

139686  
JUN 1 1891

[7-010]

# CENSUS BULLETIN.

No. 73.

WASHINGTON, D. C.

June 1, 1891.

## MINES AND MINING.—SANDSTONE.

DEPARTMENT OF THE INTERIOR,  
CENSUS OFFICE,  
WASHINGTON, D. C., May 25, 1891.

The following bulletin in relation to the sandstone industry was prepared by Dr. WILLIAM C. DAY, special agent, under the supervision of Dr. DAVID T. DAY, special agent in charge of the Division of Mines and Mining of the Census Office.

The amount of sandstone produced in the United States in 1889 was 71,571,054 cubic feet, valued at \$10,816,057, while for 1880 the value was only \$4,780,391, an increase during the decade of \$6,035,666 or 126.26 per cent. There were 16,925 workmen employed, to whom were paid in wages \$6,257,580. The total expense of producing sandstone in 1889 was \$8,130,295, and the total capital invested \$17,776,467, of which \$11,501,100 was invested in land.

The Tenth Census report included the bluestone of New York, New Jersey, and Pennsylvania with sandstone, but in the present report a separate bulletin on the production of these states has been issued, on account of the difference of the practical applications of the stones named, although the combination is scientifically correct.



*Superintendent of Census.*

# THE SANDSTONE INDUSTRY OF THE UNITED STATES.

BY WILLIAM C. DAY.

The name "sandstone" is applied to stone which has been formed by sedimentary deposit from water of granules which have resulted from the disintegration of older rocks by various kinds of dynamic action, weathering, and erosion. Naturally therefore grains of quartz, the hardest essential component of the older rocks, are vastly more abundant in sandstone than all other minerals; indeed, most sandstones are almost entirely made up of particles of quartz. Other minerals, however, occur. Various varieties of feldspar and mica are frequently found, while small amounts of still other minerals are occasionally observed, but there is by no means the variety which characterizes the constitution of granitic and volcanic rocks.

The size of the granules composing sandstone is quite variable, giving rise to the distinction between the fine and coarse grained varieties.

The granules constituting sandstone are usually held together by some cementing material, and the nature of the latter is an all-important consideration bearing upon the strength, durability, and beauty of the stone, and, consequently, upon its value as a structural material. Some sandstones are apparently without this cementing or binding material, and are particularly desirable as abrasive material, although they may also form good building stone.

Lithologically considered, the different kinds of sandstone are classed with reference to the cementing material rather than to the mineralogical nature of the component granules. Argillaceous sandstone is one in which the cementing material is clay, and in cases where the clay has not been subjected to metamorphic action such stone is subject to disintegration under the influences of weather.

In calcareous sandstone the cementing material is calcium carbonate, and when the latter is present in great excess the stone is called siliceous limestone. Limestone being readily acted upon by acids, disintegration may easily result from atmospheric agencies.

Ferruginous sandstone is one in which the cementing material consists of oxides of iron, which determine the color of the stone when it is pink, red, brown, or shades intermediate between those named.

Siliceous sandstone is that in which the cementing material is silica, so that the rock consists of almost pure silica. Such stone is usually hard, durable, capable of withstanding great crushing strength, and is not subject to alteration in color, and as a consequence of its extreme hardness it is naturally difficult to work. This kind grades into quartzite, which has been hardened by heat and pressure.

Freestone is a name of popular origin, and is applied to such sandstones as work well in any direction. The terms "arkose," "conglomerate," and "breccia" are names which have special reference to the character of the granules present. Arkose is composed of the constituents of granitic rocks which have been disintegrated and reconsolidated into sandstone, and conglomerate is a sandstone in which the granules are rounded pebbles instead of small grains. When these fragments are angular instead of rounded it is called breccia.

The terms "quartzose," "feldspathic," and "micaceous" sandstone refer to the presence of the minerals implied by these names.

---

NOTE.—Acknowledgments are due to Mr. J. H. Humphries, special agent, for his valuable aid in the tabulation of the statistics herein presented.

The following table of analyses of sandstone from a number of localities will serve to indicate its general composition:

## ANALYSES OF SANDSTONE.

KINDS OF STONE.	Locality.	Silica.	Alumina.	Iron oxides.	Manga- nese oxide.	Lime.	Magne- sia.	Potash.	Soda.	Carbonic acid, water, and loss.
		<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>	
1 Manyard.....	East Longmeadow, Massachu- setts.	79.38	8.75	2.43	.....	2.57	.....	4.08		2.79
2 Worcester.....	East Longmeadow, Massachu- setts.	88.89	5.95	1.79	0.41	0.27	.....	0.86		1.83
3 Kibbie quartz..	East Longmeadow, Massachu- setts.	81.38	9.44	3.54	0.11	0.76	0.28	.....		4.49
4 Brownstone....	Portland, Connecticut.....	69.94	13.15	2.48	0.70	3.09	Trace.	3.30	5.43	1.01
5 Sandstone.....	Stony Point, Michigan.....	84.57	5.90	6.48	.....	.....	0.68	Undetermined.		1.92
6 Quartzite.....	Pipestone, Minnesota.....	84.52	12.33	2.12	.....	0.31	Trace.	0.11	0.34	2.31
7 Buff.....	Amherst, Ohio.....	97.00	.....	1.00	.....	1.15	.....	0.64		0.21
8 Berea.....	Berea, Ohio.....	96.90	.....	1.68	.....	0.55	.....	0.55		0.32
9 Euclid bluestone	Euclid county, Ohio.....	95.00	2.50	1.00	.....	.....	.....	.....		1.50
10 Columbia.....	Columbia, Ohio.....	96.50	.....	.....	.....	1.00	.....	0.50		2.00
11 Red.....	Laurel Run, Pennsylvania.....	94.00	Trace.	1.90	.....	1.10	1.00	.....		1.92
12 Elyria.....	Grafton, Ohio.....	87.66	1.72	3.52	.....	0.17	0.20	.....		2.03
13 Sandstone.....	Fond du Lac, Minnesota.....	78.24	10.88	3.83	.....	0.95	1.60	1.67	0.06	.....

AUTHORITIES FOR ANALYSES.—Nos. 1 and 2, Leonard P. Kinnicutt, Ph. D.; No. 3, C. F. Chambers, Ph. D.; No. 4, F. W. Taylor; No. 5, F. W. Clarke, United States Geological Survey, Bulletin No. 27; No. 6, Geology of Minnesota, vol. 1; No. 7, J. H. Salesbury; No. 8, John Eisenmann; No. 11, A. A. Breniman; No. 12, F. F. Jewett; No. 13, N. H. Winchell, Geology of Minnesota, vol. 1.

The commercial names of sandstone are usually found by reference to the places at which they are quarried, as Portland brownstone, Berea grit, etc.

In connection with this report it should be carefully noted that the stone commercially known as bluestone, in so far as it comes from certain sections of the states of New York, New Jersey, and Pennsylvania, is not included here, but is specially treated in another report under the title of "Bluestone." The Tenth Census report included bluestone with sandstone from the above-named states, which is scientifically correct, but the difference in the practical applications of bluestone from the states named and the other kinds of sandstone is so well defined commercially that it was thought best to separate bluestone and treat of it in a report by itself.

The table following shows the relative standing of productive states according to the Tenth and Eleventh Censuses. The states are arranged in the order of value of output. It is evident from this that, while eighteen states only were productive in 1850, the number has now reached forty. Ohio holds first place in both columns. At the Tenth Census New York held second place, but it must be remembered that bluestone is included in the figures given for value of output. At the present time New York holds fifth place, and the apparent decline is due to the exclusion of bluestone. According to the Eleventh Census Colorado holds third place, while ten years ago it held sixteenth place among the productive states. The vast increase in the sandstone production of this state, namely, from \$9,000 to \$1,224,098, is due largely to the operations of the Union Pacific Railway Company. This company is not only one of the most extensive producing concerns, but the facilities for shipment which they afford to other large producers account in a great measure for the striking increase in production. Enormous shipments of sandstone are now made from Colorado to remote parts of the United States, and the business is in a most flourishing condition. Another notable change is the appearance of California as a productive state, holding eleventh place. This state does not appear among the eighteen states of the Tenth Census.

## COMPARISON OF VALUE OF OUTPUT OF SANDSTONE AT THE TENTH AND ELEVENTH CENSUSES.

Rank.	TENTH CENSUS, INCLUDING BLUESTONE.		Rank.	ELEVENTH CENSUS, NOT INCLUDING BLUESTONE.	
	States and territories.	Value of output.		States and territories.	Value of output.
	Total .....	\$4,780,391		Total .....	\$10,816,057
1	Ohio .....	1,871,924	1	Ohio .....	3,046,656
2	New York .....	724,556	2	Pennsylvania .....	1,609,159
3	Connecticut .....	650,200	3	Colorado .....	1,224,098
4	Pennsylvania .....	627,943	4	Connecticut .....	920,061
5	New Jersey .....	400,420	5	New York .....	702,419
6	Massachusetts .....	144,294	6	Massachusetts .....	649,007
7	Missouri .....	81,960	7	New Jersey .....	597,309
8	Michigan .....	53,080	8	Michigan .....	246,570
9	Minnesota .....	41,150	9	New Mexico .....	186,804
10	Indiana .....	40,400	10	Wisconsin .....	183,958
11	Wisconsin .....	37,745	11	California .....	175,598
12	Illinois .....	21,830	12	Missouri .....	155,557
13	West Virginia .....	16,689	13	Kansas .....	149,289
14	South Dakota .....	12,000	14	West Virginia .....	140,687
15	Kansas .....	11,000	15	Minnesota .....	131,979
16	Colorado .....	9,000	16	Kentucky .....	117,940
17	Iowa .....	4,200	17	South Dakota .....	93,570
18	Washington .....	2,000 <sup>a</sup>	18	Iowa .....	80,251
			19	Washington .....	75,936
			20	Utah .....	48,306
			21	Indiana .....	43,983
			22	Alabama .....	43,965
			23	Montana .....	31,648
			24	Arkansas .....	25,074
			25	Illinois .....	17,896
			26	Wyoming .....	16,760
			27	Texas .....	14,651
			28	North Carolina .....	12,000
			29	Virginia .....	11,500
			30	Maryland .....	10,605
			31	Arizona .....	9,146
			32	Oregon .....	8,424
			33	New Hampshire .....	3,750
			34	Tennessee .....	2,722
			35	Idaho .....	2,490
				Other states (a) .....	26,199

<sup>a</sup> The states here grouped, in order that the business of individual establishments may not be disclosed to the public, embrace Florida, Georgia, Nevada, Rhode Island, and Vermont.

It is evident that the increase in production during the last ten years amounted to \$6,035,666, or 126.26 per cent. The eighteen states which were productive in both census years produced sandstone in 1889 to the value of \$10,068,475, or 93.09 per cent of the entire product, not, however, including bluestone. The twenty-two new states produced to the value of \$747,582 in 1889, or 6.91 per cent of the total amount. It is thus apparent that, although the number of states producing sandstone is now more than twice as great as in 1880, nearly the entire output comes from the same states that were productive ten years ago.

The table following shows the comparison of these eighteen states in detail, and also gives the percentage of increase or decrease for each.

## COMPARISON OF STATES PRODUCTIVE IN 1880 AND 1889.

Rank in Tenth Census.	STATES.	Value of output at Tenth Census.	Value of output at Eleventh Census.	Per cent increase.	Rank in Eleventh Census.
	Total .....	\$4,780,391	\$10,068,475	110.62	
1	Ohio .....	1,871,924	3,046,656	62.76	1
2	New York .....	724,556	702,419	α3.06	5
3	Connecticut .....	680,200	920,061	35.26	4
4	Pennsylvania .....	627,943	1,609,159	156.26	2
5	New Jersey .....	400,420	597,309	49.17	7
6	Massachusetts .....	144,294	649,097	349.84	6
7	Missouri .....	81,960	155,557	89.80	12
8	Michigan .....	53,080	246,570	364.53	8
9	Minnesota .....	41,150	131,979	220.73	15
10	Indiana .....	40,400	43,983	8.87	21
11	Wisconsin .....	37,745	183,958	387.37	10
12	Illinois .....	21,830	17,896	α18.02	25
13	West Virginia .....	16,689	140,687	742.99	14
14	South Dakota .....	12,000	93,570	679.75	17
15	Kansas .....	11,000	149,289	1,257.17	13
16	Colorado .....	9,000	1,224,098	13,501.09	3
17	Iowa .....	4,200	80,251	1,810.74	18
18	Washington .....	2,000	75,936	3,696.80	19

α Decrease.

The following table shows the amount yielded by states and territories not productive in 1880:

## ELEVENTH CENSUS STATES AND TERRITORIES NOT REPRESENTED IN TENTH CENSUS.

Rank.	STATES AND TERRITORIES.	Value.	Rank.	STATES AND TERRITORIES.	Value.
	Total .....	\$747,582	28	North Carolina .....	\$12,000
9	New Mexico .....	186,804	29	Virginia .....	11,500
11	California .....	175,598	30	Maryland .....	10,605
16	Kentucky .....	117,940	31	Arizona .....	9,146
20	Utah .....	48,306	32	Oregon .....	8,424
22	Alabama .....	43,965	33	New Hampshire .....	3,750
23	Montana .....	31,648	34	Tennessee .....	2,722
24	Arkansas .....	25,074	35	Idaho .....	2,490
26	Wyoming .....	16,760		Other states (α) .....	26,199
27	Texas .....	14,651			

α The states here grouped, in order that the business of individual establishments may not be disclosed to the public, embrace Florida, Georgia, Nevada, Rhode Island, and Vermont.

The following table shows for both census years the geographical distribution of sandstone. The states and territories included in the various divisions are as follows:

NORTH ATLANTIC DIVISION.—New Hampshire, Massachusetts, Connecticut, New Jersey, Vermont, Rhode Island, New York, Pennsylvania.

SOUTH ATLANTIC DIVISION.—Maryland, West Virginia, Florida, Georgia, Virginia, North Carolina.

NORTH CENTRAL DIVISION.—Ohio, Illinois, Wisconsin, Iowa, South Dakota, Indiana, Michigan, Minnesota, Missouri, Kansas.

SOUTH CENTRAL DIVISION.—Kentucky, Alabama, Arkansas, Tennessee, Texas.

WESTERN DIVISION.—Montana, Colorado, Arizona, Nevada, Washington, California, Wyoming, New Mexico, Utah, Idaho, Oregon.

## COMPARISON OF TENTH AND ELEVENTH CENSUSES BY DIVISIONS AND VALUES.

DIVISIONS.	Eleventh Census.	Tenth Census.	Increase.	Per cent increase.
Total .....	\$10,816,057	\$4,780,391	\$6,035,666	126.26
North Atlantic .....	4,504,165	2,577,413	1,926,752	74.76
South Atlantic .....	176,292	16,689	159,603	956.34
North Central .....	4,149,709	2,175,289	1,974,420	90.77
South Central .....	204,352	.....	204,352	.....
Western .....	1,781,539	11,000	1,770,539	16,095.81

It is evident that in both censuses the North Atlantic division was the most productive, the North Central division following closely in value of production. The Western division stands third for the Eleventh Census, with a product amounting to \$1,781,539, while the third position for the Tenth Census is occupied by the South Atlantic division. Fourth place for the Eleventh Census is filled by the South Central division, in which at the Tenth Census no sandstone was produced. Fifth place for the Eleventh Census is occupied by the South Atlantic division, which produced only a small amount ten years ago. The great bulk of the sandstone production comes, therefore, at present from the North Atlantic and North Central divisions, the South Atlantic and the South Central producing very little in comparison, while the Western division shows the enormous increase in ten years from \$11,000 to \$1,781,539.

The following table, the states and territories being arranged in alphabetical order, gives all totals relative to the sandstone output for the calendar year 1889. From the grand total for the United States it appears that 71,571,054 cubic feet of sandstone, having a total value of \$10,816,057, were produced by 16,925 workmen from 803 quarries. To this number of men \$6,257,580 were paid in wages. The total expense of producing the entire amount of sandstone is \$8,130,295, thus indicating a profit to the producers of \$2,685,762. The total capital invested is \$17,776,467, of which \$11,501,100 is invested in land.

PRODUCTION OF SANDSTONE IN THE UNITED STATES IN 1889, BY STATES AND TERRITORIES.

STATES AND TERRITORIES.	No. of quarries.	PRODUCTION.		LABOR.							POWER.			
		Cubic feet.	Value.	Foremen.	Quarrymen.	Mechanics and stone-cutters.	Laborers.	Boys under sixteen years.	Office force.	Total employed.	No. of boilers.	Total horse power of boilers.	No. of animals.	Other power.
Total .....	803	71,571,054	\$10,816,057	782	7,746	1,983	5,912	250	252	16,925	553	15,183	2,851	165
Alabama .....	5	610,026	43,965	5	53	9	54	5	1	127				9
Arizona .....	2	127,907	9,146	1	10		2			13				3
Arkansas .....	8	210,010	25,074	3	24	9	14			50	1	12		8
California .....	15	333,209	175,598	10	114	31	64	2	1	232	2	20		33
Colorado .....	71	6,570,529	1,224,098	90	834	187	313	8	33	1,485	21	535		298
Connecticut .....	13	2,821,430	920,061	45	814	58	150	5	20	1,092	66	2,111		294
Idaho .....	2	28,710	2,490		3		2			5				4
Illinois .....	10	141,605	17,896	4	33	1	8			46	2	24		14
Indiana .....	11	334,441	43,983	12	71	25	67	11	2	188	7	113		35
Iowa .....	11	404,350	80,251	8	41	21	63	3	6	142	4	130		18
Kansas .....	17	680,289	149,239	11	159	57	88	4	10	329	4	88		84
Kentucky .....	11	888,738	117,940	15	126	43	105	11	2	302	10	162		39
Maryland .....	4	508,325	10,605	2	39		2			43	1	50		8
Massachusetts .....	21	1,967,179	649,097	28	358	161	347	2	10	906	33	782		289
Michigan .....	6	658,318	246,570	9	132	31	166	5	2	345	11	320		24
Minnesota .....	7	4,156,224	131,979	10	151	16	22	5	1	205	6	139		15
Missouri .....	17	734,370	155,537	12	80	17	77	3	3	192	15	282		36
Montana .....	6	614,740	31,648	6	57	1	2	2	1	69	2	26		24
New Hampshire .....	2	21,665	3,750	2	9	1	1			13	2	30		4
New Jersey .....	26	6,010,212	597,309	38	299	130	378	11	10	866	24	560		191
New Mexico .....	11	588,048	186,804	11	217	47	87	11	4	377	3	82		98
New York .....	63	4,878,365	702,419	58	568	183	738	10	12	1,569	30	470		302
North Carolina .....	2	50,000	12,000	1	4	2	40	5	1	53	4	100		3
Ohio .....	192	16,016,258	3,046,656	187	1,660	506	1,610	54	78	4,095	231	7,310		400
Oregon .....	2	50,000	8,424		5		2			7	1	15		6
Pennsylvania .....	159	17,414,875	1,609,159	140	1,262	337	1,102	66	25	2,932	44	1,167		376
South Dakota .....	12	341,875	93,570	9	64	18	43		6	140	2	54		36
Tennessee .....	4	53,978	2,722	2	22	2	4	1	2	33	1	30		2
Texas .....	7	180,591	14,651	3	16	4	19			42				12
Utah .....	7	145,726	48,306	6	28	1	25		1	61	3	40		10
Virginia .....	3	70,800	11,500	3	20	5	8	1		37				17
Washington .....	5	540,039	75,936	6	57	10	29		2	105	3	89		2
West Virginia .....	27	964,263	140,687	23	136	23	133	13	4	337	5	162		20
Wisconsin .....	32	1,146,736	183,958	15	199	39	103	5	12	373	14	260		48
Wyoming .....	7	197,775	16,760	5	32	1	28	2	1	69	1	10		44
Other states (a) .....	5	1,079,448	26,199	2	29	2	19	1	2	55				45

a The states here grouped, in order that the business of individual establishments may not be disclosed to the public, embrace Florida, Georgia, Nevada, Rhode Island, and Vermont.

## PRODUCTION OF SANDSTONE IN THE UNITED STATES IN 1889, BY STATES AND TERRITORIES—CONTINUED.

STATES AND TERRITORIES.	EXPENSES.				CAPITAL.				
	Total wages.	Cost of supplies.	All other expenses.	Total expenses.	Land.	Buildings and fixtures.	Tools, live stock, machinery, and supplies.	Cash.	Total capital.
Total .....	\$6,257,580	\$1,277,004	\$595,711	\$8,130,295	\$11,501,100	\$1,492,850	\$3,044,557	\$1,737,960	\$17,776,467
Alabama.....	41,562	5,600	1,425	48,587	8,000	1,535	3,800	5,200	18,535
Arizona.....	2,542	1,200	.....	3,742	19,400	350	15,250	.....	35,000
Arkansas.....	11,287	1,122	451	12,860	9,750	2,200	2,510	3,200	17,660
California.....	122,847	16,729	7,688	147,264	278,000	33,600	49,150	40,200	400,950
Colorado.....	772,158	76,831	53,779	902,768	1,507,255	100,300	220,860	181,069	2,009,484
Connecticut.....	528,089	127,402	55,281	710,772	1,190,606	234,992	292,398	178,961	1,896,957
Idaho.....	1,350	75	515	1,940	6,200	3,500	550	.....	10,250
Illinois.....	8,987	977	894	10,808	33,450	1,900	5,625	8,425	49,400
Indiana.....	37,387	4,663	1,182	43,232	113,700	7,400	40,025	7,200	169,225
Iowa.....	56,714	11,387	2,913	71,014	86,870	6,115	71,710	13,760	178,455
Kansas.....	105,507	8,855	3,232	117,594	194,510	18,025	32,600	79,000	324,135
Kentucky.....	62,745	14,223	9,134	86,102	90,468	12,822	41,200	52,000	196,580
Maryland.....	7,749	410	1,112	9,271	27,480	1,700	7,770	4,050	41,000
Massachusetts.....	414,282	51,051	44,316	509,649	130,550	37,170	126,851	79,291	373,862
Michigan.....	102,094	11,529	14,339	127,962	215,402	104,025	177,500	112,950	609,877
Minnesota.....	74,110	23,301	5,696	103,107	323,000	16,590	52,900	9,600	407,090
Missouri.....	69,549	8,806	3,418	81,773	201,100	14,150	57,480	25,650	298,380
Montana.....	27,881	3,473	100	31,454	46,300	6,650	9,450	8,000	70,400
New Hampshire.....	3,138	403	80	3,621	2,500	2,500	4,010	500	22,310
New Jersey.....	380,767	48,012	23,878	452,657	153,650	45,075	127,313	132,077	793,115
New Mexico.....	122,730	14,750	1,829	139,309	366,400	24,022	21,605	9,473	421,500
New York.....	522,702	39,017	9,662	571,381	507,880	69,155	153,522	88,823	879,350
North Carolina.....	7,500	2,000	100	9,600	40,000	5,000	25,000	.....	70,000
Ohio.....	1,450,266	585,035	241,834	2,277,735	3,455,499	373,045	869,686	378,430	5,075,660
Oregon.....	3,000	500	300	4,400	50,000	1,000	2,000	.....	53,000
Pennsylvania.....	943,641	143,174	93,509	1,180,324	1,081,894	250,484	382,781	212,251	1,927,410
South Dakota.....	65,434	19,075	5,704	90,213	240,300	14,965	40,505	8,000	303,770
Tennessee.....	2,119	182	302	2,603	800	7,520	4,168	500	12,988
Texas.....	8,993	1,865	672	11,520	10,650	850	635	50	12,185
Utah.....	33,598	10,470	253	44,321	81,125	30,200	10,250	2,000	123,575
Virginia.....	8,000	570	59	8,629	4,700	300	1,180	3,000	9,180
Washington.....	45,722	8,650	583	54,955	30,000	13,600	11,100	24,000	78,700
West Virginia.....	72,269	6,037	2,398	80,704	114,478	8,070	36,510	22,100	181,158
Wisconsin.....	110,509	19,724	8,310	138,543	319,615	50,010	133,787	47,410	550,822
Wyoming.....	18,283	3,950	638	22,871	130,048	1,500	7,300	500	139,348
Other states (a).....	11,519	5,366	125	17,010	10,000	250	4,676	200	15,126

a The states here grouped, in order that the business of individual establishments may not be disclosed to the public, embrace Florida, Georgia, Nevada, Rhode Island, and Vermont.

The following list is presented for the purpose of showing by states and territories as well as for the entire country the purposes to which sandstone is applied. It will be seen that they are as follows: Building purposes; street work; abrasive purposes; bridge, dam, and railroad work, and miscellaneous uses. In order that these general purposes may be understood, the following list of detailed uses which come under one or another of the general headings in the table is presented:

## FOUNDATIONS, SUPERSTRUCTURES, AND TRIMMINGS.

Solid fronts.	Steps.	Kiln stone.	Ashlar.
Foundations.	Buttresses.	Capping.	Forts.
Cellar walls.	Window sills.	Belting or belt courses.	Dimension.
Underpinning.	Lintels.	Rubble.	Sills.

## STREET WORK.

Paving blocks.	Basin heads or catch-basin covers.	Road making:	Macadam.	Sledged stone.
Curbing.	Stepping stones.	}	Telford.	Crushed stone.
Flagging.			Concrete.	

## ABRASIVE PURPOSES.

Grindstones.	Whetstones.	Shoe rubbers.	Oilstones.
--------------	-------------	---------------	------------

## BRIDGE, DAM, AND RAILROAD WORK.

Bridges.	Breakwater.	Rails.	Bank stone.
Culverts.	Jetties.	Ballast.	Parapets.
Aqueducts.	Piers.	Approaches.	Docks.
Dams.	Buttresses.	Towers.	Bridge covering.
Wharf stone.	Capstone.		

## MISCELLANEOUS.

Grout.	Furnace hearths.	Cemetery work.	Lining for steel converters.
Hitching posts.	Lining for blast furnaces.	Watering troughs.	Glass furnaces.
Fence wall.	Rolling-mill furnaces.	Fluxing.	Core sand for foundries.
Sand for glass.	Adamantine plaster.	Ganister.	Random stock.
Sand for plaster and cement.	Millstones.	Fire brick, silica brick.	

## DISTRIBUTION OF SANDSTONE ACCORDING TO ITS SEVERAL USES.

STATES AND TERRITORIES.	Number of quarries.	Total number of cubic feet.	Total value.	BUILDING PURPOSES.			STREET WORK.		
				Cubic feet.	Value.	Value per cubic foot.	Cubic feet.	Value.	Value per cubic foot.
Total .....	803	71,571,054	\$10,816,057	41,979,241	\$7,121,942	\$0.16	8,463,506	\$1,832,822	\$0.22
Alabama .....	5	610,026	43,965	542,700	31,310	0.06			
Arizona .....	2	127,907	9,146	42,250	1,750	0.04			
Arkansas .....	8	210,010	25,074	139,950	12,359	0.09	27,160	8,215	0.30
California .....	15	333,209	175,598	320,275	172,758	0.52	100	200	2.00
Colorado .....	71	6,570,529	1,224,098	4,601,965	703,477	0.15	1,926,464	599,955	0.26
Connecticut .....	13	2,821,430	920,061	2,524,895	894,226	0.35	40,500	2,250	0.06
Idaho .....	2	28,710	2,490	28,710	2,490	0.09			
Illinois .....	10	141,605	17,896	82,799	13,178	0.16	3,200	50	0.02
Indiana .....	11	334,441	43,983	104,600	16,033	0.15			
Iowa .....	11	404,350	80,251	394,870	79,356	0.20	8,840	880	0.10
Kansas .....	17	680,289	149,239	225,774	17,026	0.08	452,015	132,188	0.29
Kentucky .....	11	888,738	117,940	485,863	77,877	0.16	13,900	1,600	0.12
Maryland .....	4	508,325	10,605	63,269	1,944	0.03	40,320	2,045	0.05
Massachusetts .....	21	1,967,179	619,097	1,344,850	602,137	0.45	501,221	40,471	0.08
Michigan .....	6	658,318	246,570	606,182	217,720	0.36	2,496	550	0.22
Minnesota .....	7	4,156,224	131,979	1,088,870	82,000	0.08	51,930	38,200	0.74
Missouri .....	17	734,370	155,557	409,187	113,445	0.21	6,533	2,512	0.38
Montana .....	6	644,740	31,648	644,740		0.05			
New Hampshire .....	2	21,665	3,750						
New Jersey .....	26	6,010,212	597,309	4,607,767	486,788	0.11			
New Mexico .....	11	588,048	186,804	545,648	182,184	0.33	10,000	3,000	0.30
New York .....	63	4,878,365	702,419	1,960,277	241,216	0.12	2,864,366	459,158	0.16
North Carolina .....	2	50,000	12,000	50,000	12,000	0.24			
Ohio .....	192	16,016,258	3,046,656	10,122,544	1,846,918	0.18	1,603,614	430,552	0.27
Oregon .....	2	50,000	8,424	50,000	8,424	0.17			
Pennsylvania .....	159	17,414,875	1,609,150	9,864,139	777,123	0.08	854,907	175,062	0.20
South Dakota .....	13	341,875	93,570	317,751	81,949	0.26			
Tennessee .....	4	53,978	2,722	45,878	2,632	0.06			
Texas .....	7	180,591	14,651	180,591	14,651	0.08			
Utah .....	7	145,726	48,306	145,726	48,306	0.33			
Virginia .....	3	70,800	11,500	70,800	11,500	0.16			
Washington .....	5	540,039	75,936	540,039	75,936	0.14			
West Virginia .....	27	964,263	140,687	412,053	40,149	0.10	42,075	23,274	0.55
Wisconsin .....	32	1,146,736	183,958	1,087,856	182,333	0.17			
Wyoming .....	7	197,775	16,760	197,775	16,760	0.08			
Other states (a) .....	5	1,079,448	26,199	1,059,148	22,339	0.02	13,865	2,660	0.19

a The states here grouped, in order that the business of individual establishments may not be disclosed to the public, embrace Florida, Georgia, Nevada, Rhode Island, and Vermont.



## DISTRIBUTION OF SANDSTONE ACCORDING TO ITS SEVERAL USES—CONTINUED.

STATES AND TERRITORIES.	ABRASIVE PURPOSES.			BRIDGE, DAM, AND RAILROAD WORK.			MISCELLANEOUS.		
	Cubic feet.	Value.	Value per cubic foot.	Cubic feet.	Value.	Value per cubic foot.	Cubic feet.	Value.	Value per cubic foot.
Total .....	1,378,535	\$580,229	\$0.42	13,614,390	\$1,021,920	\$0.08	3,135,382	\$259,144	\$0.08
Alabama .....				67,326	12,655	0.19			
Arizona .....				85,657	7,396	0.09			
Arkansas .....							42,900	4,500	0.10
California .....	448	440	0.98				2,386	2,200	0.92
Colorado .....				42,100	10,666	0.25			
Connecticut .....				256,035	23,585	0.09			
Idaho .....									
Illinois .....				55,606	4,668	0.08			
Indiana .....	3,813	9,870	2.59	226,028	18,080	0.08			
Iowa .....				640	15	0.02			
Kansas .....				2,500	75	0.03			
Kentucky .....				389,475	38,463	0.10			
Maryland .....				255,041	3,368	0.01	149,695	3,248	0.02
Massachusetts .....				121,108	6,489	0.05			
Michigan .....	44,640	27,800	0.62	5,000	500	0.10			
Minnesota .....				3,015,424	11,779	0.004			
Missouri .....				258,650	39,600	0.15			
Montana .....									
New Hampshire .....	21,665	3,750	0.17						
New Jersey .....				1,302,445	100,521	0.08	100,000	10,000	0.10
New Mexico .....				32,400	1,620	0.05			
New York .....				9,840	445	0.05	43,882	1,600	0.04
North Carolina .....									
Ohio .....	1,277,410	525,548	0.41	2,026,314	166,114	0.08	986,376	77,524	0.08
Oregon .....									
Pennsylvania .....				4,885,686	496,902	0.10	1,810,143	160,072	0.09
South Dakota .....	24,124	11,621	0.48						
Tennessee .....				8,100	90	0.01			
Texas .....									
Utah .....									
Virginia .....									
Washington .....									
West Virginia .....				510,135	77,264	0.15			
Wisconsin .....				58,880	1,625	0.03			
Wyoming .....									
Other states (a) .....	6,435	1,200	0.19						

a The states here grouped, in order that the business of individual establishments may not be disclosed to the public, embrace Florida, Georgia, Nevada, Rhode Island, and Vermont.

Glancing over this table, it appears that \$7,121,942 worth of stone is applied to building purposes, while \$1,832,822 worth has been applied to street work. Abrasive purposes have consumed an amount valued at \$580,229, while for bridge, dam, and railroad work \$1,021,920 worth was used. For miscellaneous purposes the amount is \$259,144. Although the value of the stone for abrasive purposes is comparatively small, it is important to note that the quality of stone applied to these purposes is necessarily very fine, and consequently has a decidedly higher average value per cubic foot than that used for any other purpose. It will be noticed that there is quite a variation in the value per cubic foot of the stone used for different purposes, and in some cases for one and the same purpose. This is due to a variety of causes, among which may be mentioned variations in the quality of the stone, distance from any competing sources, rates of wages, etc.

The tables following give the relative standing of the states and territories, first, according to value and purpose, and second, according to number of cubic feet and purposes.

RELATIVE STANDING OF STATES AND TERRITORIES ACCORDING TO VALUE AND PURPOSES.

BUILDING PURPOSES.		STREET WORK.		ABRASIVE PURPOSES.		BRIDGE, DAM, AND RAILROAD WORK.		MISCELLANEOUS.	
States, etc.	Value.	States, etc.	Value.	States, etc.	Value.	States, etc.	Value.	States, etc.	Value.
Total .....	\$7, 121, 942	Total .....	\$1, 832, 822	Total .....	\$580, 229	Total .....	\$1, 021, 920	Total .....	\$259, 144
1 Ohio .....	1, 846, 918	Colorado .....	509, 955	Ohio .....	525, 548	Pennsylvania .....	496, 902	Pennsylvania .....	160, 072
2 Connecticut .....	894, 226	New York .....	459, 158	Michigan .....	27, 800	Ohio .....	166, 114	Ohio .....	77, 524
3 Pennsylvania .....	777, 123	Ohio .....	430, 552	South Dakota .....	11, 621	New Jersey .....	100, 521	New Jersey .....	10, 000
4 Colorado .....	703, 477	Pennsylvania .....	175, 062	Indiana .....	9, 870	West Virginia .....	77, 264	Arkansas .....	4, 500
5 Massachusetts .....	602, 137	Kansas .....	132, 188	New Hampshire .....	3, 750	Missouri .....	39, 600	Maryland .....	3, 248
6 New Jersey .....	486, 788	Massachusetts .....	40, 471	California .....	440	Kentucky .....	38, 463	California .....	2, 200
7 New York .....	241, 216	Minnesota .....	38, 200			Connecticut .....	23, 585	New York .....	1, 600
8 Michigan .....	217, 730	West Virginia .....	23, 274			Indiana .....	18, 080		
9 Wisconsin .....	182, 333	Arkansas .....	8, 215			Alabama .....	12, 658		
10 New Mexico .....	182, 184	New Mexico .....	3, 000			Minnesota .....	11, 779		
11 California .....	172, 758	Missouri .....	2, 512			Colorado .....	10, 666		
12 Missouri .....	113, 445	Connecticut .....	2, 250			Arizona .....	7, 396		
13 Minnesota .....	82, 000	Maryland .....	2, 045			Massachusetts .....	6, 489		
14 South Dakota .....	81, 949	Kentucky .....	1, 600			Illinois .....	4, 668		
15 Iowa .....	79, 356	Iowa .....	880			Maryland .....	3, 368		
16 Kentucky .....	77, 877	Michigan .....	550			Wisconsin .....	1, 625		
17 Washington .....	75, 936	California .....	200			New Mexico .....	1, 620		
18 Utah .....	48, 306	Illinois .....	50			Michigan .....	500		
19 West Virginia .....	40, 149					New York .....	445		
20 Montana .....	31, 648					Tennessee .....	90		
21 Alabama .....	31, 310					Kansas .....	75		
22 Kansas .....	17, 026					Iowa .....	15		
23 Wyoming .....	16, 760								
24 Indiana .....	16, 033								
25 Texas .....	14, 651								
26 Illinois .....	13, 178								
27 Arkansas .....	12, 359								
28 North Carolina .....	12, 000								
29 Virginia .....	11, 500								
30 Oregon .....	8, 424								
31 Tennessee .....	2, 632								
32 Idaho .....	2, 490								
33 Maryland .....	1, 944								
34 Arizona .....	1, 750								
Other states (a) .....	22, 339	Other states .....	2, 660	Other states .....	1, 200				

RELATIVE STANDING OF STATES AND TERRITORIES ACCORDING TO CUBIC FEET AND PURPOSES.

BUILDING PURPOSES.		STREET WORK.		ABRASIVE PURPOSES.		BRIDGE, DAM, AND RAILROAD WORK.		MISCELLANEOUS.	
States, etc.	Cubic feet.	States, etc.	Cubic feet.	States, etc.	Cubic feet.	States, etc.	Cubic feet.	States, etc.	Cubic feet.
Total .....	44, 979, 241	Total .....	8, 463, 500	Total .....	1, 378, 535	Total .....	13, 614, 390	Total .....	3, 135, 382
1 Ohio .....	10, 122, 544	New York .....	2, 864, 366	Ohio .....	1, 277, 410	Pennsylvania .....	4, 885, 086	Pennsylvania .....	1, 810, 143
2 Pennsylvania .....	9, 864, 139	Colorado .....	1, 926, 464	Michigan .....	44, 640	Minnesota .....	3, 015, 424	Ohio .....	986, 376
3 New Jersey .....	4, 607, 767	Ohio .....	1, 603, 614	South Dakota .....	24, 124	Ohio .....	2, 026, 314	Maryland .....	149, 695
4 Colorado .....	4, 601, 965	Pennsylvania .....	854, 907	New Hampshire .....	21, 665	New Jersey .....	1, 302, 445	New Jersey .....	100, 000
5 Connecticut .....	2, 524, 895	Massachusetts .....	501, 221	Indiana .....	3, 813	West Virginia .....	510, 135	New York .....	43, 882
6 New York .....	1, 960, 277	Kansas .....	452, 015	California .....	448	Kentucky .....	389, 475	Arkansas .....	42, 900
7 Massachusetts .....	1, 344, 850	Minnesota .....	51, 930			Missouri .....	258, 650	California .....	2, 386
8 Minnesota .....	1, 088, 870	West Virginia .....	42, 075			Connecticut .....	256, 035		
9 Wisconsin .....	1, 087, 856	Connecticut .....	40, 500			Maryland .....	255, 041		
10 Montana .....	644, 740	Maryland .....	40, 320			Indiana .....	226, 028		
11 Michigan .....	606, 182	Arkansas .....	27, 160			Massachusetts .....	121, 108		
12 New Mexico .....	545, 648	Kentucky .....	13, 900			Arizona .....	85, 657		
13 Alabama .....	542, 700	New Mexico .....	10, 000			Alabama .....	67, 326		
14 Washington .....	540, 039	Iowa .....	8, 840			Wisconsin .....	58, 880		
15 Kentucky .....	485, 363	Missouri .....	6, 533			Illinois .....	55, 608		
16 Missouri .....	469, 187	Illinois .....	3, 200			Colorado .....	42, 100		
17 West Virginia .....	412, 053	Michigan .....	2, 496			New Mexico .....	32, 400		
18 Iowa .....	394, 870	California .....	100			New York .....	9, 840		
19 California .....	330, 275					Tennessee .....	8, 100		
20 South Dakota .....	317, 751					Michigan .....	5, 000		
21 Kansas .....	225, 774					Kansas .....	2, 500		
22 Wyoming .....	197, 775					Iowa .....	640		
23 Texas .....	180, 591								
24 Utah .....	145, 726								
25 Arkansas .....	139, 950								
26 Indiana .....	104, 600								
27 Illinois .....	82, 799								
28 Virginia .....	70, 800								
29 Maryland .....	63, 269								
30 Oregon .....	50, 000								
31 North Carolina .....	50, 000								
32 Tennessee .....	45, 878								
33 Arizona .....	42, 250								
34 Idaho .....	28, 710								
Other states (a) .....	1, 059, 148	Other states .....	13, 865	Other states .....	6, 435				

a The states here grouped, in order that the business of individual establishments may not be disclosed to the public, embrace Florida, Georgia, Nevada, Rhode Island, and Vermont.

It is evident that for building and abrasive purposes Ohio holds first place, while for street work Colorado stands first. It is also interesting to note that only seven states produce sandstone suitable for abrasive purposes. These in the order of importance are Ohio, Michigan, Indiana, New Hampshire, Vermont, California, and South Dakota. The vast difference in the value of stone for abrasive purposes produced by Ohio as compared with the other states is very striking.

The following table gives information in reference to the labor employed in the sandstone industry. It is evident that the highest wages are paid in the western states. This statement, of course, is true not only for this industry, but for others generally. In Ohio and Pennsylvania wages are not greatly different, although in Pennsylvania they are, as a rule, a little higher than in Ohio.

It will also be noticed that the total wages reported in the table on page 8 as actually paid do not exactly agree with the figures which would result from computing the total wages from the data given in the following table. This is very naturally the case, since the figures of the latter table are the averages given by the producers in response to an inquiry calling for average statements. The figures given for total wages actually paid are exact.

LABOR AND WAGES INVOLVED IN PRODUCTION OF SANDSTONE CLASSIFIED.

STATES AND TERRITORIES.	FOREMEN.				QUARRYMEN.				MECHANICS AND STONECUTTERS.			
	Average number.	Average daily wages.	Average number of days.	Average yearly earnings.	Average number.	Average daily wages.	Average number of days.	Average yearly earnings.	Average number.	Average daily wages.	Average number of days.	Average yearly earnings.
Alabama.....	5	\$2.48	254	\$629.92	53	\$1.06	239	\$253.34	9	\$3.50	230	\$805.00
Arizona.....	1	3.00	150	450.00	10	1.84	89	163.76				
Arkansas.....	3	2.38	218	518.84	24	1.44	185	266.40	9	1.87	94	175.78
California.....	10	4.05	231	935.55	114	2.42	223	539.66	31	3.92	237	929.04
Colorado.....	90	3.09	208	642.72	854	2.35	216	507.60	187	2.45	236	578.20
Connecticut.....	45	2.98	249	742.02	814	1.87	249	465.63	58	2.80	232	649.60
Idaho.....					3	2.00	247	494.00				
Illinois.....	4	2.56	175	448.00	33	1.67	116	193.72	1	2.15	86	77.40
Indiana.....	12	4.00	280	1,120.00	71	1.49	175	260.75	25	1.75	280	490.00
Iowa.....	8	3.30	191	630.30	41	2.20	160	352.00	21	2.43	210	510.30
Kansas.....	11	2.72	190	516.80	159	1.87	216	403.92	57	2.02	231	466.62
Kentucky.....	15	3.06	164	501.84	126	1.61	107	173.27	43	3.15	157	494.55
Maryland.....	2	1.50	170	255.00	89	1.14	158	180.12				
Massachusetts.....	28	3.02	267	806.34	358	2.00	209	418.00	161	3.06	221	676.26
Michigan.....	9	2.92	255	744.60	132	1.68	171	287.28	31	2.63	232	610.16
Minnesota.....	10	3.00	235	705.00	151	1.53	231	353.43	16	2.00	260	520.00
Missouri.....	12	2.83	214	616.32	80	2.00	182	364.00	17	2.33	218	507.94
Montane.....	6	4.55	138	627.90	57	2.66	149	396.34	1	3.00	30	90.00
New Hampshire.....	2	3.80	174	661.20	9	1.49	119	177.31	1	1.50	130	195.00
New Jersey.....	38	3.00	268	804.00	299	2.03	246	499.38	130	3.20	241	771.20
New Mexico.....	11	4.08	120	489.60	217	2.26	96	216.96	47	3.30	116	382.80
New York.....	58	2.79	170	474.30	568	1.99	161	320.39	183	2.96	163	488.40
North Carolina.....	1	4.00	200	800.00	4	1.50	200	300.00	2	1.50	200	300.00
Ohio.....	187	2.59	222	574.98	1,660	1.73	204	352.92	506	2.06	231	475.86
Oregon.....					5	2.00	300	600.00				
Pennsylvania.....	140	2.67	201	536.67	1,262	1.83	194	355.02	337	2.66	175	465.50
South Dakota.....	9	3.98	197	784.06	64	2.07	101	207.05	18	2.91	186	395.76
Tennessee.....	2	1.83	45	82.35	22	1.08	45	48.60	2	1.50	30	45.00
Texas.....	3	2.29	215	492.35	16	1.74	76	132.24	4	1.76	138	242.88
Utah.....	6	4.09	219	895.71	28	2.93	182	533.26	1	3.00	119	357.00
Virginia.....	3	2.72	145	394.40	20	1.00	146	146.00	5	2.50	120	300.00
Washington.....	6	3.57	262	935.34	57	2.28	157	357.96	10	3.16	153	433.48
West Virginia.....	23	2.51	149	373.99	136	1.41	154	221.76	28	2.73	145	395.85
Wisconsin.....	15	3.10	174	539.40	199	1.92	144	276.48	39	2.91	167	485.97
Wyoming.....	5	3.63	120	435.60	32	2.85	142	404.70	1	3.00	175	525.00
Other states (a).....	2	2.00	138	276.00	29	1.37	134	183.58	2	1.50	175	262.50

a The states here grouped, in order that the business of individual establishments may not be disclosed to the public, embrace Florida, Georgia, Nevada, Rhode Island, and Vermont.

## LABOR AND WAGES INVOLVED IN PRODUCTION OF SANDSTONE CLASSIFIED—CONTINUED.

STATES AND TERRITORIES.	LABORERS.				BOYS UNDER SIXTEEN YEARS.				OFFICE FORCE.	
	Average number.	Average daily wages.	Average number of days.	Average yearly earnings.	Average number	Average daily wages.	Average number of days.	Average yearly earnings.	Average number.	Average annual salary.
Alabama.....	54	\$1.16	242	\$280.72	5	\$0.59	237	\$139.83	1	\$480.00
Arizona.....	2	1.50	150	225.00						
Arkansas.....	14	1.22	149	181.78						
California.....	64	2.05	229	469.45	2	1.00	250	250.00	1	1,200.00
Colorado.....	313	2.01	238	478.38	8	1.24	119	147.56	33	725.00
Connecticut.....	150	1.74	238	414.12	5	0.85	280	238.00	20	2,006.88
Idaho.....	2	2.00	208	416.00						
Illinois.....	8	1.38	60	82.80						
Indiana.....	67	1.25	263	328.75	11	0.73	186	135.78	2	180.00
Iowa.....	63	1.48	209	309.32	3	0.51	146	74.46	6	1,250.00
Kansas.....	88	1.43	218	311.74	4	0.75	300	225.00	10	744.44
Kentucky.....	105	1.28	157	200.96	11	0.63	108	68.04	2	105.88
Maryland.....					2	0.57	175	99.75		
Massachusetts.....	347	1.70	211	358.70	2	0.60	150	90.00	10	852.84
Michigan.....	166	1.46	243	354.78	5	1.00	145	145.00	2	800.00
Minnesota.....	22	1.55	300	465.00	5	1.00	260	260.00	1	800.00
Missouri.....	77	1.38	190	262.20	3	0.75	257	192.75	3	1,000.00
Montana.....	2	1.50	100	150.00	2	1.75	300	525.00	1	55.00
New Hampshire.....					1	0.50	35	17.50		
New Jersey.....	378	1.45	251	363.95	11	0.94	231	217.14	10	480.74
New Mexico.....	87	1.79	56	100.24	11	0.75	45	33.75	4	393.33
New York.....	738	1.52	173	262.96	10	0.73	136	99.28	12	762.50
North Carolina.....	40	1.00	260	200.00	5	0.50	200	100.00	1	500.00
Ohio.....	1,610	1.33	182	242.06	54	0.74	198	146.52	78	1,157.24
Oregon.....	2	1.00	300	300.00						
Pennsylvania.....	1,102	1.41	181	255.21	66	0.89	199	177.11	25	629.62
South Dakota.....	43	1.96	118	231.28					6	472.50
Tennessee.....	4	0.60	30	18.00					2	75.00
Texas.....	19	1.20	192	230.40						
Utah.....	25	2.23	232	517.36					1	300.00
Virginia.....	8	1.00	130	130.00	1	0.75	130	97.50		
Washington.....	29	2.08	200	416.00	1	0.75	50	37.50	2	1,033.33
West Virginia.....	133	1.24	144	178.56	13	0.73	153	111.69	4	445.50
Wisconsin.....	103	1.71	145	247.95	5	0.90	217	195.30	12	977.78
Wyoming.....	28	2.02	133	268.66					1	800.00
Other states (a).....	19	1.41	147	207.27	1	1.00	175	175.00	2	450.00

a The states here grouped, in order that the business of individual establishments may not be disclosed to the public, embrace Florida, Georgia, Nevada, Rhode Island, and Vermont.

The table following gives the states and territories in the order of their relative importance with respect to a number of different statistical items. It will be noticed that for all of these items except the number of cubic feet Ohio stands first, while Pennsylvania stands first in the number of cubic feet quarried. Inspection of this table will reveal at once a number of interesting features, which would require no little time and labor to extract from the principal table relative to production, in which all these items are contained. The most important of these items in determining the relative standing of the states is, of course, the value of the output.

## RELATIVE STANDING OF STATES PRODUCING SANDSTONE ACCORDING TO VARIOUS STATISTICAL ITEMS.

STATES AND TERRITORIES.	Cubic feet.	STATES AND TERRITORIES.	Value of product.	STATES AND TERRITORIES.	Capital in land.	STATES AND TERRITORIES.	Total capital.
Total .....	71, 571, 054	Total .....	\$10, 816, 057	Total .....	\$11, 501, 100	Total .....	\$17, 776, 487
1 Pennsylvania .....	17, 414, 875	Ohio .....	3, 046, 656	Ohio .....	3, 455, 499	Ohio .....	5, 075, 680
2 Ohio .....	16, 016, 258	Pennsylvania .....	1, 609, 159	Colorado .....	1, 507, 255	Colorado .....	2, 009, 484
3 Colorado .....	6, 570, 529	Colorado .....	1, 224, 098	Connecticut .....	1, 190, 606	Pennsylvania .....	1, 927, 410
4 New Jersey .....	6, 010, 212	Connecticut .....	920, 061	Pennsylvania .....	1, 081, 894	Connecticut .....	1, 896, 957
5 New York .....	4, 878, 365	New York .....	702, 419	New York .....	567, 880	New York .....	879, 380
6 Minnesota .....	4, 156, 224	Massachusetts .....	649, 097	New Jersey .....	488, 650	New Jersey .....	793, 115
7 Connecticut .....	2, 821, 430	New Jersey .....	597, 309	New Mexico .....	366, 400	Michigan .....	609, 877
8 Massachusetts .....	1, 967, 179	Michigan .....	246, 570	Minnesota .....	328, 000	Wisconsin .....	550, 522
9 Wisconsin .....	1, 146, 736	New Mexico .....	186, 804	Wisconsin .....	319, 615	New Mexico .....	421, 500
10 West Virginia .....	964, 263	Wisconsin .....	183, 958	California .....	278, 000	Minnesota .....	407, 090
11 Kentucky .....	868, 738	California .....	175, 598	South Dakota .....	240, 300	California .....	400, 950
12 Missouri .....	734, 370	Missouri .....	155, 537	Michigan .....	215, 402	Massachusetts .....	373, 862
13 Kansas .....	680, 289	Kansas .....	149, 289	Missouri .....	201, 100	Kansas .....	324, 135
14 Michigan .....	658, 318	West Virginia .....	140, 687	Kansas .....	194, 510	South Dakota .....	303, 770
15 Montana .....	644, 740	Minnesota .....	131, 979	Massachusetts .....	130, 550	Missouri .....	298, 380
16 Alabama .....	610, 026	Kentucky .....	117, 940	Wyoming .....	130, 048	Kentucky .....	196, 580
17 New Mexico .....	588, 048	South Dakota .....	93, 570	West Virginia .....	114, 478	West Virginia .....	181, 158
18 Washington .....	540, 039	Iowa .....	80, 251	Indiana .....	113, 700	Iowa .....	178, 455
19 Maryland .....	508, 325	Washington .....	75, 936	Kentucky .....	90, 468	Indiana .....	169, 225
20 Iowa .....	404, 350	Utah .....	48, 306	Iowa .....	86, 870	Wyoming .....	139, 348
21 South Dakota .....	341, 875	Indiana .....	43, 983	Utah .....	81, 125	Utah .....	123, 575
22 Indiana .....	334, 441	Alabama .....	43, 965	Oregon .....	50, 000	Washington .....	78, 700
23 California .....	333, 209	Montana .....	31, 648	Montana .....	46, 300	Montana .....	70, 400
24 Arkansas .....	210, 010	Arkansas .....	25, 074	North Carolina .....	40, 000	North Carolina .....	70, 000
25 Wyoming .....	197, 775	Illinois .....	17, 896	Illinois .....	33, 450	Oregon .....	53, 000
26 Texas .....	180, 591	Wyoming .....	16, 760	Washington .....	30, 000	Illinois .....	49, 400
27 Utah .....	145, 726	Texas .....	14, 651	Maryland .....	27, 480	Maryland .....	41, 000
28 Illinois .....	141, 605	North Carolina .....	12, 000	Arizona .....	19, 400	Arizona .....	35, 000
29 Arizona .....	127, 907	Virginia .....	11, 500	New Hampshire .....	15, 300	New Hampshire .....	22, 310
30 Virginia .....	70, 800	Maryland .....	10, 605	Texas .....	10, 650	Alabama .....	18, 335
31 Tennessee .....	53, 973	Arizona .....	9, 146	Arkansas .....	9, 750	Arkansas .....	17, 660
32 North Carolina .....	50, 000	Oregon .....	8, 424	Alabama .....	8, 000	Tennessee .....	12, 988
33 Oregon .....	50, 000	New Hampshire .....	3, 750	Tennessee .....	7, 520	Texas .....	12, 185
34 Idaho .....	28, 710	Tennessee .....	2, 722	Idaho .....	6, 200	Idaho .....	10, 250
35 New Hampshire .....	21, 665	Idaho .....	2, 490	Virginia .....	4, 700	Virginia .....	9, 180
Other states (a) .....	1, 079, 448	Other states .....	26, 199	Other states .....	10, 000	Other states .....	15, 126

  

STATES AND TERRITORIES.	Number of employes.	STATES AND TERRITORIES.	Wages paid.	STATES AND TERRITORIES.	Cost of supplies.	STATES AND TERRITORIES.	Total expenses.
Total .....	16, 925	Total .....	\$6, 257, 580	Total .....	\$1, 277, 004	Total .....	\$8, 130, 295
1 Ohio .....	4, 095	Ohio .....	1, 450, 266	Ohio .....	585, 635	Ohio .....	2, 277, 735
2 Pennsylvania .....	2, 932	Pennsylvania .....	943, 641	Pennsylvania .....	143, 174	Pennsylvania .....	1, 180, 824
3 New York .....	1, 569	Colorado .....	772, 158	Connecticut .....	127, 402	Colorado .....	902, 768
4 Colorado .....	1, 485	Connecticut .....	528, 089	Colorado .....	76, 831	Connecticut .....	710, 772
5 Connecticut .....	1, 092	New York .....	522, 762	Massachusetts .....	51, 051	New York .....	571, 381
6 Massachusetts .....	906	Massachusetts .....	414, 282	New Jersey .....	48, 012	Massachusetts .....	509, 649
7 New Jersey .....	866	New Jersey .....	340, 767	New York .....	39, 017	New Jersey .....	452, 657
8 New Mexico .....	377	California .....	122, 847	Minnesota .....	122, 301	California .....	147, 264
9 Wisconsin .....	373	New Mexico .....	122, 730	Wisconsin .....	19, 724	New Mexico .....	139, 309
10 Michigan .....	345	Wisconsin .....	110, 509	South Dakota .....	19, 075	Wisconsin .....	138, 543
11 West Virginia .....	337	Kansas .....	105, 507	California .....	16, 729	Michigan .....	127, 962
12 Kansas .....	329	Michigan .....	102, 094	New Mexico .....	14, 750	Kansas .....	117, 594
13 Kentucky .....	302	Minnesota .....	74, 110	Kentucky .....	14, 223	Minnesota .....	103, 107
14 California .....	222	West Virginia .....	72, 269	Michigan .....	11, 529	South Dakota .....	90, 213
15 Minnesota .....	205	Missouri .....	69, 549	Iowa .....	11, 387	Kentucky .....	86, 102
16 Missouri .....	192	South Dakota .....	65, 434	Utah .....	10, 470	Missouri .....	81, 773
17 Indiana .....	188	Kentucky .....	62, 745	Kansas .....	8, 855	West Virginia .....	80, 704
18 Iowa .....	142	Iowa .....	56, 714	Missouri .....	8, 806	Iowa .....	71, 014
19 South Dakota .....	140	Washington .....	45, 722	Washington .....	8, 650	Washington .....	54, 955
20 Alabama .....	127	Alabama .....	41, 562	West Virginia .....	6, 037	Alabama .....	48, 587
21 Washington .....	105	Indiana .....	37, 387	Alabama .....	5, 600	Utah .....	44, 321
22 Montana .....	69	Utah .....	33, 598	Indiana .....	4, 663	Indiana .....	43, 232
23 Wyoming .....	69	Montana .....	27, 881	Wyoming .....	3, 950	Montana .....	31, 454
24 Utah .....	61	Wyoming .....	18, 283	Montana .....	3, 473	Wyoming .....	22, 871
25 North Carolina .....	53	Arkansas .....	11, 287	North Carolina .....	2, 000	Arkansas .....	12, 860
26 Arkansas .....	50	Texas .....	8, 993	Texas .....	1, 855	Texas .....	11, 520
27 Illinois .....	46	Illinois .....	8, 937	Arizona .....	1, 200	Illinois .....	10, 808
28 Maryland .....	43	Virginia .....	8, 000	Arkansas .....	1, 122	North Carolina .....	9, 600
29 Texas .....	42	Maryland .....	7, 749	Illinois .....	977	Maryland .....	9, 271
30 Virginia .....	37	North Carolina .....	7, 500	Virginia .....	570	Virginia .....	8, 629
31 Tennessee .....	33	Oregon .....	3, 600	Oregon .....	500	Oregon .....	4, 400
32 Arizona .....	13	New Hampshire .....	3, 138	Maryland .....	410	Arizona .....	3, 742
33 New Hampshire .....	13	Arizona .....	2, 542	New Hampshire .....	403	New Hampshire .....	3, 621
34 Oregon .....	7	Tennessee .....	2, 119	Tennessee .....	182	Tennessee .....	2, 603
35 Idaho .....	5	Idaho .....	1, 350	Idaho .....	75	Idaho .....	1, 940
Other states (a) .....	55	Other states .....	11, 519	Other states .....	5, 366	Other states .....	17, 010

a The states here grouped, in order that the business of individual establishments may not be disclosed to the public, embrace Florida, Georgia, Nevada, Rhode Island, and Vermont.

The following table gives a number of deductions from the figures in the table on production, such as the percentages of the profit on capital, also on sales in the different states. It will be noticed that in two of the states loss is reported, but in these cases operations have been quite limited, and only recently begun:

## GENERAL STATISTICS.

STATES AND TERRITORIES.	Total number of cubic feet.	Total value of product.	Total wages.	Total expense.	Total capital.	PER CENT OF PROFIT—		Cost per cubic foot of production.	Percentage of wages to total expense.	Amount of wages paid per cubic foot.	Percentage of wages to total value.	Value per cubic foot.
						On capital.	On value of product.					
Total .....	71, 571, 054	\$10, 816, 057	\$6, 257, 580	\$8, 130, 295	\$17, 776, 467	15. 11	24. 83	\$0. 11	76. 97	\$0. 09	57. 85	\$0. 15
Alabama .....	610, 026	43, 905	41, 562	48, 587	18, 535	-24. 04	-10. 51	0. 08	85. 54	0. 07	94. 53	0. 07
Arizona .....	127, 907	9, 146	2, 542	3, 742	35, 000	15. 44	59. 09	0. 03	67. 93	0. 02	27. 79	0. 07
Arkansas .....	210, 010	25, 074	11, 287	12, 860	17, 660	69. 16	48. 71	0. 06	87. 77	0. 05	45. 01	0. 12
California .....	333, 209	175, 598	123, 847	147, 264	400, 950	7. 07	16. 14	0. 44	83. 42	0. 37	69. 96	0. 53
Colorado .....	6, 570, 520	1, 234, 098	773, 158	902, 768	2, 009, 484	15. 99	26. 25	0. 14	85. 53	0. 12	63. 08	0. 19
Connecticut .....	2, 821, 430	920, 061	528, 039	710, 772	1, 896, 957	11. 03	22. 75	0. 23	74. 30	0. 19	57. 40	0. 33
Idaho .....	28, 710	2, 490	1, 350	1, 940	10, 250	5. 37	22. 09	0. 07	69. 59	0. 05	54. 22	0. 09
Illinois .....	141, 695	17, 896	8, 937	10, 868	49, 490	14. 35	39. 61	0. 08	82. 69	0. 06	49. 94	0. 13
Indiana .....	334, 441	43, 933	37, 387	43, 232	169, 225	0. 44	1. 71	0. 13	86. 48	0. 11	85. 00	0. 13
Iowa .....	404, 350	80, 231	56, 714	71, 014	178, 455	5. 18	11. 51	0. 18	79. 86	0. 14	70. 67	0. 20
Kansas .....	680, 289	140, 239	105, 507	117, 594	324, 135	9. 78	21. 23	0. 17	80. 72	0. 16	70. 67	0. 22
Kentucky .....	888, 738	117, 940	62, 745	86, 102	196, 580	16. 20	27. 00	0. 10	72. 87	0. 07	53. 20	0. 13
Maryland .....	508, 325	10, 605	7, 749	9, 271	41, 000	3. 25	12. 58	0. 02	83. 58	0. 02	73. 67	0. 02
Massachusetts .....	1, 967, 179	649, 097	414, 282	509, 649	373, 862	37. 30	21. 48	0. 26	81. 29	0. 21	63. 82	0. 33
Michigan .....	658, 318	246, 570	102, 094	127, 962	609, 877	10. 45	48. 10	0. 19	79. 78	0. 16	41. 41	0. 37
Minnesota .....	4, 156, 224	131, 979	74, 110	103, 107	407, 090	7. 09	21. 88	0. 02	71. 88	0. 02	56. 15	0. 03
Missouri .....	734, 370	155, 557	69, 549	81, 773	298, 380	24. 73	47. 43	0. 11	85. 05	0. 09	44. 71	0. 21
Montana .....	644, 740	31, 648	27, 881	31, 454	70, 400	0. 28	0. 61	0. 05	88. 64	0. 04	88. 10	0. 05
New Hampshire .....	21, 665	3, 750	3, 138	3, 621	22, 310	0. 58	3. 44	0. 17	86. 66	0. 14	83. 68	0. 17
New Jersey .....	6, 010, 212	597, 309	380, 767	452, 657	793, 115	18. 24	24. 22	0. 08	84. 12	0. 06	63. 75	0. 10
New Mexico .....	588, 048	186, 804	122, 730	139, 309	421, 500	11. 27	25. 43	0. 24	88. 10	0. 21	65. 70	0. 32
New York .....	4, 878, 365	702, 419	522, 702	571, 381	879, 380	14. 90	18. 66	0. 12	91. 48	0. 11	74. 41	0. 14
North Carolina .....	50, 060	12, 000	7, 500	9, 600	70, 000	3. 43	20. 00	0. 19	78. 13	0. 15	62. 50	0. 24
Ohio .....	16, 016, 258	3, 046, 656	1, 450, 266	2, 277, 735	5, 075, 660	15. 15	25. 24	0. 14	63. 67	0. 09	47. 60	0. 19
Oregon .....	50, 000	8, 424	3, 600	4, 400	53, 000	7. 59	47. 77	0. 09	81. 82	0. 07	42. 74	0. 17
Pennsylvania .....	17, 414, 875	1, 609, 159	943, 641	1, 180, 324	1, 927, 410	22. 25	26. 65	0. 07	79. 95	0. 05	58. 64	0. 09
South Dakota .....	341, 370	65, 434	90, 213	303, 770	303, 770	1. 11	3. 59	0. 26	72. 53	0. 19	69. 93	0. 27
Tennessee .....	53, 978	2, 722	2, 119	2, 603	12, 988	0. 92	4. 37	0. 05	81. 41	0. 04	77. 85	0. 05
Texas .....	180, 591	14, 651	8, 993	11, 520	12, 185	25. 70	21. 27	0. 06	78. 06	0. 05	61. 38	0. 08
Utah .....	145, 726	48, 306	33, 598	44, 321	123, 575	3. 22	8. 25	0. 30	75. 81	0. 23	69. 55	0. 33
Virginia .....	70, 800	11, 500	8, 000	8, 629	9, 180	31. 27	24. 97	0. 12	92. 71	0. 11	69. 57	0. 16
Washington .....	540, 039	75, 936	45, 722	54, 955	78, 700	26. 66	27. 63	0. 10	83. 20	0. 08	60. 21	0. 14
West Virginia .....	964, 263	140, 687	72, 269	80, 704	181, 158	33. 11	42. 64	0. 08	89. 55	0. 07	51. 37	0. 15
Wisconsin .....	1, 146, 736	138, 958	110, 509	138, 543	550, 822	8. 24	24. 69	0. 12	79. 77	0. 10	60. 07	0. 16
Wyoming .....	197, 775	16, 760	18, 283	22, 871	139, 348	-4. 39	-36. 46	0. 12	79. 94	0. 09	109. 09	0. 08
Other states (a) .....	1, 079, 448	26, 199	11, 519	17, 010	15, 126							

a The states here grouped, in order that the business of individual establishments may not be disclosed to the public, embrace Florida, Georgia, Nevada, Rhode Island, and Vermont.

## METHODS OF QUARRYING.

The work of quarrying sandstone is greatly facilitated by the ease with which parallel top and bottom beds may be obtained. In most cases good natural beds or partings parallel to the stratifications may be taken advantage of by the quarryman, and the rock is said to be thick-bedded or thin-bedded owing to the thickness of these sheets. The beds in the majority of quarries are horizontal or nearly so, and the object desired is to cut or break the sheets into rectangular blocks through to the bedding planes below. Much of this work was formerly accomplished by gunpowder used in the ordinary way or by heavy charges of powder contained in tin canisters and exploded in specially large drill holes. These processes have been supplanted in the larger quarries by the Knox patent system of blasting rock and by the more extended use of steam-channeling machines, such as are used in quarrying marble. The Knox system is particularly efficacious in thick-bedded sandstone, and the channelers are specially serviceable where the sheets are thinner. Vertical joints in the rock are a great aid in quarrying, and where they are numerous channelers are not required, and but little powder is necessary in loosening the blocks.

In some quarries the Knox system is used also in blocking up or subdividing the rock after the initial cuts have been made. Ordinarily, however, the plug and feather method is used, or in a rather soft variety, like the Connecticut brownstone, grooves are cut with pickaxes and the stone is broken by driving iron wedges into the grooves thus formed.

The following is a list of prominent structures built of sandstone in some of the principal cities of the United States:

PROMINENT SANDSTONE STRUCTURES IN SOME OF THE PRINCIPAL CITIES OF THE UNITED STATES.

LOCALITY.	Name of structure and date of erection.	Commercial name of stone.	Locality of quarry.
Albany, New York .....	All Saints' Cathedral .....	Potsdam sandstone .....	Potsdam, New York.
	Cathedral of the Immaculate Conception, 1852.	Brownstone .....	Portland, Connecticut.
	First Presbyterian Church, 1884 .....	.....	East Longmeadow, Massachusetts.
Albuquerque, New Mexico ....	Albany Academy, 1815 .....	Nyack sandstone .....	Nyack, New York.
	Territorial University (wing) .....	.....	Rio Puerco, New Mexico.
Baltimore, Maryland .....	First Presbyterian Church .....	.....	New Brunswick, New Jersey.
Boston, Massachusetts .....	Mount Vernon Methodist Episcopal Church ..	Berea sandstone .....	Berea, Ohio.
	Second Unitarian Church .....	Red sandstone .....	Newark, New Jersey.
	New Old South Church .....	Pudding stone .....	Roxbury, Massachusetts.
	Tremont street Methodist Episcopal Church ..	Pudding stone .....	Boston, Massachusetts.
Brooklyn, New York .....	Hotel Brunswick .....	Buff Amherst sandstone .....	Amherst, Ohio.
	Saint Ann's Protestant Episcopal Church .....	.....	—, New Jersey.
	Academy of Design .....	Brownstone .....	Portland, Connecticut.
Carson City, Nevada .....	United States Mint .....	Sandstone .....	Cañon City, Nevada.
Chicago, Illinois .....	Union League club house .....	Brown sandstone .....	Springfield, Massachusetts.
	Palmer House .....	Buff Amherst sandstone .....	Amherst, Massachusetts.
	Public Library .....	Berea sandstone .....	Berea, Ohio.
Cincinnati, Ohio .....	City Hall .....	Brownstone .....	Houghton, Wisconsin.
Cleveland, Ohio .....	Garfield Monument, Lake View cemetery .....	Berea sandstone .....	Berea, Ohio.
Colorado Springs, Colorado .....	First National Bank building .....	Peachblow sandstone .....	Peachblow, Colorado.
Columbus, Ohio .....	United States post office and court house .....	Berea sandstone .....	Berea, Ohio.
Denver, Colorado .....	Arapahoe county court house .....	.....	Cañon City, Colorado.
	Tabor Grand Opera House .....	Buff Amherst sandstone .....	Amherst, Ohio.
	Barclay block .....	Manitou sandstone .....	Manitou, Colorado.
Dover, Delaware .....	United States post office and court house .....	Coal Creek sandstone .....	Coal Creek, Colorado.
Grand Rapids, Michigan .....	City Hall .....	Berea sandstone .....	Berea, Ohio.
Indianapolis, Indiana .....	Hotel Denison .....	Blue Amherst sandstone .....	Amherst, Ohio.
Lansing, Michigan .....	Berea sandstone .....	Berea, Ohio.	Berea, Ohio.
Leavenworth, Kansas .....	State Capitol .....	Buff Amherst sandstone .....	Amherst, Ohio.
Milwaukee, Wisconsin .....	United States post office and court house .....	Blue Amherst sandstone .....	Amherst, Ohio.
Minneapolis, Minnesota .....	Chamber of Commerce building .....	Blue Amherst sandstone .....	Amherst, Ohio.
	Westminster Presbyterian Church, 1881-'83 ..	Brown sandstone .....	Fond du Lac, Minnesota.
	United States post office and court house .....	Blue Amherst sandstone .....	Amherst, Ohio.
Newark, New Jersey .....	Old custom house and post office, 1859 .....	.....	Little Falls, New Jersey.
New York city .....	Columbia College .....	Red sandstone .....	Potsdam, New York.
	Trinity Church, 1846 .....	.....	Little Falls, New Jersey.
	United Bank building .....	.....	East Longmeadow, Massachusetts.
	Broadway Bank building .....	.....	Portland, Connecticut.
	Collegiate Reformed Church, 1872 .....	.....	Newark, New Jersey.
	Fulton National Bank building .....	.....	Hummelstown, Pennsylvania.
	Dutch Reformed Church .....	Berea sandstone .....	Berea, Ohio.
	College of Surgeons .....	Buff Amherst sandstone .....	Amherst, Ohio.
	Saint Mark's Protestant Episcopal Church, 1849.	Brownstone .....	Portland, Connecticut.
	Bank of North America, 1850 .....	Brownstone .....	Portland, Connecticut.
Providence, Rhode Island .....	Young Men's Christian Association building, 1868.	Buff Amherst sandstone .....	Amherst, Ohio.
Salt Lake City, Utah .....	New Catholic Cathedral .....	Brownstone .....	Portland, Connecticut.
	Grace Church .....	.....	Little Falls, New Jersey.
San Francisco, California .....	Mormon Tabernacle (piers) .....	Red sandstone .....	Red Butte, Utah.
Santa Fé, New Mexico .....	Bank of California, 1865 .....	Blue sandstone .....	Angel Island, California.
Trenton, New Jersey .....	Federal building .....	Cerrillos sandstone .....	Los Cerrillos, New Mexico.
Washington, District of Columbia.	State Capitol .....	.....	Trenton, New Jersey.
	Smithsonian Institution, 1847-'56 .....	Seneca sandstone .....	Seneca creek, Maryland.
	United States Capitol, old portion, 1793 .....	.....	Aquia creek, Virginia.
	Executive Mansion (painted) .....	.....	Aquia creek, Virginia.
Treasury, old portion, 1836-'41 .....	.....	Aquia creek, Virginia.	