah.....							5,240
Vermont.....	25	9	2,431				2,693,889
Virginia.....	16,350	28,852	59,937	50,804	167,960		398,426
Washington.....	40,818	281,936	17,930			7,935	562,352
Wisconsin.....	801	14,790	110,072		44,082	288	1,228,863
Wyoming.....							90
	717,998	620,033	1,060,658	714,574	1,335,530	238,855	18,064,708

Value of granite and other igneous rocks produced in the United States in 1907 and 1908, by States and Territories and uses—Continued.

1908.

State or Territory.	Sold in the rough.			Dressed for building.	Dressed for monumental work.	Made into paving blocks.	Curbing.	Flagging.
	Building.	Monumental.	Other.					
Arizona.....	\$5,844	.....	.....	\$100	\$2,500	.....	.....	.....
Arkansas.....	100	.....	.....	.....	40	.....	.....	.....
California.....	58,743	\$44,694	\$80,146	719,833	53,784	\$66,079	123,568	\$945
Colorado.....	6,495	27,353	850	50,000	36,584	.....	.....	.....
Connecticut.....	33,833	23,218	8,051	117,242	58,672	14,951	25,324	\$999
Delaware.....	1,228	.....	.....	947	12,492	6,050	5,579	96
Georgia.....	60,850	27,450	1,300	125,350	9,500	135,510	346,383	36,000
Hawaii.....	.....	.....	.....	.....	.....	.....	.....	.....
Maine.....	293,371	63,799	8,382	1,055,989	111,774	368,715	75,247	7,558
Maryland.....	119,094	6,824	11,600	48,407	3,273	71,316	26,003	3,869
Massachusetts.....	180,063	358,830	50,436	720,796	115,386	261,880	91,430	2,897
Minnesota.....	55,243	33,600	3,050	34,453	346,389	35,750	17,462	1,954
Missouri.....	728	35,455	240	12,500	.....	75,320	.....	.....
New Hampshire.....	92,738	111,253	2,300	355,628	136,772	103,833	35,379	520
New Jersey.....	11,910	8,869	1,050	5,548	8,550	2,674	.....	.....
New York.....	11,441	7,166	1,200	63,276	14,625	98,273	2,400	.....
North Carolina.....	109,919	29,822	.....	144,261	46,834	122,488	99,070	8,258
Oklahoma.....	400	3,300	.....	10,400	3,000	400	2,000	.....
Oregon.....	12,973	940	1,205	5,428	45,000	40,000	225	.....
Pennsylvania.....	164,008	6,172	173	38,531	3,066	23,628	11,259	586
Rhode Island.....	5,272	149,638	820	71,613	262,376	29,651	577	399
South Carolina.....	12,699	52,565	45	12,012	18,697	12,277	11,670	100
Texas.....	13,790	42,026	.....	2,109	51,280	300	12,750	.....
Utah.....	917	2,900	.....	337	1,000	.....	.....	.....
Vermont.....	79,711	1,095,223	3,472	676,067	582,051	1,547	3,836	.....
Virginia.....	26,769	12,664	1,000	11,500	22,303	10,173	6,130	.....
Washington.....	11,151	29,620	.....	37,702	41,294	255	38,035	.....
Wisconsin.....	9,271	45,838	.....	34,123	337,200	939,485	5,350	5,508
Other States.....	545	7,400	875	18,000	.....	.....	2,100	2,000
	1,379,106	2,226,619	176,195	4,372,152	2,324,442	2,420,555	942,722	70,744

State or Territory.	Rubble.	Riprap.	Crushed stone.			Other.	Total.
			Road making.	Railroad ballast.	Concrete.		
Arizona.....	.....	.....	\$100	.....	.....	.....	\$8,544
Arkansas.....	\$29,476	\$22,635	6,500	.....	\$92,771	\$100	152,567
California.....	51,833	164,323	178,073	\$41,470	101,612	346	1,684,504
Colorado.....	.....	.....	.....	.....	.....	.....	121,282
Connecticut.....	210,170	92,931	2,000	.....	3,890	1,623	592,904
Delaware.....	35,571	1,349	69,462	37,065	25,922	.....	195,761
Georgia.....	119,516	36,000	2,500	9,543	50,518	10,412	970,832
Hawaii.....	.....	900	22,035	.....	49,219	9,065	81,219
Maine.....	6,726	12,326	2,557	150	9,818	11,096	2,027,508
Maryland.....	60,359	7,751	206,505	32,923	143,838	20,680	762,442
Massachusetts.....	106,461	8,733	82,501	9,268	33,942	4,840	2,027,463
Minnesota.....	18,490	34,056	10,141	17,000	21,149	690	629,427
Missouri.....	.....	3,771	6,051	.....	5,741	8,162	157,968
New Hampshire.....	7,865	3,482	6,329	.....	10,126	803	867,028
New Jersey.....	150	600	8,200	72,195	6,058	.....	125,804
New York.....	15,119	733	102,040	28,837	21,906	50	367,066
North Carolina.....	4,933	730	114,474	33,612	27,333	22,538	764,272
Oklahoma.....	2,000	.....	.....	39	1,700	.....	23,239
Oregon.....	709	600	158,051	.....	6,718	20	271,869
Pennsylvania.....	6,674	14,696	28,261	1,909	11,595	13,683	324,241
Rhode Island.....	393	421	27,476	.....	3,838	4,000	556,474
South Carolina.....	9,475	73,984	30,300	27,500	35,000	1,550	297,874
Texas.....	25	63,974	1,080	.....	2,721	.....	190,055
Utah.....	.....	75	.....	.....	.....	.....	5,229
Vermont.....	385	.....	8,641	1,000	.....	.....	2,451,933
Virginia.....	18,270	16,336	21,670	71,704	102,936	75	321,530
Washington.....	7,432	672,278	29,616	.....	1,821	1,740	870,944
Wisconsin.....	5,488	.....	76,703	.....	70,815	.....	1,529,781
Other States.....	600	.....	6,400	.....	2,400	.....	40,320
	718,120	1,232,684	1,207,666	384,215	853,387	111,473	18,420,080

The following table shows the quality and value of granite paving blocks produced in the United States in 1907 and 1908, by States:

Number and value of granite paving blocks produced in 1907 and 1908, by States and Territories.

State or Territory.	Paving blocks.			
	1907.		1908.	
	Number.	Value.	Number.	Value.
California.....	2,674,307	\$133,013	1,657,600	\$66,079
Connecticut.....	854,134	37,666	292,485	14,951
Delaware.....	298,073	12,763	121,000	6,050
Georgia.....	5,410,000	151,181	4,735,770	135,510
Maine.....	6,292,753	355,462	8,005,662	368,715
Maryland.....	901,225	56,585	692,538	71,316
Massachusetts.....	5,995,040	319,037	6,134,648	261,880
Minnesota.....	315,000	20,741	532,750	35,750
Missouri.....	336,007	15,966	1,826,742	75,320
Montana.....	10,000	700		
New Hampshire.....	1,782,406	74,978	2,842,206	103,833
New Jersey.....	43,426	1,456	96,956	2,674
New York.....			1,573,777	98,273
North Carolina.....	1,115,859	65,379	3,679,745	122,488
Oklahoma.....			5,900	400
Oregon.....	200,000	8,600	1,000,000	40,000
Pennsylvania.....	442,500	21,310	529,037	23,628
Rhode Island.....	1,643,360	85,091	567,416	29,651
South Carolina.....	239,086	5,253	351,250	12,277
Texas.....	800	25	6,000	300
Vermont.....	171,000	5,330	58,200	1,547
Virginia.....	685,100	18,072	358,664	10,173
Washington.....	13,921	917	3,000	255
Wisconsin.....	9,136,584	538,783	13,399,882	939,485
Total.....	38,560,581	1,928,308	48,471,228	2,420,555
Average value per thousand.....		50.00		49.94

This table shows a considerable gain in the granite paving-block industry—from 38,560,581 blocks, valued at \$1,928,308, in 1907 to 48,471,228 blocks, valued at \$2,420,555, in 1908, a gain of 9,910,647 blocks and of \$492,247 in 1908. The average price per thousand, however, remained practically the same, \$50 for both years. These figures include the blocks made by "motions" operators and sold through large firms.

Granite production of Vermont.—In 1907 a detailed statement of the granite output of Vermont in 1906 and 1907 was prepared for inclusion in the forthcoming report on the granites of Vermont by T. Nelson Dale (Bull. U. S. Geol. Survey No. 404). The figures for 1907 are presented again, together with a like statement for 1908.

The following table shows the production of granite in Vermont in 1907 and 1908 by counties and uses.

Production of granite in Vermont in 1907 and 1908, by counties.

1907.

County.	Number of firms reporting.	Building.			
		Rough.		Dressed.	
		Quantity (cubic feet).	Value.	Quantity (cubic feet).	Value.
Washington and Orange.....	39	35,543	\$25,239	100,081	\$234,583
Windsor.....	4			204,076	774,460
Caledonia and Orleans.....	9	3,300	1,400		
Windham.....	3	4,450	3,125	325	310
Total.....	55	43,293	29,764	304,482	1,009,353
Average value per cu. ft.....			.68		3.31

Production of granite in Vermont in 1907 and 1908, by counties—Continued.

1907—Continued.

County.	Monumental.				Paving.		Other purposes.	Total value.
	Rough.		Dressed.					
	Quantity (cubic feet).	Value.	Quantity (cubic feet).	Value.	Quantity (number of blocks).	Value.	Value.	
Washington and Orange.	1,144,263	\$1,037,993	136,103	\$503,759	5,000	\$150	\$3,645	\$1,805,369
Windsor.	1,847	3,254	3,000	12,000				789,714
Caledonia and Orleans.	143,427	77,816					1,751	80,967
Windham.	3,371	3,000	40	100	166,000	5,180	6,124	17,839
Total.	1,202,908	1,122,063	139,143	515,859	171,000	5,330	11,520	2,693,889
Average value per cu. ft.		.93		3.70				

1908.

County.	Number of firms reporting.	Building.			
		Rough.		Dressed.	
		Quantity (cubic feet).	Value.	Quantity (cubic feet).	Value.
Washington and Orange.	39	15,896	\$9,871	129,230	\$429,967
Windsor.	3	63,537	59,054	52,866	244,850
Caledonia and Orleans.	9	12,753	3,999		
Windham.	3	12,050	6,787	1,225	1,250
Total.	54	104,236	79,711	173,321	676,067
Average value per cu. ft.			.76		3.90

County.	Monumental.				Paving.		Other purposes.	Total value.
	Rough.		Dressed.					
	Quantity (cubic feet).	Value.	Quantity (cubic feet).	Value.	Quantity (cubic feet).	Value.	Value.	
Washington and Orange.	1,064,619	\$1,015,006	164,706	\$576,551	50,400	\$1,262	\$14,443	\$2,047,100
Windsor.	12,000	6,000						309,904
Caledonia and Orleans.	117,560	66,580	1,000	5,000			2,175	77,754
Windham.	11,750	7,637	200	500	7,800	285	716	17,175
Total.	1,235,929	1,095,223	165,906	582,051	58,200	1,547	17,334	2,451,933
Average value per cu. ft.		.89		3.51				

TRAP ROCK.

Besides the trap rock given in the following tables there is a small quantity contained in the figures on granite under those States in which trap rock does not form enough of an industry to warrant the separate publication of the figures. The California output of trap rock includes a considerable quantity of basalt.

The total output of trap rock in 1908 was valued at \$4,282,406; in 1907 it was \$4,594,103, a loss of \$311,697 in 1908. The chief decrease was in crushed stone, which forms the basis of the trap-rock industry and which decreased in value from 6,073,472 short tons, valued at \$4,280,554, in 1907, to 6,058,194 short tons, valued at \$4,002,220, in 1908, a decrease of 15,278 short tons in quantity and of \$278,334 in value, a noticeable decrease in value rather than in quantity. The average price per ton in 1907 was 70 cents and 66 cents in 1908. There was a slight increase in the paving-block output, and a decrease in the trap used for building.

New Jersey had the largest output of trap rock in 1908, followed by California, New York, Pennsylvania, Massachusetts, and Connecticut in the order named. In 1907 California, on account of large demand for crushed stone to repair roads damaged by the earthquake of 1906, took first rank, followed by New Jersey, New York, Pennsylvania, Connecticut, and Massachusetts.

In the different crushed-stone products there was a decrease in the stone for road making and concrete, and a slight increase in stone for railroad ballast. New Jersey showed the largest production of stone for road making in 1908, Pennsylvania for railroad ballast, and California for concrete.

The following table shows the value of the trap-rock output in the United States in 1907 and 1908, by States and uses:

Value of trap produced in the United States in 1907 and 1908, by States and uses.

1907.

State.	Building.	Paving.	Crushed stone.			Other.	Total.
			Road making.	Railroad ballast.	Concrete.		
California.....	\$4,600	\$132,345	\$435,241	\$89,031	\$356,427	\$12,105	\$1,029,749
Connecticut.....	6,052	15,110	215,206	74,660	144,825	4,100	459,953
Massachusetts.....	20,947	.....	225,983	41,774	141,370	2,530	432,604
New Jersey.....	5,369	31,126	557,655	161,367	224,587	15,332	995,436
New York.....	.....	1,500	764,582	7,367	107,090	34,856	915,395
Pennsylvania.....	11,235	2,409	236,485	306,698	190,206	13,933	760,966
	48,203	182,490	2,435,152	680,897	1,164,505	82,856	4,594,103

1908.

California.....	\$722	\$114,996	\$423,798	\$148,154	\$285,380	\$6,089	\$979,139
Connecticut.....	7,594	8,125	199,540	100,000	152,950	5,010	473,219
Massachusetts.....	12,235	.....	348,108	30,695	117,134	500	508,672
New Jersey.....	11,399	58,169	578,570	182,355	235,967	13,054	1,079,514
New York.....	.....	.....	567,908	20,580	107,234	28,231	723,953
Pennsylvania.....	8,593	2,835	195,769	201,091	106,987	2,634	517,909
	40,543	184,125	2,313,693	682,875	1,005,652	55,518	4,282,406

The following table shows the quantity and value of trap paving blocks produced in the United States in 1907 and 1908, by States:

Number and value of trap paving blocks produced in the United States, 1907-8, by States.

State.	Paving blocks.			
	1907.		1908.	
	Number.	Value.	Number.	Value.
California.....	2,494,989	\$132,345	2,765,587	\$114,996
Connecticut.....	474,580	15,110	232,160	8,125
New Jersey.....	1,107,000	31,126	1,665,983	58,169
New York.....	50,000	1,500	.....	.....
Pennsylvania.....	55,900	2,409	63,000	2,835
Total.....	4,182,469	182,490	4,726,730	184,125
Average price per thousand.....	.....	41	.....	38.95

SANDSTONE.

The decrease of \$1,277,587 in the output of sandstone for 1908, when the value of the output was \$7,594,091 as contrasted with a value of \$8,871,678 in 1907, was a much larger decrease than for previous years, although the value of the sandstone production has been on the decrease since 1903, when it was \$11,262,259. The total value for 1908 is the smallest since 1900, when the value was \$6,471,384.

New York, Pennsylvania, and Ohio, with total values, respectively, of \$1,774,843, \$1,368,784, and \$1,244,752 in 1908, were the leading sandstone-producing States. In 1907 the rank and output of these States were, Pennsylvania, \$2,064,913; New York, \$1,978,117; and Ohio, \$1,591,148. Each of these States showed a decrease for 1908, but New York exceeded Pennsylvania in value of output and ranked first. The next States in rank in 1908 were Washington, Arizona, California, Massachusetts, and Wisconsin, with values of production ranging from \$464,587 to \$219,130; in 1907 the corresponding States were California, Minnesota, Colorado, Washington, and Massachusetts, with values ranging from \$437,738 to \$243,323. The greater number of sandstone-producing States showed a decreased value of output; but Washington and Arizona had a marked increase in value of output. The value of sandstone in Washington in 1908 was \$464,587; in 1907 it was \$295,585, an increase for 1908 of \$169,002. This increase was due to a large demand for paving blocks during the improvement and extension of streets in the cities of Seattle and Tacoma. The output of Arizona was valued at \$396,358 in 1908; in 1907 it was \$158,435, an increase of \$237,923 for 1908. This was accounted for by the large quantity of stone, reported as a fine-grained sandstone, quarried and used at Roosevelt in the work on the irrigation dam.

In New York and Pennsylvania a part of the sandstone output is known to the trade as bluestone, the production of which is given in a separate table.

Building stone.—Sandstone for building purposes, including rough and dressed stone, decreased in value from \$3,154,783 in 1907 to \$2,605,381 in 1908, a loss of \$549,402. Pennsylvania, New York, and Ohio produced most of the building stone, each State showing a decreased output for 1908.

Ganister.—Ganister reported from Pennsylvania, Wisconsin, Colorado, Maryland, Ohio, and Illinois was valued at \$175,325 in 1908 as against \$308,520 in 1907, a decrease in 1908 of \$133,195.

Paving.—Notwithstanding a considerable increase in value in the State of Washington the total value of the paving stone decreased \$229,947—from \$884,843 in 1907 to \$654,896 in 1908. Besides Washington, New York and Minnesota were large producers of this product.

Curbing.—Sandstone for curbing was valued at \$1,025,259 in 1908; in 1907 the value was \$1,380,516, a decrease of \$355,257 for 1908. New York, Ohio, and Pennsylvania, the principal producers of this material, showed marked decreases in value. The New York and Pennsylvania output was chiefly bluestone.

Flagging.—New York, Ohio, and Pennsylvania were the chief States producing flagstone, and although the New York output

increased somewhat, the output from the other States showed such decided decreases that the total decrease amounted to \$118,545—from \$1,185,879 in 1907 to \$1,067,334 in 1908.

Rubble.—Rubble increased in value \$113,328—from \$556,440 in 1907 to \$669,768 in 1908.

Riprap.—Sandstone sold for riprap increased in value from \$289,419 in 1907 to \$370,161 in 1908, a gain of \$80,742.

Crushed stone.—There was a decrease in value in crushed stone of \$81,211—from \$987,528 in 1907 to \$906,317 in 1908. The quantity decreased from 1,336,314 short tons in 1907 to 1,199,872 short tons in 1908, a decrease of 136,442 tons. The average price per ton in 1908 was 76 cents; in 1907 it was 74 cents.

The following table shows the value of the sandstone production in the United States from 1904 to 1908, inclusive, by States and Territories:

Value of sandstone production in the United States, 1904-1908, by States and Territories.

State or Territory.	1904.	1905.	1906.	1907.	1908.
Alabama.....	\$12,788	\$28,107	\$40,467	\$48,673	\$34,099
Arizona.....	91,900	65,558	33,149	158,435	396,358
Arkansas.....	63,950	58,161	55,703	94,275	42,463
California.....	735,662	685,668	642,166	437,738	330,214
Colorado.....	281,142	453,029	286,544	299,443	181,051
Connecticut.....	117,696	62,618	(a)	(a)	55,949
Idaho.....	9,320	22,265	11,969	24,001	33,394
Illinois.....	47,377	29,115	19,125	14,996	12,218
Indiana.....	22,681	15,421	30,740	15,425	3,342
Indian Territory.....		2,198	615		
Iowa.....	9,300	9,335	5,600	3,542	2,337
Kansas.....	130,516	79,617	42,809	46,831	67,950
Kentucky.....	93,622	280,579	125,123	98,450	78,732
Louisiana.....	8,315				
Maryland.....	8,998	12,984	9,533	13,859	6,262
Massachusetts.....	320,861	367,461	260,721	243,323	241,462
Michigan.....	74,868	123,123	65,395	53,003	39,103
Minnesota.....	319,209	294,640	285,433	300,204	197,184
Missouri.....	44,455	27,086	20,951	35,289	17,954
Montana.....	64,232	45,116	37,462	39,216	51,564
Nebraska.....	142	120	6,899	11,609	b 15,815
Nevada.....	10,558	1,500			(c)
New Jersey.....	236,426	294,719	215,142	177,667	154,422
New Mexico.....	133,390	101,522	42,574	12,450	d 10,410
New York.....	e 1,755,524	e 1,831,756	e 1,905,892	e 1,978,117	e 1,774,843
North Carolina.....	250	4,483	3,531	4,105	g 12,266
North Dakota.....		1,055	44	3,260	(h)
Ohio.....	1,808,062	1,744,472	1,426,645	1,591,148	1,244,752
Oklahoma.....	2,995	12,914	40,246	43,403	57,124
Oregon.....	6,186	1,229	25,950	3,904	(h)
Pennsylvania.....	e 2,641,510	e 2,487,939	e 2,724,874	e 2,064,913	e 1,368,784
South Dakota.....	338,970	193,408	145,966	143,585	128,554
Tennessee.....	24,868	8,715	14,136	16,523	(i)
Texas.....	209,313	123,281	111,533	108,047	154,948
Utah.....	70,168	43,429	137,529	24,298	25,097
Virginia.....	13,522	2,000	5,100	(j)	(i)
Washington.....	88,185	124,910	169,500	295,585	464,587
West Virginia.....	287,381	171,309	113,369	k 197,926	127,149
Wisconsin.....	158,503	161,741	181,986	236,183	219,130
Wyoming.....	30,986	33,591	24,715	32,252	44,574
	10,273,891	10,006,774	9,169,337	8,871,678	7,594,091

a Included in New York.
b Includes North Dakota and Oregon.
c Included with New Mexico.
d Includes Nevada.
e Includes bluestone.
f Includes Connecticut.

g Includes Tennessee and Virginia.
h Included with Nebraska.
i Included with North Carolina.
j Included in West Virginia.
k Includes a small value for Virginia.

The following table shows the value of the sandstone production of the United States in 1907 and 1908, by States and Territories, and uses:

Value of sandstone production in the United States in 1907 and 1908, by States and Territories and uses.

1907.

State or Territory.	Rough building.	Dressed building.	Ganister.	Paving.	Curbing.	Flagging.	Rubble.
Alabama.....							\$4,095
Arizona.....	\$3,113						60,427
Arkansas.....	3,680	\$800		\$525	\$16,095	\$950	4,325
California.....	14,318	215,453		4,761	3,950	3,600	20,207
Colorado.....	67,020	10,283	\$35,100	25,638	36,987	46,974	32,792
Connecticut.....							
Idaho.....	12,739	5,525					5,737
Illinois.....	6,464	4,120	1,900	375		50	1,639
Indiana.....	5,600	2,000		977	325	73	4,850
Iowa.....	2,765						606
Kansas.....	11,037	600		28	13,112	20,027	1,204
Kentucky.....	37,210	38,170		2,700	1,120	3,000	8,601
Maryland.....	1,769	30	10,200		1,643		100
Massachusetts.....	38,779	52,729		750			10,215
Michigan.....	33,561	10,918				528	7,900
Minnesota.....	9,438	109,270		78,211	19,440	1,968	32,450
Missouri.....	17,292	7,911		50	150	325	2,940
Montana.....	8,550	26,357					2,829
Nebraska.....	1,409						400
New Jersey.....	83,513	30,750	455	840	240	4,800	47,000
New Mexico.....	2,640	1,460			50	100	7,900
New York.....	144,673	401,742		368,697	621,934	361,383	22,454
North Carolina.....		2,650					455
North Dakota.....	3,200			60			
Ohio.....	228,777	373,224	5,500	1,408	336,974	400,072	45,041
Oklahoma.....	8,758	160		16	85	210	5,354
Oregon.....	3,306	48			21		
Pennsylvania.....	181,914	469,233	206,661	145,629	315,307	270,227	116,109
South Dakota.....	17,288	14,745		60,015	335	584	19,458
Tennessee.....	795	13,000			90		2,240
Texas.....	12,680	12,562			450		11,200
Utah.....	5,353	1,002		15,600			583
Virginia.....							
Washington.....	16,680	95,640		175,285			750
West Virginia.....	46,263	59,609		3,085	12,038		42,021
Wisconsin.....	56,566	86,267	48,704	333		1,408	25,156
Wyoming.....	18,850	2,525			170	600	9,402
	1,106,000	2,048,783	308,520	884,843	1,380,516	1,185,879	556,440

Value of sandstone production in the United States in 1907 and 1908, by States and Territories and uses—Continued.

1907—Continued.

State or Territory.	Riprap.	Crushed stone.			Other.	Total.
		Road making.	Railroad ballast.	Concrete.		
Alabama.....	\$44,578					\$48,673
Arizona.....	250			\$41,645	\$53,000	158,435
Arkansas.....	1,350	\$375		66,025	150	94,275
California.....	2,880	108,244	\$163	64,162		437,738
Colorado.....	4,064	900	21,580	18,095	10	299,443
Connecticut.....						(a)
Idaho.....						24,001
Illinois.....	418				30	14,996
Indiana.....	1,600					15,425
Iowa.....	171					3,542
Kansas.....					823	46,831
Kentucky.....	2,022	1,572		1,130	2,925	98,450
Maryland.....				117		13,859
Massachusetts.....		18,653		122,197		243,323
Michigan.....	96					53,003
Minnesota.....	8,364	31,510		1,978	7,575	300,204
Missouri.....	3,600				3,021	35,289
Montana.....	1,246				234	39,216
Nebraska.....	9,750			50		11,609
New Jersey.....		5,550		4,519		177,667
New Mexico.....		300				12,450
New York.....	1,933	35,549		8,225	11,527	b c 1,978,117
North Carolina.....					1,000	4,105
North Dakota.....						3,260
Ohio.....	54,222	12,357	21,200	21,118	22,255	1,591,148
Oklahoma.....	2,700		26,000		120	43,403
Oregon.....	427	102				3,904
Pennsylvania.....	99,518	75,496	88,960	80,986	14,873	c 2,064,913
South Dakota.....	15,360	14,000			1,800	143,585
Tennessee.....		94			304	16,523
Texas.....	15,555		21,850	33,750		108,047
Utah.....					1,700	24,298
Virginia.....						(d)
Washington.....	6,730		500			295,585
West Virginia.....	4,901	240	1,220	27,845	704	e 197,926
Wisconsin.....	7,534	7,455		1,381	1,379	236,183
Wyoming.....	150	60		375	120	32,252
	289,419	312,457	181,473	493,598	123,750	8,871,678

a Included in New York.

b Includes Connecticut.

c Includes bluestone.

d Included in West Virginia.

e Includes small output for Virginia.

Value of sandstone production in the United States in 1907 and 1908, by States and Territories and uses—Continued.

1908.

State or Territory.	Rough building.	Dressed building.	Ganister.	Paving.	Curbing.	Flagging.	Rubble.
Alabama.....							\$3, 450
Arizona.....	\$4, 600	\$6, 500				\$38	378, 500
Arkansas.....	4, 158	850			\$13, 800	625	2, 650
California.....	26, 326	79, 050			4, 925	700	9, 505
Colorado.....	56, 767	17, 534	\$14, 861	\$14, 895	13, 480	32, 510	23, 668
Connecticut.....	5, 901	50, 048					
Idaho.....	13, 605	11, 932					7, 857
Illinois.....	6, 174	3, 265	700	75			538
Indiana.....	500	150			200	192	2, 300
Iowa.....	1, 737						460
Kansas.....	12, 780	500			15, 265	16, 020	300
Kentucky.....	29, 337	46, 699		275	15	300	1, 560
Maryland.....	2, 850	106	2, 419				
Massachusetts.....	59, 229	52, 300					3, 150
Michigan.....	15, 100	18, 813					5, 190
Minnesota.....	5, 795	25, 693		81, 104	24, 129	1, 849	28, 859
Missouri.....	2, 820	7, 556			52	292	1, 772
Montana.....	40, 755	3, 674					3, 830
Nebraska.....	7, 016	3, 419				100	525
Nevada.....							
New Jersey.....	72, 693	28, 905			250	2, 900	22, 998
New Mexico.....	900	1, 230			50	580	7, 122
New York.....	217, 968	270, 853		231, 789	420, 404	456, 091	2, 230
North Carolina.....	4, 000	6, 600					1, 250
North Dakota.....							
Ohio.....	157, 074	282, 370	1, 575	7, 000	330, 045	326, 593	19, 819
Oklahoma.....	8, 149	960			50	100	7, 033
Oregon.....							
Pennsylvania.....	136, 084	362, 388	111, 870	16, 310	199, 800	226, 940	66, 470
South Dakota.....	46, 093	9, 875		48, 700	250	360	7, 893
Tennessee.....							
Texas.....	11, 490	33, 300			1, 200		6, 290
Utah.....	13, 117	100		5, 775	75		5, 705
Virginia.....							
Washington.....	1, 375	99, 656		248, 973			1, 062
West Virginia.....	37, 941	32, 393			1, 269	1, 144	27, 123
Wisconsin.....	82, 705	27, 460	43, 900				14, 458
Wyoming.....	23, 563	12, 600					6, 201
	1, 108, 602	1, 496, 779	175, 325	654, 896	1, 025, 259	1, 067, 334	669, 768

Value of sandstone production in the United States in 1907 and 1908, by States and Territories and uses—Continued.

1908—Continued.

State or Territory.	Riprap.	Crushed stone.			Other.	Total.
		Road making.	Railroad ballast.	Concrete.		
Alabama.....	\$20,599			\$10,000	\$50	\$34,099
Arizona.....			\$2,500	4,220		396,358
Arkansas.....	3,725	\$250		16,400	5	42,463
California.....	3,050	92,306	8,427	103,955	1,970	330,214
Colorado.....	40			6,210	1,086	181,051
Connecticut.....						55,949
Idaho.....						33,394
Illinois.....	122	1,200			144	12,218
Indiana.....						3,342
Iowa.....	65			40	35	2,337
Kansas.....		18,750		3,985	350	67,950
Kentucky.....	100			446		78,732
Maryland.....	363			524		6,262
Massachusetts.....	1,025	25,804		97,254	2,700	241,462
Michigan.....						39,103
Minnesota.....	4,755	8,204	7,404	8,392	1,000	197,184
Missouri.....	4,900				562	17,954
Montana.....	2,931				374	51,564
Nebraska.....	4,755					^a 15,815
Nevada.....						^(b)
New Jersey.....		4,260		22,316	100	154,422
New Mexico.....	75	253			200	^c 10,410
New York.....	19,335	34,828	4,986	42,257	74,102	^d 1,774,843
North Carolina.....					416	^e 12,206
North Dakota.....						^(f)
Ohio.....	32,716	40,555	4,970	38,800	3,235	1,244,752
Oklahoma.....	1,045		5,200	34,582	5	57,124
Oregon.....						^(f)
Pennsylvania.....	33,273	53,279	75,778	66,037	20,555	^d 1,368,784
South Dakota.....	4,883	6,000		2,500	2,000	128,554
Tennessee.....						^(g)
Texas.....	58,230	27,000	7,038	850	9,556	154,948
Utah.....			125		200	25,097
Virginia.....						^(g)
Washington.....	113,062			459		464,587
West Virginia.....	10,591	3,040	2,710	10,213	725	127,149
Wisconsin.....	50,521				86	219,130
Wyoming.....				2,010	200	44,574
	370,161	315,729	119,138	471,450	119,650	7,594,091

^a Includes North Dakota and Oregon.

^b Included with New Mexico.

^c Includes Nevada.

^d Includes bluestone.

^e Includes Tennessee and Virginia.

^f Included with Nebraska.

^g Included with North Carolina.

BLUESTONE.

Bluestone as quarried in New York and northeastern Pennsylvania forms an important industry. Because of the peculiar method of quarrying bluestone, it has been found that the best figures of production are obtained from the dealers who buy the stone from the numerous small quarrymen, mostly farmers, who get out this stone at unoccupied intervals. The dealers usually quarry for themselves also, and are better able to give the entire quantity of stone bought and sold than are the small producers. The principal channels to market for this stone are the Erie Railroad, the New York, Ontario and Western Railway, and Hudson River, although some is shipped on other railroads.

The output for 1908 decreased in value. Producers and dealers generally reported lack of demand, with consequent lack of produc-

tion, on account of financial conditions. The total value for 1908 was \$1,762,860; for 1907 it was \$2,117,916, a decrease in 1908 of \$355,056.

Building stone increased in value \$16,404, from \$585,341 in 1907 to \$601,745 in 1908. Stone for all other purposes decreased in value. As stated previously, bluestone in 1908 represented 59.18 per cent of the total output of flagging and 19.47 per cent of the total output of curbing for the entire United States. Both New York and Pennsylvania decreased in total value of output, although New York increased in value of building and crushed stone, while Pennsylvania decreased in value of all products.

The following table shows the value and uses of the bluestone produced in New York and Pennsylvania in 1907 and 1908:

Value and uses of bluestone produced in New York and Pennsylvania in 1907 and 1908.

1907.

State.	Building purposes.	Flagging.	Curbing.	Crushed stone.	Other purposes.	Total value.
New York.....	\$374,369	\$468,045	\$431,663	\$2,675	\$79,803	\$1,356,555
Pennsylvania.....	210,972	253,523	128,740	54,552	113,574	761,361
	585,341	721,568	560,403	57,227	193,377	2,117,916

1908.

New York.....	\$415,652	\$413,920	\$313,319	\$9,219	\$68,852	\$1,220,962
Pennsylvania.....	186,093	217,690	116,197	6,985	14,933	541,898
	601,745	631,610	429,516	16,204	83,785	1,762,860

MARBLE.

The figures for marble here presented include, for some of the States, the value of quantities of serpentine (verde antique marble) and "onyx" marble. The serpentine (verde antique marble) included is simply that form of serpentine which, from its use as ornamental stone for interior decorative work in buildings, answers the purpose of marble. The Georgia and Pennsylvania figures in this report include this stone. Onyx marble, or cave onyx, is included in the production of Kentucky and New Mexico in this report.

In 1908 the commercial output of marble was from Vermont, Georgia, Tennessee, New York, Massachusetts, Alabama, Pennsylvania, Maryland, California, Colorado, Alaska, North Carolina, Kentucky, New Mexico, Utah, Missouri, and Idaho, named in order of value of output. In 1907 the producing States, according to rank, were Vermont, New York, Georgia, Tennessee, Massachusetts, California, Pennsylvania, Maryland, Alabama, Alaska, Oklahoma, Kentucky, New Mexico, Utah, Washington, and Idaho, with a quantity for Missouri included with limestone. In 1908 Colorado and North Carolina reentered as productive States, and Oklahoma and Washington dropped out. Vermont, Tennessee, and Georgia increased in value of output; the other States decreased.

The marble output in the United States was valued at \$7,733,920 in 1908; in 1907 the output was valued at \$7,837,685, a loss of \$103,765 for 1908.

The chief uses of marble are for building stone, exterior and interior work, and for monumental purposes.

Building stone.—The value of building marble, rough and dressed, as sold by the producer, was \$3,076,926 in 1908, an increase of \$217,689 over the value for 1907, which was \$2,859,237. The total for 1908 includes \$747,488 for rough building and \$2,329,438 for dressed building; in 1907, the rough building marble sold was valued at \$954,092 and the dressed building stone at \$1,905,145, a decrease in 1908 of \$206,604 for rough stock and an increase of \$424,293 for dressed marble.

7.13 Vermont produces most of the building marble, the value of whose output in 1908 was \$1,558,954, or 50.67 per cent of the total output of building marble. This was chiefly dressed stone. The percentage for Vermont in 1907 was 42.12 and the value was \$1,204,212.

New York, whose marble output is chiefly dressed building stone, produced 17.78 per cent of the total building stone, at a value of \$546,945. The Georgia output, which is principally rough stone, was valued at \$468,981 and represented 15.24 per cent of the total.

Monumental stone.—Monumental marble was valued at \$2,397,780 in 1908 and at \$2,640,130 in 1907, a decrease of \$242,350 for 1908. In 1908 the value of rough stock was \$554,354 and of dressed monumental stone \$1,843,426; the corresponding figures for 1907 were \$596,130 for rough monumental stock and \$2,044,000 for dressed monumental stone, a decrease in 1908 of \$41,776 in value of rough stock and of \$200,574 for dressed stone. Vermont, with a value of \$1,848,444, produced 77.09 per cent of the total monumental marble; Georgia produced 10.82 per cent; and New York, with 4.57 per cent, ranked third. The Vermont stone was chiefly dressed stone, the Georgia material was rough stone, and the New York value was practically evenly divided between rough stone and dressed stone.

Interior work.—Vermont, Tennessee, and California produced most of the marble used for interior decoration, the total value for 1908 being \$1,943,750, as against \$1,900,952 for 1907, a gain in 1908 of \$42,798. The Vermont output represents 60.93 per cent, the Tennessee output 28.37 per cent, and the California output 2.61 per cent of the total marble produced for interior work.

Other marble.—Rough stone for other purposes includes waste marble sold to lime burners, to carbonic acid factories, to pulp mills, to iron furnaces for flux, and for road making, etc., and dressed stone includes stone for mosaics, electrical work, etc.

The Alabama output was from Gantts Quarry and from the vicinity of Talladega, in Talladega County.

The Alaska output was from Marble Island, near Shakan, and from Calder, Prince of Wales Island. It is reported that eastern capital is to begin development in the Alaska marble field in the near future.

The Arizona Marble Company reports the opening and development of marble quarries near Bowie (Teveston post-office), Cochise County, Ariz. A description of the marble deposits in Cochise County is given in Bulletin No. 380 of the United States Geological Survey.^a

^a Paige, Sidney, Contributions to economic geology, 1908, pt. 1: Bull. U. S. Geol. Survey No. 380, 1909 pp. 299-311.

The decrease in value of California marble in 1908 was \$122,877. The value of the output was \$60,408 in 1908 and \$183,285 in 1907. The producing localities in 1908 were Vallecito, Calaveras County, and Columbia, Tuolumne County. Development and assessment work was reported on quarry property at Inyo, Inyo County; Topaz, Mono County; and near Victorville and Redlands, San Bernardino County.

For the first time in several years Colorado reported a marble output. It was from Marble, Gunnison County, where after several years of development work the Colorado-Yule Marble Company and the Crystal River Marble Company have begun to put their material on the market. Development work was also reported in 1908 on a marble or onyx deposit near Salida, Chaffee County.

In 1907 New York exceeded Georgia, but in 1908 Georgia took second place and New York fourth. The output for Georgia in 1908 was valued at \$916,281, and represented about 800,000 cubic feet of stone; in 1907 the total value was \$864,757, and the quantity reported was about 807,000 cubic feet, an increase in value for 1908 of \$51,524 and a decrease in quantity of about 7,000 cubic feet. Most of the Georgia marble is sold in the rough to the manufacturers.

The small output of marble reported from near Basin, Cassia County, Idaho, was used to supply local demand for cemetery stone.

The onyx marble reported from Kentucky was from near Cave City, Barren County.

The Maryland output was from Cockeysville and Loch Raven, Baltimore County.

The Massachusetts output was from Ashley Falls, Lee, and North Adams, Berkshire County, and from Westfield, Hampden County. Quarrying was also reported as carried on at South Egremont, Berkshire County, although no material was put on the market.

The marble reported from Missouri was quarried at Phoenix, Greene County, and quarry development was reported on marble property at Cassville, Barry County.

Sample blocks of marble were reported from Nevada as quarried at Luning, Esmeralda County, and at Las Vegas, Lincoln County, although none was marketed.

The "onyx" marble reported from New Mexico in 1908 was from Alamogordo, Otero County.

New York decreased \$205,093 in value of output in 1908, or from \$911,951 in 1907 to \$706,858 in 1908. About 280,000 cubic feet were sold for building and monumental work, and besides this about 30,000 long tons were sold for flux, crushed stone, and other uses.

The marble reported from North Carolina in 1908 was quarried at Murphy, Cherokee County.

There is included in the Pennsylvania output a quantity of serpentine (verde antique marble), used chiefly for interior decorations. This serpentine is quarried near Easton, Northampton County. The other marble is quarried at West Grove, Chester County, in Derry Township, Dauphin County, and at King of Prussia, Montgomery County. There was a decrease of \$15,792 in the output for 1908, which fell from \$118,539 in 1907 to \$102,747 in 1908.

A marble deposit near Westminster, Oconee County, S. C., was reported to this office as opened in 1908 with a view to placing the product on the market.

Tennessee, ranking third in 1908 as against fourth in 1907, increased in value of marble output from \$688,148 in 1907 to \$790,233 in 1908, a gain of \$102,085. The 1907 value was represented by 400,393 cubic feet and the 1908 value by 476,795 cubic feet, a gain for 1908 of 76,402 cubic feet.

A marble deposit near Alpine, Brewster County, Tex., has been reported as opened during 1908, but no marble was placed on the market.

The small quantity of marble quarried in Utah in 1907 was from Beaver, Beaver County, and was for monumental work.

Vermont in 1907 produced 58.65 per cent of the marble output of the United States. In 1908, with a small increase in the total output for the State, Vermont produced 60.51 per cent of the total for the United States. The Vermont production increased \$83,236 in value, from \$4,596,724 in 1907 to \$4,679,960 in 1908. The quantity reported for 1907 was about 1,450,000 cubic feet; in 1908 the quantity reported was about 1,250,000 cubic feet, a decrease in production of about 250,000 cubic feet, though with an increase in value. The Vermont marble is used for building, monumental, and interior decorative work, ornaments, mosaic work, electrical work, etc., and is practically all sold as dressed stone.

ONYX MARBLE.

In order to comply with repeated requests concerning onyx marble, the following brief description is given. A more detailed statement may be found in a report on onyx marbles by George P. Merrill, curator of geology, United States National Museum.^a

The name onyx, as applied to marble, is not to be taken as meaning precious onyx, a variety of quartz closely allied to agate. The "onyx marble" included in this report differs from ordinary marble chiefly in manner of deposition in the earth, both being essentially carbonate of lime. The ordinary marble is a crystalline form of common limestone, formed by metamorphism; onyx marble is a name given to two varieties of calcite or travertine formed by deposition from aqueous solutions of calcium carbonate, which from the manner of deposition contains bands of wavy lines similar to the banded structure of the precious onyx. One form of onyx marble is found in the stalactite and stalagmite formations so familiar in caves and is a deposit from the cold water charged with calcium carbonate, which seeps through the cracks in the roof or floor of a limestone cavern. This is usually called cave onyx. The other form of onyx marble is the one that is formed from hot springs by the precipitation of calcareous matter from an oversaturated solution of calcium carbonate. This is generally called onyx marble.

The physical differences between these two varieties are found in the fact that the onyx marbles are translucent and the cave onyxes are generally opaque. The onyx marble is generally more brilliantly colored and more beautiful than the cave onyxes; the onyx marble is especially noted for its uniformity of structure and homogeneous texture, but the cave onyxes often show a fibrous structure and are

^a The onyx marbles; their origin, composition, and uses, both ancient and modern: Rept. U. S. Natl. Mus. for 1893, pp. 539-585, pls. 1-18.

made up of concretionary layers which scale off. The coloring in each is due to the presence or absence of impurities in the water, such as oxides of iron, aluminum, manganese, etc. The cave onyxes generally contain fewer impurities than the onyx marbles. It is of interest to note in connection with onyx marbles and cave onyxes that the best of the onyx is found in regions either formerly subjected to volcanic action or closely connected with hot springs or deposits associated with hot springs, like those in California, Arizona, Utah, New Mexico, and Lower California.

The chief beauty, and therefore value, of the onyx marble consists in the nearly perfect uniformity of texture and structure, the translucency which gives the appearance of depth, and the delicacy of the coloring. The various colors of the stone show translucent whites, delicate greens shading to very dark greens, delicate pinks, light browns and chocolates, amber, ocher, yellow, brilliant red, orange, lemon, and often veining of other colors. The coloring is in some cases not uniform throughout and generally has a wavy effect, with sometimes alternating bands of light and dark shades. The white onyx marbles are sometimes called and sold under the name of alabaster. The true alabaster is, however, a variety of gypsum and is softer and less durable than the onyx marble.

The value of a deposit of onyx depends on the size and thickness of the stone that can be obtained from it, as well as on the coloring and texture of the stone. It is generally cut in slabs, but is also sold in rough blocks suitable for carving or being made into columns.

This stone takes a high polish and is easily worked. The price commanded in the market is determined by the beauty of the stone, the size of the block or slab, the amount of work necessary to put it in shape, the difficulty of quarrying or obtaining it, and the difficulty of transportation. The cave onyxes seldom yield blocks or slabs sufficiently large and uniform in texture to make them very valuable, except for small ornaments and interior work where large pieces are not required.

The best known quarries of onyx in America are in Mexico; from them large and beautiful slabs are obtained, and the small pieces when carved and polished are made into ornamental pieces and sold in various forms as souvenirs. The principal deposits are near Veracruz and the City of Mexico, at Tecali, near the city of Puebla, and in the district of Tehuacan. Also on Mexican territory are the onyx deposits of Lower California, near the Gulf coast, which are probably the most important in Mexico. Egypt, Algiers, Persia, Italy, France, Spain, Germany, and the caves of Gibraltar also have more or less valuable deposits of this stone, the Egyptian and Algerian product being generally known as alabaster.

The onyx marble of the United States, except perhaps that of California and Arizona, is not considered as good as the Mexican article in color or in fineness of texture and is more expensive for the reason that labor is cheaper in Mexico and that in Mexico the quarries have been opened long enough to have transportation facilities. In most cases in the United States the onyx is found in territory which is but little developed and in which both labor and transportation are high, and the deposits are owned by firms and individuals who have not the means necessary to develop them. The principal

deposits in the United States are in Arizona, Arkansas, California, Colorado, Idaho, Connecticut, Missouri, Montana, New Mexico, South Dakota, Utah, Virginia, Tennessee, Texas, and Washington; cave onyxes, however, are found in nearly all of the large limestone-producing States.

California and Arizona were the first States to report any production of onyx, but at the present time no material, except for samples, is being taken out in these States.

In Arizona the best known deposits are at Bigbug, Mayer, and Cave Creek in Yavapai County. The colors of the Arizona quarries vary considerably, and the stone here is exceptionally beautiful.

In California the most important deposit is found at Musick, San Luis Obispo County, where the stone is a creamy white, with bands or clouds of red, chocolate brown, smoky black, etc. It is also reported as occurring at Suisun, Solano County; Sulphur Creek, Colusa County; in San Bernardino, Siskiyou, Los Angeles, Kern, Placer, Tehama, San Diego, Sonoma, Tulare, Lake, and Mono counties, although these deposits are but little known and not at all developed.

In New Mexico deposits have been worked commercially near Alamogordo, Otero County, and have been reported near Silver City, Grant County, and at White, Lincoln County.

The Kentucky deposits of cave onyx at Cave City, in Barron County, have been worked for commercial purposes.

Virginia has deposits of cave onyx, as well as onyx marbles, although little has been put on the market.

The following table shows the value of the marble production in 1907 and 1908 by States and Territories and uses:

Value of the marble product, 1907 and 1908, by States and Territories and uses.

1907.

State or Territory.	Rough.			Dressed.					Total.
	Build- ing.	Monu- mental.	Other pur- poses.	Build- ing.	Monu- mental.	Orna- men- tal.	Interior decora- tion.	Other pur- poses.	
Alabama.....	\$67,780	.....	\$1,226	\$4,537	\$8,900	.....	\$2,500	\$532	\$85,475
Alaska.....	35,250	.....	.....	.....	2,660	.....	200	.....	38,116
California.....	20,054	\$3,100	1,500	429	4,500	.....	153,702	.....	183,285
Georgia.....	385,704	334,600	76,700	47,753	18,000	.....	2,000	.....	864,757
Idaho.....	.....	.....	.....	.....	.....	.....	.....	.....	(a)
Kentucky.....	.....	.....	.....	.....	.....	.....	12,500	.....	12,500
Maryland.....	25,653	6,400	2,040	41,750	10,180	.....	10,000	2,895	98,918
Massachusetts.....	242	.....	2,493	61,800	35,050	\$811	97,542	14,500	212,438
Missouri.....	.....	.....	.....	.....	.....	.....	.....	.....	(b)
New Mexico.....	2,000	1,050	500	1,500	1,000	200	625	600	c 7,535
New York.....	147,119	68,565	19,624	590,515	66,286	.....	10,000	9,842	911,951
Oklahoma.....	15,000	1,325	.....	.....	.....	.....	480	.....	16,805
Pennsylvania.....	17,667	1,250	3,800	53,587	17,235	.....	.....	25,000	118,539
Tennessee.....	111,185	10,500	39,500	25,500	3,000	.....	427,463	71,000	688,148
Utah.....	.....	.....	.....	.....	2,500	.....	.....	.....	2,500
Vermont.....	126,438	169,340	226	1,077,774	1,874,689	24,039	1,183,940	140,278	4,596,724
Washington.....	.....	.....	.....	.....	.....	.....	.....	.....	(a)
	954,092	596,130	147,669	1,905,145	2,044,000	25,050	1,900,952	264,647	7,837,685

a Included in New Mexico.

b Included in limestone.

c Includes Idaho and Washington.

Value of the marble product, 1907 and 1908, by States and Territories and uses—Cont'd.

1908.

Graph 5 highest totals.

State or Territory.	Rough.			Dressed.					Total.
	Build- ing.	Monu- mental.	Other pur- poses.	Build- ing.	Monu- mental.	Orna- men- tal.	Interior decora- tion.	Other pur- poses.	
Alabama.....	\$898		\$2,500	\$113	\$4,650		\$77,000	\$33,419	^a \$118,580
Alaska.....	38,500	\$1,688		45,000	7,200	\$500	10,600	400	^b 103,888
California.....	8,100	1,250					50,782	276	60,408
Colorado.....									(c)
Georgia.....	368,981	342,000	78,800	100,000	17,500			9,000	916,281
Kentucky.....									(d)
Maryland.....	1,050	8,425	4,652	65,190					^e 79,317
Massachusetts.....	1,888			110,856	19,786		34,660	8,458	175,648
Missouri.....									(d)
New Mexico.....									(c)
New York.....	74,538	56,200	30,421	472,407	53,292		20,000		706,858
North Carolina.....									(f)
Pennsylvania.....	13,444			54,803	9,000	7,000	15,000	3,500	102,747
Tennessee.....	83,764	10,755	37,575	78,440	17,590		551,449	10,660	790,233
Utah.....									(e)
Vermont.....	156,325	134,036	190	1,402,629	1,714,408	18,006	1,184,259	70,107	4,679,960
	747,488	554,354	154,138	2,329,438	1,843,426	25,506	1,943,750	135,820	7,733,920

^a Includes Kentucky and Missouri.^b Includes Colorado, New Mexico, and Utah.^c Included in Alaska.^d Included in Alabama.^e Includes North Carolina.^f Included in Maryland.

The following table shows the value of the marble produced in the United States from 1904 to 1908, inclusive, by States and Territories:

Value of marble produced in the United States, 1904-1908, by States and Territories.

State or Territory.	1904.	1905.	1906.	1907.	1908.
Alabama.....	(a)		\$85,000	\$85,475	^b \$118,580
Alaska.....	(a)	\$710	(c)	38,110	^d 103,888
Arizona.....	(a)				
Arkansas.....	(a)	1,000	16,900		
California.....	\$87,659	95,540	103,048	183,285	60,408
Colorado.....					(e)
Connecticut.....	(a)				
Georgia.....	690,714	774,550	919,356	864,757	916,281
Idaho.....				(f)	
Kentucky.....				12,500	(g)
Maryland.....	73,814	138,404	176,495	98,918	^h 79,317
Massachusetts.....	183,388	166,360	271,934	212,438	175,648
Missouri.....	(a)		(i)	(i)	(g)
Nevada.....			5,000		
New Mexico.....	4,250	2,200	500	^j 7,535	(e)
New York.....	565,987	795,721	557,954	911,951	706,858
North Carolina.....	2,741				(k)
Oklahoma.....				16,805	
Pennsylvania.....	90,390	97,887	171,632	118,539	102,747
Tennessee.....	505,259	582,229	635,821	688,148	790,233
Utah.....	3,950	1,150	1,400	2,500	(e)
Vermont.....	4,004,669	4,410,820	4,576,913	4,596,724	4,679,960
Washington.....	23,098	60,000	59,985	(f)	
Wyoming.....	2,000	2,500	1,000		
Other States.....	459,916				
	6,297,835	7,129,071	7,582,938	7,837,685	7,733,920

^a Included in other States.^b Includes Kentucky and Missouri.^c Included in Washington.^d Includes Colorado, New Mexico, and Utah.^e Included in Alaska.^f Included in New Mexico.^g Included in Alabama.^h Includes North Carolina.ⁱ Included in limestone.^j Includes Idaho and Washington.^k Included with Maryland.^l Includes Alabama, Alaska, Arizona, Arkansas, Connecticut, and Missouri.

The following table shows the various uses to which the marble quarried in 1903, 1904, 1905, 1906, 1907, and 1908 was put:

Distribution and value of output of marble, 1903-1908, among various uses.

Use.	1903.	1904.	1905.	1906.	1907.	1908.
Sold by producers in rough state....	\$2,454,263	\$2,599,052	\$2,987,542	\$1,795,169	\$1,697,891	\$1,455,980
Dressed for building.....	1,111,072	988,671	1,168,450	1,559,925	1,905,145	2,329,438
Ornamental purposes.....	51,359	21,554	13,643	44,523	25,050	25,506
Dressed for monumental work.....	1,062,339	1,211,389	1,170,279	2,214,872	2,044,000	1,843,426
Interior decoration in buildings.....	663,553	1,257,963	1,682,651	1,722,445	1,900,952	1,943,750
Other uses.....	20,100	219,206	106,506	246,004	264,647	135,820
	5,362,686	6,297,835	7,129,071	7,582,938	7,837,685	7,733,920

LIMESTONE.

This report does not include the value of stone burned into lime and put on the market and sold as lime, except in cases where the stone is quarried by manufacturing plants and ultimately burned into lime and used in the manufacturing process. This applies especially to stone quarried by sugar factories and alkali works, which make no accounting for the lime, but measure the stone quarried. A large quantity of limestone used in the manufacture of Portland cement is also excluded from these figures; the value of this stone enters into and is included in the value of the cement.

The figures for Missouri include a quantity of material known as "chats." This is the product obtained in the concentration of zinc ores. The impurity in these ores is chiefly chert, and these cherty tailings, generally known as chats, have been found to answer exceedingly well as a road material, for railroad ballast, and for concrete. Although this material has a very small value at the mine, when shipped it takes the place of stone valued at 50 cents a cubic yard, and it has been valued accordingly. The chats may be purchased at the mine for \$1 per car, the purchaser doing the loading and paying the transportation. The railroads take large quantities at this rate for use as ballast, and it is also used for making roads and in all kinds of concrete work. The collection of statistics of this material for 1908 is the first that has been made. The Alabama figures include a considerable quantity of chert used for road-making purposes.

The commercial output of lime is given separately in a succeeding chapter of this report.

The total limestone output decreased \$4,055,629 in value, from \$31,737,631 in 1907 to \$27,682,002 in 1908. In 1907 there was an increase of \$4,410,489 over the value for 1906, which was \$27,327,142. The output for 1908 was therefore but slightly in excess of the output for 1906. The large increase in 1907 was chiefly in crushed stone, which gained in value \$2,602,188, and in blast-furnace flux, which gained \$1,531,797. In 1908, the large decrease was chiefly in blast-furnace flux, which decreased in value \$3,239,248, and in crushed stone, which decreased \$767,246. Other decreases in value were rough building stone, paving stone, curbstone, flagstone, and stone for other purposes. Dressed building stone, rubble, riprap, stone

for sugar factories, and crushed stone for road making increased in value.

The chief States producing limestone in 1908 were, in order of rank of value, Pennsylvania, Indiana, Ohio, Illinois, New York, and Missouri, each reporting over \$2,000,000. In 1907 the rank of production for these States was Pennsylvania, Illinois, Indiana, Ohio, New York, and Missouri; Indiana and Ohio passed Illinois in 1908 and took second and third places, respectively, while Illinois fell to fourth place. The combined output of these 6 States in 1908 amounted to \$19,057,536, or 68.84 per cent of the total; in 1907 these States produced \$21,839,006, or 68.81 per cent of the total. Of these 6 leading States Indiana showed a small increase of output for 1908, but in spite of this the decrease of \$2,781,470 for the 6 combined States was over one-half of the total decrease in the limestone output. States reporting a value of over \$500,000 in 1908 were Wisconsin, Kentucky, Michigan, Minnesota, West Virginia, Tennessee, and Iowa; in 1907 these States ranked as follows: Wisconsin, Kentucky, West Virginia, Kansas, Michigan, Minnesota, Alabama, Iowa, and Colorado. In 1908 Kansas, Alabama, and Colorado dropped from this class of States, and Tennessee, with an increased output of crushed stone for road making, entered it.

In 1907 31 States and Territories increased and 10 States and Territories decreased in value of limestone output; and in 1908 16 States increased and 26 States decreased in value of limestone output.

Building stone.—Limestone for building purposes, including rough and dressed stone sold by producers, decreased in value \$13,704, from \$4,580,226 in 1907 to \$4,566,522 in 1908. In 1907 the decrease from the 1906 value, \$5,098,631, was \$518,405. Rough building stone sold by quarrymen in 1908 was valued at \$2,305,367, and dressed stone at \$2,261,155; the figures for 1907 were rough stone, \$2,593,875, and dressed stone, \$1,986,351—a decrease in 1908 of \$288,508 for rough building stone and an increase of \$274,804 for dressed building stone.

Indiana, with a total output of building stone valued at \$2,487,039, produced 54.46 per cent of the total building limestone in 1908; in 1907 the output was \$2,378,008, or 51.92 per cent of the total, an increase in 1908 of \$109,031. This building stone is quarried principally in Lawrence and Monroe counties, and is well known as "Bedford limestone" from the town of Bedford, Lawrence County, which with Bloomington, Monroe County, forms the shipping center for this stone. This "Bedford" stone is chiefly used for building stone, although some is sold for flagstone, curbstone, monumental stone, crushed stone, furnace flux, and some—not included in this report—is used for lime and for cement. Exclusive of 93,085 tons of stone, valued at \$42,150, used for riprap, crushed stone, furnace flux, etc., the total quantity and value of limestone produced in Lawrence County in 1908 was 5,199,996 cubic feet, valued at \$1,498,822; Monroe County produced 8,620 tons, valued at \$1,719, for flux, etc., and 3,147,097 cubic feet, valued at \$880,218, of other stone. The total for the two counties, exclusive of the flux, etc., was therefore 8,347,093 cubic feet, valued at \$2,379,040. In 1907, the total output of these two counties was 7,849,027 cubic feet, valued at \$2,321,892, a gain in 1908 of 498,066 cubic feet, and of \$57,148.

In 1907 the quantity from these two counties, not included in the above figures, was 256,960 tons, valued at \$110,525, a decrease in 1908 in this class of material of 155,255 tons in quantity and of \$66,656 in value. The low price per ton, as represented by the production of Monroe County, was due to the low price obtained for waste stone sold for flux. In 1908 the total quantity for the two counties included 5,373,992 cubic feet of stone sold rough, of which 3,442,440 cubic feet, valued at \$767,763, were for Lawrence County and 1,931,552 cubic feet, valued at \$298,993, for Monroe County. In 1907 there were 4,930,055 cubic feet of rough stone sold. This gives an increase for 1908 of 443,937 cubic feet for rough stock. In 1908 the two counties reported 2,983,101 cubic feet of dressed stone, of which 1,757,556 cubic feet, valued at \$731,059, were from Lawrence County, and 1,225,545 cubic feet, valued at \$581,225, from Monroe County. In 1907 the quantity of dressed stone sold was 2,918,972 cubic feet, an increase of 64,129 cubic feet for 1908. In 1907 the total value for Lawrence County was \$1,413,280, and for Monroe County \$908,612—a gain in 1908 of \$85,542 for Lawrence County and a decrease of \$28,394 for Monroe County. Most of this stone was for building purposes, but there is included a small quantity for rubble, curbstone, and flagstone. The average price per cubic foot in 1907 was 30 cents; in 1908, 29 cents.

Missouri ranked next to Indiana in output of building limestone, the value of the output being \$603,597 as against \$538,114 for 1907, a gain in 1908 of \$65,483. This stone is principally from Carthage, Jasper County.

Paving.—Limestone for paving decreased in value \$268,663, from \$545,300 in 1907 to \$276,637 in 1908. Pennsylvania and Illinois usually produce most of the limestone used for paving, but in 1908 there was comparatively little produced in Illinois, and Pennsylvania decreased in value of output.

Curbstone.—There was a decrease of \$141,274 in the curbstone output in 1908, or from \$378,853 in 1907 to \$237,579 in 1908. Indiana furnishes most of this material.

Flagging.—A decrease of \$4,995 marked the limestone output for flagging in 1908, or from a value of \$84,076 in 1907 to \$79,081 in 1908. Most of this stone was from Wisconsin.

Rubble.—Rubble increased in value \$335,315, from \$1,067,445 in 1907 to \$1,402,760 in 1908. Ohio, Illinois, Missouri, and Minnesota reported the largest productions.

Riprap.—Riprap increased in value \$231,794, from \$620,328 in 1907 to \$852,122 in 1908. Illinois, Missouri, Wisconsin, and Minnesota produced most of this stone in 1908.

Crushed stone.—Limestone for crushed stone shows a higher value than any other limestone product; it is used for road making, railroad ballast, concrete, paving, etc. In 1908 this output was 22,913,494 short tons, valued at \$12,908,207, a decrease of 619,403 short tons in quantity and of \$767,246 in value for 1908 as compared with 1907, when the figures were 23,532,897 short tons, valued at \$13,675,453. In 1907 the increase over 1906, when the output was reported as 20,286,589 short tons, valued at \$11,073,265, was 3,246,308 short tons in quantity and \$2,602,188 in value.

In 1908 the total was divided into 11,910,760 short tons, valued at \$6,880,893, for road making; 5,095,109 short tons, valued at

\$2,530,738, for railroad ballast; and 5,907,625 short tons, valued at \$3,496,576, for concrete, which compared with the itemized output for 1907—road making, 9,619,178 tons, valued at \$5,860,977; railroad ballast, 8,122,342 tons, valued at \$4,144,345; concrete, 5,791,377 tons, valued at \$3,670,131—shows an increase of 2,291,582 tons in quantity and of \$1,019,916 in value for road making, a decrease of 3,027,233 tons in quantity and \$1,613,607 in value for railroad ballast, and an increase of 116,248 tons in quantity and a decrease of \$173,555 in value for concrete. It is possible that the stone for road making includes some stone used for concrete, some of the operators reporting that they were unable to subdivide, except approximately, their total output of crushed stone, not knowing the exact use which was to be made of the stone. The average price per short ton was 56 cents in 1908 compared with 58 cents in 1907.

Ohio ranked first in 1908 in the production of crushed limestone, followed by Illinois, New York, Pennsylvania, Missouri, Indiana, Wisconsin, Kentucky, and Tennessee, in the order named. In 1907 Illinois held first place, followed by Ohio, New York, Pennsylvania, Missouri, Indiana, Kentucky, Wisconsin, and Kansas, in the order named. In 1908 the values reported by these 9 States ranged from \$2,032,925 to \$328,685, and represented 82.60 per cent of the total crushed limestone output; in 1907 the values for the 9 States ranged from \$2,576,155 to \$489,709, and represented 83.46 per cent of the total crushed limestone. Ohio, New York, Illinois, Missouri, Pennsylvania, Indiana, Wisconsin, Kentucky, Tennessee, and Michigan, named according to value of output, produced the greater part of the stone for road making, a considerable increase being noted in Tennessee, due to a large quantity of stone crushed locally for new roads. Most of the railroad ballast was furnished by Illinois, Ohio, Pennsylvania, Kansas, and New York, named according to rank of output. Concrete stone was principally from Illinois, although large values were reported by New York, Pennsylvania, Missouri, Ohio, and Wisconsin.

Furnace flux.—Next to crushed stone, limestone sold for furnace flux shows the largest value. This product, on account of the shutting down of a large number of iron furnaces late in 1907, showed a large decrease in both quantity and value of output. The output in 1907 was 17,119,297 long tons, valued at \$9,144,489; in 1908 the output dropped to 11,091,442 long tons, valued at \$5,905,241, a decrease of 6,027,855 long tons in quantity and of \$3,239,248 in value. In 1907 the increase over 1906, when the output was 16,077,202 long tons, valued at \$7,612,692, was 1,042,095 tons in quantity and \$1,531,797 in value. The average price per ton was 53 cents in 1908 and 1907, and 47 cents in 1906. Pennsylvania, Ohio, Illinois, Alabama, West Virginia, and Colorado were the principal States producing this class of stone. All the States show a decreased output, except California and Illinois.

Other purposes.—Stone reported as sold to sugar refiners increased in value from \$316,860 in 1907 to \$361,186 in 1908, a gain of \$44,326. Stone for other purposes includes stone quarried and used by alkali works in New York and Michigan, stone sold to glass factories, to paper mills, to carbonic acid plants, for making whiting and mineral wool, and also a small quantity sold to farmers for burning into lime to be used as a fertilizer, it being impossible to get the lime value for this

stone. This output decreased \$231,934, in value—from \$1,324,601 in 1907 to \$1,092,667 in 1908.

The following table shows the value of limestone produced in the United States in 1907 and 1908, by States and Territories and uses:

Value of the production of limestone in the United States in 1907 and 1908, by States and Territories and uses.

1907.

State or Territory.	Rough building.	Dressed building.	Paving.	Curbing.	Flagging.	Rubble.	Riprap.
Alabama.....	\$5,200	\$12,375	\$11,100	.....	.....	\$11,113	\$23,970
Arizona.....	200	.....	.....	.....	.....	.....	.....
Arkansas.....	10,373	33,069	.....	.....	.....	3,157	.....
California.....	9,400	.....	.....	.....	.....	225	.....
Colorado.....	.....	.....	.....	.....	.....	.....	.....
Connecticut.....	.....	.....	.....	.....	.....	.....	.....
Florida.....	.....	.....	.....	.....	.....	.....	.....
Georgia.....	1,860	500	.....	\$200	.....	245	.....
Idaho.....	.....	.....	.....	.....	.....	.....	.....
Illinois.....	83,408	26,022	150,193	12,031	\$5,916	363,045	77,627
Indiana.....	1,168,476	1,209,532	3,202	204,750	21,432	20,188	12,980
Iowa.....	108,992	34,663	23,411	1,345	3,682	72,232	46,146
Kansas.....	92,206	49,172	53,885	51,663	4,052	42,613	18,078
Kentucky.....	106,293	71,938	3,515	23,555	1,663	2,467	8,730
Maine.....	.....	.....	.....	.....	.....	.....	.....
Maryland.....	2,100	.....	1,767	20	150	.....	50
Massachusetts.....	100	.....	.....	.....	.....	.....	.....
Michigan.....	15,120	100	56,500	.....	.....	1,433	1,234
Minnesota.....	151,985	112,993	3,065	4,264	8,267	109,928	98,529
Missouri.....	205,436	332,678	2,218	14,104	12,699	218,827	152,090
Montana.....	6,160	.....	.....	.....	.....	.....	.....
Nebraska.....	21,050	29	.....	.....	.....	16,983	17,833
New Jersey.....	700	.....	.....	.....	.....	.....	.....
New Mexico.....	300	.....	180	.....	.....	.....	.....
New York.....	176,746	41,202	25,304	14,869	6,630	21,453	8,380
North Carolina.....	13,328	.....	.....	.....	.....	.....	.....
Ohio.....	114,250	4,495	17,027	2,228	440	70,851	63,434
Oklahoma.....	4,105	2,175	9,000	7,855	877	2,663	19,566
Oregon.....	3,000	500	.....	100	.....	.....	600
Pennsylvania.....	113,919	2,315	143,013	2,272	6,820	27,805	11,220
Rhode Island.....	.....	.....	.....	.....	.....	.....	.....
South Dakota.....	1,100	.....	.....	.....	.....	.....	.....
Tennessee.....	9,275	9,497	2,672	3,542	30	11,100	4,018
Texas.....	31,295	1,948	8,388	1,075	.....	32,150	21,650
Utah.....	10,855	445	.....	.....	.....	.....	475
Vermont.....	9,598	364	.....	107	.....	850	.....
Virginia.....	3,170	1,130	500	.....	.....	.....	.....
Washington.....	.....	.....	.....	.....	.....	.....	.....
West Virginia.....	420	.....	.....	.....	.....	.....	.....
Wisconsin.....	110,955	39,209	30,360	34,873	11,418	38,117	33,718
Wyoming.....	2,500	.....	.....	.....	.....	.....	.....
	2,593,875	1,986,351	545,300	378,853	84,076	1,067,445	620,328

Value of the production of limestone in the United States in 1907 and 1908, by States and Territories and uses—Continued.

1907—Continued.

State or Territory.	Crushed stone.			Flux.	Sugar factories.	Other.	Total.
	Road making.	Railroad ballast.	Concrete.				
Alabama.....	\$5,000		\$21,287	\$604,654			\$694,699
Arizona.....				64,775			64,975
Arkansas.....	608	\$5,000					52,207
California.....	6,375	1,800	18,290	48,376	\$88,116	\$4,751	177,333
Colorado.....			2,620	397,244	102,887		502,751
Connecticut.....				1,476			1,476
Florida.....	15,000						15,000
Georgia.....	407	550	155	18,080		281	22,278
Idaho.....				6,900	9,000		15,900
Illinois.....	958,032	499,204	1,118,919	423,315	8,151	48,483	3,774,346
Indiana.....	476,711	134,932	60,918	279,838		31,667	3,624,126
Iowa.....	69,817	77,571	118,682			4,041	560,582
Kansas.....	76,420	357,820	55,469	50		12,320	813,748
Kentucky.....	290,669	292,714	53,787	14,489		21,680	891,500
Maine.....						1,350	1,350
Maryland.....	66,565	61,881	8,842			1,450	142,825
Massachusetts.....				1,737			1,837
Michigan.....	131,708	46,516	97,762	109,429	22,234	278,297	760,333
Minnesota.....	116,143	22,398	103,854	119	2,675	1,099	735,319
Missouri.....	428,261	284,058	418,990	43,612	317	40,627	2,153,917
Montana.....				118,080	450		124,690
Nebraska.....	55,824	53,584	120,977	11,700	13,635	1,015	312,603
New Jersey.....	3,545	3,000	3,830	262,873		504	274,452
New Mexico.....		175,252			18,000		193,732
New York.....	956,535	440,223	450,799	343,866		412,513	2,898,520
North Carolina.....	9,000						22,328
Ohio.....	1,232,939	393,453	285,159	1,134,793	4,800	242,953	3,566,822
Oklahoma.....	4,000	120,747	15,205			3,375	189,568
Oregon.....					1,375	175	5,750
Pennsylvania.....	445,347	676,776	412,451	3,829,967		149,370	5,821,275
Rhode Island.....				750			750
South Dakota.....			10,500				11,600
Tennessee.....	13,900	118,911	41,530	169,775		1,200	385,450
Texas.....	48,318	57,993	3,748	59,394		1,798	267,757
Utah.....				266,789	27,600	180	306,344
Vermont.....	5,257		4,850	535		1,565	23,126
Virginia.....	37,000	12,269	32,326	275,517		150	362,062
Washington.....				53,868	1,200	7,249	62,317
West Virginia.....	18,166	271,667	21,167	528,587		15,934	855,941
Wisconsin.....	389,430	36,026	188,014	73,901		41,074	1,027,065
Wyoming.....					16,420		18,920
	5,860,977	4,144,345	3,670,131	9,144,489	316,860	1,324,601	31,737,631

Value of the production of limestone in the United States in 1907 and 1908, by States and Territories and uses—Continued.

1908.

State or Territory.	Rough building.	Dressed building.	Paving.	Curbing.	Flagging.	Rubble.	Riprap.
Alabama.....	\$912	\$18,300	.....	.....	.....	\$1,620	\$20,750
Arizona.....	1,800	4,500	.....	.....	.....	700	.....
Arkansas.....	15,654	43,432	.....	.....	.....	327	.....
California.....	614	90	.....	.....	.....	.....	.....
Colorado.....	.....	.....	.....	.....	.....	.....	.....
Connecticut.....	.....	.....	.....	.....	.....	.....	565
Florida.....	5,250	25,000	.....	.....	.....	2,000	.....
Georgia.....	1,518	.....	\$1,020	.....	.....	.....	.....
Idaho.....	4,200	.....	.....	.....	.....	.....	.....
Illinois.....	49,193	21,253	2,576	\$3,850	\$3,227	366,490	152,582
Indiana.....	1,102,375	1,884,664	2,354	155,173	11,712	18,983	11,473
Iowa.....	63,277	24,858	4,146	3,355	4,661	84,554	48,405
Kansas.....	63,893	50,644	15,182	8,800	3,625	19,151	19,730
Kentucky.....	77,561	43,727	13,900	5,387	2,236	13,621	14,355
Maine.....	.....	.....	.....	.....	.....	.....	.....
Maryland.....	13,105	.....	100	.....	50	150	.....
Massachusetts.....	1,950	.....	.....	.....	.....	.....	.....
Michigan.....	7,276	.....	10,825	300	100	15,907	1,574
Minnesota.....	140,241	102,924	24,750	6,890	10,841	93,435	98,616
Missouri.....	254,286	349,311	4,380	4,421	6,758	138,448	107,243
Montana.....	12,126	.....	.....	.....	.....	.....	.....
Nebraska.....	23,029	451	.....	27	.....	22,680	30,892
New Jersey.....	425	.....	.....	.....	.....	.....	.....
New Mexico.....	.....	.....	.....	.....	.....	.....	.....
New York.....	123,973	128,415	27,473	7,974	2,295	34,766	39,982
North Carolina.....	.....	.....	.....	.....	.....	.....	.....
Ohio.....	70,884	12,460	8,824	1,055	605	488,492	61,823
Oklahoma.....	4,815	844	.....	500	1,008	7,848	39,139
Oregon.....	100	.....	.....	.....	.....	.....	.....
Pennsylvania.....	80,222	13,388	128,454	9,930	1,413	24,239	7,176
Rhode Island.....	.....	.....	.....	.....	.....	.....	.....
South Dakota.....	.....	.....	.....	.....	.....	.....	.....
Tennessee.....	7,884	3,680	1,315	3,213	190	12,579	21,233
Texas.....	23,662	2,280	.....	480	.....	4,375	44,088
Utah.....	32,358	3,200	519	.....	.....	5,951	25,000
Vermont.....	7,102	.....	285	75	1,053	.....	.....
Virginia.....	1,870	2,950	.....	79	110	.....	3,377
Washington.....	.....	.....	.....	.....	.....	.....	.....
West Virginia.....	10,800	.....	.....	.....	.....	.....	.....
Wisconsin.....	97,172	24,784	30,534	26,070	29,197	46,444	104,119
Wyoming.....	5,840	.....	.....	.....	.....	.....	.....
	2,305,367	2,261,155	276,637	237,579	79,081	1,402,760	852,122

Value of the production of limestone in the United States in 1907 and 1908, by States and Territories and uses—Continued.

1908—Continued.

State or Territory.	Crushed stone.			Flux.	Sugar factories.	Other.	Total.
	Road making.	Railroad ballast.	Concrete.				
Alabama.....	\$43,028	\$1,500	\$6,651	\$386,874		\$95	\$479,730
Arizona.....	350		350	42,430			^a 50,130
Arkansas.....	2,373					185	61,971
California.....	25,185	2,700	12,000	86,945	\$104,676	5,110	237,320
Colorado.....		2,000		276,140	100,172	510	378,822
Connecticut.....				1,488		1,674	^b 3,727
Florida.....	9,660						41,910
Georgia.....	791	1,900	2,148	946		172	8,495
Idaho.....					31,800		36,000
Illinois.....	728,017	384,827	851,889	540,718	3,893	14,037	3,122,552
Indiana.....	622,726	95,165	77,011	139,703		21,922	3,643,261
Iowa.....	75,806	28,687	181,668		750	10,778	530,945
Kansas.....	29,800	99,306	74,555			18,490	403,176
Kentucky.....	350,577	235,802	35,482	11,283		6,159	810,090
Maine.....							(^c)
Maryland.....	62,316	35,344	16,745	210		571	128,591
Massachusetts.....							1,950
Michigan.....	182,510	33,900	73,200	56,841	32,594	253,990	669,017
Minnesota.....	48,264	20,389	95,995	100	4,425	20,225	667,095
Missouri.....	726,772	130,296	341,768	14,678	5,970	45,805	2,130,136
Montana.....		756		116,071	5,642		134,595
Nebraska.....	51,007	16,010	173,449	11,700	1,250	75	330,570
New Jersey.....	18,294		2,533	149,301		1,447	172,000
New Mexico.....							(^d)
New York.....	942,434	227,730	472,425	205,758	1,080	370,254	2,584,559
North Carolina.....							(^e)
Ohio.....	1,436,874	349,535	246,516	635,354	2,500	204,635	3,519,557
Oklahoma.....	2,000	102,335	95,819			2,758	257,066
Oregon.....				130	6,000		6,230
Pennsylvania.....	653,503	300,702	419,518	2,324,173	20,034	74,719	4,057,471
Rhode Island.....							(^c)
South Dakota.....							(^f)
Tennessee.....	211,896	56,439	60,350	142,573		14,530	^g 535,882
Texas.....	81,978	115,322	9,495	31,266		1,625	314,571
Utah.....	14		263	161,383	24,400		253,088
Vermont.....	9,275		2,535	334		72	20,731
Virginia.....	30,159	45,541	26,604	169,847		5	280,542
Washington.....				26,410		5,250	31,660
West Virginia.....	70,939	197,189	24,939	337,742		3,776	645,385
Wisconsin.....	464,345	47,363	192,248	25,935		13,798	1,102,009
Wyoming.....			420	8,908	16,000		^h 31,168
	6,880,893	2,530,738	3,496,576	5,905,241	361,186	1,092,667	27,682,002

^a Includes New Mexico.

^b Includes Maine and Rhode Island.

^c Includes with Connecticut.

^d Includes with Arizona.

^e Included with Tennessee.

^f Included with Wyoming.

^g Includes North Carolina.

^h Includes South Dakota.

The following table shows the value of limestone, by States, from 1904 to 1908, inclusive:

Value of limestone from 1904 to 1908, by States and Territories.

State or Territory.	1904.	1905.	1906.	1907.	1908.
Alabama.....	\$498,723	\$532,103	\$579,344	\$604,699	\$479,730
Arizona.....	250	135	40	64,975	^a 50,130
Arkansas.....	106,147	154,818	48,844	52,207	61,971
California.....	74,670	49,902	80,205	177,333	237,320
Colorado.....	124,600	289,920	373,158	502,751	378,822
Connecticut.....	830	1,558	1,171	1,476	^b 3,727
Florida.....	34,278	5,800	1,450	15,000	41,910
Georgia.....	15,200	9,030	16,042	22,278	8,495
Idaho.....	5,900	14,105	12,600	15,900	36,000
Illinois.....	2,690,822	3,511,890	2,942,331	3,774,346	3,122,552
Indiana.....	2,789,500	3,189,259	3,725,565	3,624,126	3,643,261
Indian Territory.....	6,076	5,512	44,622	.....	.....
Iowa.....	442,585	451,791	493,815	560,582	530,945
Kansas.....	799,286	923,389	849,203	813,748	403,176
Kentucky.....	692,417	744,465	795,408	891,500	810,190
Maine.....	2,955	7,428	2,000	1,350	(^c)
Maryland.....	128,421	149,402	170,046	142,825	128,591
Massachusetts.....	7,566	65,908	10,750	1,837	1,950
Michigan.....	501,708	544,754	656,269	760,333	669,017
Minnesota.....	517,940	555,401	632,115	735,319	667,095
Missouri.....	2,277,969	2,238,164	1,988,334	2,153,917	2,130,136
Montana.....	109,765	103,123	141,082	124,690	134,595
Nebraska.....	236,780	225,119	276,381	312,630	330,570
New Jersey.....	76,710	147,353	221,141	274,452	172,000
New Mexico.....	.....	7,200	125,493	193,732	(^d)
New York.....	1,636,255	1,970,968	2,204,724	2,898,520	2,584,559
North Carolina.....	12,088	16,500	30,583	22,328	(^e)
Ohio.....	2,406,355	2,850,793	3,025,038	3,566,822	3,519,557
Oklahoma.....	92,246	163,412	127,361	189,568	257,066
Oregon.....	5,390	8,600	7,480	5,750	6,230
Pennsylvania.....	3,708,750	4,499,503	4,865,130	5,821,275	4,057,471
Rhode Island.....	312	300	678	750	(^c)
South Carolina.....	225	.....	.....	.....	(^f)
South Dakota.....	3,954	6,653	10,400	11,600	.....
Tennessee.....	288,053	401,622	481,952	385,450	^g 535,882
Texas.....	252,745	171,847	239,125	267,757	314,571
Utah.....	170,447	232,519	248,868	306,344	253,088
Vermont.....	9,653	11,095	14,728	23,126	20,731
Virginia.....	165,459	212,660	260,343	362,062	280,542
Washington.....	71,857	52,470	49,192	62,317	31,660
West Virginia.....	460,303	671,318	628,602	855,941	645,385
Wisconsin.....	738,684	804,081	891,746	1,027,095	1,102,009
Wyoming.....	15,090	23,340	53,783	18,920	^h 31,168
	22,178,964	26,025,210	27,327,142	31,737,631	27,682,002

^a Includes New Mexico.

^b Includes Maine and Rhode Island.

^c Includes with Connecticut.

^d Includes with Arizona.

^e Included with Tennessee.

^f Included with Wyoming.

^g Includes North Carolina.

^h Includes South Dakota.

The following table shows the production of limestone for furnace flux in 1907 and 1908, by States, in long tons:

Production of furnace flux in 1907 and 1908, by States, in long tons.

State or Territory.	1907.		1908.	
	Quantity.	Value.	Quantity.	Value.
Alabama.....	939,437	\$604,654	582,958	\$386,874
Arizona.....	115,714	64,775	70,718	42,430
California.....	38,225	48,376	78,305	86,945
Colorado.....	672,801	397,244	441,490	276,146
Connecticut.....	3,735	1,476	2,564	^a 1,488
Georgia.....	30,825	18,080	1,522	946
Idaho.....	4,100	6,900		
Illinois.....	970,158	423,315	1,209,326	540,718
Indiana.....	577,052	279,838	272,505	139,703
Kansas.....	50	50		
Kentucky.....	31,752	14,489	21,947	11,283
Maryland.....			421	210
Massachusetts.....	3,560	1,737		
Michigan.....	128,926	109,429	104,186	56,841
Minnesota.....	135	119	100	100
Missouri.....	55,371	43,612	18,524	14,678
Montana.....	236,200	118,080	216,964	116,071
Nebraska.....	18,000	11,700	18,000	11,700
New Jersey.....	465,018	262,873	318,455	149,301
New York.....	584,964	343,866	357,194	205,758
Ohio.....	2,497,616	1,134,793	1,444,412	635,354
Oregon.....			104	130
Pennsylvania.....	7,178,508	3,829,967	4,350,381	2,324,173
Rhode Island.....	500	750		^(b)
Tennessee.....	299,247	169,775	260,294	142,573
Texas.....	93,531	59,394	43,716	31,266
Utah.....	372,896	266,789	209,708	161,383
Vermont.....	535	535	334	334
Virginia.....	541,610	275,517	289,369	169,847
Washington.....	80,295	53,868	43,640	26,410
West Virginia.....	1,063,772	528,587	666,087	337,742
Wisconsin.....	114,764	73,901	62,718	25,935
Wyoming.....			5,500	8,908
Total.....	17,119,297	9,144,489	11,091,442	5,905,241
Average price per ton.....		.53		.53

^a Includes Rhode Island.

^b Included with Connecticut.

SURVEY PUBLICATIONS ON BUILDING STONE AND ROAD METAL.

The following list comprises the more important publications on building stone and road metal by the United States Geological Survey. These publications, except those to which a price is affixed, can be obtained free by applying to the Director, United States Geological Survey, Washington, D. C. The priced publications may be purchased from the Superintendent of Documents, Government Printing Office, Washington, D. C. The annual volumes on Mineral Resources of the United States contain not only statistics of stone production but occasional discussions of available stone resources in various parts of the country. Many of the Survey's geologic folios also contain notes on stone resources that may be of local importance.

ALDEN, W. C. The stone industry in the vicinity of Chicago, Ill. In Bulletin No. 213, pp. 357-360. 1903. 25c.

BAIN, H. F. Notes on Iowa building stones. In Sixteenth Ann. Rept., pt. 4, pp. 500-503. 1895.

BASTIN, E. S. (See Leighton, Henry, and Bastin, E. S.)

BURCHARD, E. F. Concrete materials produced in the Chicago district. In Bulletin No. 340, pp. 383-410. 1908.

- CLAPP, F. G. Limestones of southwestern Pennsylvania. Bulletin No. 249. 1905.
- COONS, A. T. Stone. In Mineral Resources U. S. for 1907, pt. 2, pp. 563-605. 1908.
- DALE, T. N. The slate belt of eastern New York and western Vermont. In Nineteenth Ann. Rept., pt. 3, pp. 153-200. 1899. \$2.25.
- The slate industry of Slatington, Pa., and Martinsburg, W. Va. In Bulletin No. 213, pp. 361-364. 1903. 25c.
- Notes on Arkansas roofing slates. In Bulletin No. 225, pp. 414-416. 1904. 35c.
- Slate investigations during 1904. In Bulletin No. 260, pp. 486-488. 1905. 40c.
- Note on a new variety of Maine slate. In Bulletin No. 285, pp. 449-450. 1906. 60c.
- Recent work on New England granites. In Bulletin No. 315, pp. 356-359. 1907.
- The granites of Maine. Bulletin No. 313. 202 pp. 1907.
- The chief commercial granites of Massachusetts, New Hampshire, and Rhode Island. Bulletin No. 354. 228 pp. 1908.
- The granites of Vermont. Bulletin No. 404. (In press.)
- The granites of Connecticut. (In preparation.)
- DALE, T. N., and others. Slate deposits and slate industry of the United States. Bulletin No. 275. 154 pp. 1906. 15c.
- DARTON, N. H. Marble of White Pine County, Nev., near Gandy, Utah. In Bulletin No. 340, pp. 377-380. 1908.
- Structural materials near Portland, Oreg., and Seattle and Tacoma, Wash. Bulletin No. 387. — pp. 1909.
- DILLER, J. S. Limestone of the Redding district, California. In Bulletin No. 213, p. 365. 1903. 25c.
- ECKEL, E. C. Slate deposits of California and Utah. In Bulletin No. 225, pp. 417-422. 1904. 35c.
- HILLEBRAND, W. F. Chemical notes on the composition of the roofing slates of eastern New York and western Vermont. In Nineteenth Ann. Rept., pt. 3, pp. 301-305. 1899. \$2.25.
- HOPKINS, T. C. The sandstones of western Indiana. In Seventeenth Ann. Rept., pt. 3, pp. 780-787. 1896.
- Brownstones of Pennsylvania. In Eighteenth Ann. Rept., pt. 5, pp. 1025-1043. 1897.
- HOPKINS, T. C., and SIEBENTHAL, C. E. The Bedford oolitic limestone of Indiana. In Eighteenth Ann. Rept., pt. 5, pp. 1050-1057. 1897.
- HUMPHREY, R. L. The fire-resistive properties of various building materials. Bulletin No. 370. 99 pp. 1909.
- KEITH, A. Tennessee marbles. In Bulletin No. 213, pp. 366-370. 1903. 25c.
- LEIGHTON, HENRY, and BASTIN, E. S. Road materials of southern and eastern Maine. Bulletin No. 33, Office of Public Roads, Department of Agriculture. 1908. (May be obtained from Department of Agriculture.)
- RIES, H. The limestone quarries of eastern New York, western Vermont, Massachusetts, and Connecticut. In Seventeenth Ann. Rept., pt. 3 (continued), pp. 795-811. 1896.
- SHALER, N. S. Preliminary report on the geology of the common roads of the United States. In Fifteenth Ann. Rept., pp. 259-306. 1895.
- The geology of the road-building stones of Massachusetts, with some consideration of similar materials from other parts of the United States. In Sixteenth Ann. Rept., pt. 2, pp. 277-341. 1895.
- SIEBENTHAL, C. E. The Bedford oolitic limestone [Indiana]. In Nineteenth Ann. Rept., pt. 6, pp. 292-296. 1898.
- (See also Hopkins, T. C., and Siebenthal, C. E.)
- SMITH, G. O. The granite industry of the Penobscot Bay district, Maine. In Bulletin No. 260, pp. 489-492. 40c.

BUILDING STONE STATISTICS.

The statistical reports on the production of stone, etc., will be found in the following volumes of Mineral Resources of the United States.

- 1882. Structural Materials, pp. 450-464, 50c.
- 1883-4. Structural Materials, pp. 662-670, 60c.
- 1885. Structural Materials, by H. H. Sproull, pp. 396-413, 60c.
- 1886. Structural Materials, by Wm. C. Day, pp. 517-566, 40c.
- 1887. Structural Materials, by Wm. C. Day, pp. 503-534, 50c.
- 1888. Structural Materials, by Wm. C. Day, pp. 516-557, 50c.
- 1889-90. Stone, by Wm. C. Day, pp. 373-440, 50c.
- 1891. Stone, by Wm. C. Day, pp. 456-473, 50c.
- 1892. Stone, by Wm. C. Day, pp. 704-711, 50c.
- 1893. Stone, by Wm. C. Day, pp. 543-602, 50c.
- 1894. 16th Annual Report, U. S. Geological Survey, pt. 4, Nonmetallic Products.
Stone, by Wm. C. Day, pp. 436-510.
- 1895. 17th Annual Report, U. S. Geological Survey, pt. 3 continued, Nonmetallic Products, except Coal.
Stone, by Wm. C. Day, pp. 759-811.
- 1896. 18th Annual Report, U. S. Geological Survey, pt. 5 continued, Nonmetallic Products, except Coal.
Stone, by Wm. C. Day, pp. 948-1068.
- 1897. 19th Annual Report, U. S. Geological Survey, pt. 6 continued, Nonmetallic Products, except Coal and Coke.
Stone, by Wm. C. Day, pp. 205-309.
- 1898. 20th Annual Report, U. S. Geological Survey, pt. 6 continued, Nonmetallic Products, except Coal and Coke.
Stone, by Wm. C. Day, pp. 269-464.
- 1899. 21st Annual Report, U. S. Geological Survey, pt. 6 continued, Nonmetallic Products, except Coal and Coke.
Stone, pp. 333-360.
- 1900. Stone, pp. 661-691, 70c.
- 1901. Stone, pp. 641-666, 70c.
- 1902. Stone, pp. 665-701.
- 1903. Stone, pp. 755-789, 70c.
- 1904. Stone, pp. 801-841.
- 1905. Slate, by A. T. Coons, pp. 1011-1017; Stone, by A. T. Coons, pp. 1021-1067, \$1.
- 1906. Slate, by A. T. Coons, pp. 1001-1005; Stone, by A. T. Coons, pp. 1007-1041.
- 1907. Slate, by A. T. Coons, pt. 2, pp. 557-562; Stone, by A. T. Coons, pt. 2, pp. 563-605, 50c.
- 1908. Slate, by A. T. Coons, with general note on the Classification and Characteristics of Slate, by T. Nelson Dale; Stone, by A. T. Coons.