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MINES AND MINING.—GRANITE.

DEPARTMENT OF THE INTERIOR,

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In order that the information may be made accessible as promptly as possible, the following report on the granite industry of the United States, by Dr. WILLIAM C. DAY, special agent, is published as a bulletin from the Division of Mines and Mining of the Census Office, under the supervision of Dr. DAVID T. DAY, special agent in charge of the division.

The report shows the production of granite in the several states and the rank of the states in this industry, the characteristics of granite in the different localities, the labor, wages, and capital concerned, the uses for granite and the amount consumed for each, the methods by which granite is quarried, and other interesting information, together with a complete directory of granite producers in the United States.

The total value of the output for the production of granite for the calendar year ending 1889 was \$14,464,095, while according to the census of 1880 it was only \$5,188,998, showing a gain of \$9,275,097, or 179 per cent. The four most productive states according to the census of 1890 were Massachusetts, Maine, California, and Connecticut, in the order named, and the four states having the greatest percentage increase of productiveness since 1880 are Minnesota, New York, Delaware, and Georgia.

Superintendent of Census.

GRANITE INDUSTRY OF THE UNITED STATES.

BY WILLIAM C. DAY.

Of the various kinds of stone quarried in the United States granite is capable of the widest application when all the uses to which stone is put are considered. This statement applies, of course, not only to uses in which strength, power to resist disintegration, and permanency are essential, but also to those in which natural beauty and susceptibility to ornamentation and high polish are necessarily taken into account. (a)

The purposes to which granite is now applied are much more numerous than they were a comparatively few years ago. The increase in the wealth of the country at large, as well as of individuals, has had much to do with this, especially in connection with those involving ornamentation and fine finish. The great hardness of the stone, and the consequent difficulty with which it is cut and polished, make it when entirely finished decidedly expensive. Among wealthy people its costliness frequently determines its selection in preference to other kinds of stone, simply because the high price is an indication that nothing better can be had.

In this report the term "granite" is made to cover a much greater variety of stones than the strictly scientific use of the name would allow; in other words, it is used in its commercial rather than in its scientific sense. At the same time it is true that the great bulk of the granite herein reported is true granite of one subvariety or another. This broad classification is adopted for the purpose of making the report more significant, and, consequently, more valuable to stone producers, who in their business do not, as a rule, make fine distinctions between one kind of granite and another. Although variations in the nature and proportions of the minerals which constitute the granites have much to do in determining the adaptability of the stone to many purposes, still this fact is not made prominent by granite quarrymen in placing their products on the market. If by actual use a particular granite is found to do well for a certain purpose, it is, in general, correspondingly well received without inquiry as to its special constitution, which in reality determines its adaptability for such purpose.

The following list gives a general idea of the geographical distribution of granite, and indicates most of the particular kinds that have been or are now being quarried in the various localities mentioned:

ARKANSAS.

Hornblende-biotite granite. Pulaski county.
Ekaolite syenite. Garland county.

CALIFORNIA.

Biotite granite. Placer county.
Hornblende-biotite granite. Placer and Sacramento counties.
Hornblende granite. Placer county.
Quartz diorite. Placer county.
Basalt. Solano, Sonoma, and Alameda counties.
Andesite. Shasta county.
Andesitic tufa. Solano county.
Quartz porphyry. San Bernardino county.
Basaltic tufa. Tehama county.

COLORADO.

Biotite granite. Clear Creek and Jefferson counties.

COLORADO—continued.

Muscovite gneiss. Clear Creek county.
Diorite. Chaffee county.
Rhyolite. Chaffee and Conejos counties.
Rhyolitic tufa. Douglas county.
Basalt. Jefferson county.

CONNECTICUT.

Biotite granite. Litchfield, New Haven, New London, and Fairfield counties.
Muscovite-biotite granite. Litchfield county.
Muscovite-biotite gneiss. Litchfield county.
Biotite gneiss. Litchfield, New Haven, New London, Windham, Tolland, and Hartford counties.
Hornblende-biotite gneiss. Middlesex and Fairfield counties.
Diabase. New Haven county.

a Special acknowledgments are due to Mr. Walter B. Smith, of Levant, Maine, special agent, for his valuable field notes in reference to granite and his assistance in the tabulation and final preparation of this report.

DELAWARE.

Augite-hornblende gneiss ..New Castle county.

GEORGIA.

Muscovite graniteDe Kalb county.
Hornblende-biotite gneiss..Fulton county.

MAINE.

Biotite graniteKnox, York, Washington, Lincoln, Waldo, Oxford, Kennebec, and Hancock counties.
Biotite gneiss.....Lincoln, Franklin, and Androscoggin counties.
Muscovite-biotite granite ..Kennebec, Waldo, and Franklin counties.
Hornblende-biotite granite.Penobscot and Knox counties.
Hornblende granite.....Hancock county.
Olivine diabase.....Washington county.
DiabaseWashington and Knox counties.

MARYLAND.

Biotite graniteBaltimore, Howard, and Montgomery counties.
Biotite gneiss.....Cecil and Baltimore counties.
Gabbro.....Baltimore county.

MASSACHUSETTS.

Hornblende granite.....Norfolk and Essex counties.
Hornblende-biotite granite.Essex county.
Epidote granite.....Norfolk county.
Biotite graniteNorfolk, Middlesex, Bristol, Worcester, and Plymouth counties.
Biotite-muscovite granite..Worcester and Berkshire counties.
Biotite gneiss.....Franklin county.
Muscovite gneissMiddlesex, Essex, Worcester, and Hampden counties.
DiabaseMiddlesex and Hampden counties.
Melaphyre.....Suffolk county.

MINNESOTA.

Hornblende granite.....Sherburne, Benton, and Lake counties.
Hornblende-mica granite ..Benton county.
Quartz porphyry.....Lake and Saint Louis counties.
DiabaseSaint Louis county.
Olivine diabase.....Chisago county.
Gabbro.....Saint Louis county.

MISSOURI.

Hornblende-biotite granite. Iron and Saint François counties.
GraniteIron county.
Olivine diabase.....Iron county.

MONTANA.

Hornblende-mica granite...Lewis and Clarke county.

NEVADA.

Hornblende andesite.....Washoe county.

NEW HAMPSHIRE.

Biotite-muscovite granite..Merrimaek, Cheshire, Hillsborough, Grafton, Sullivan, and Strafford counties.
Biotite graniteCheshire, Hillsborough, Grafton, and Rockingham counties.
Hornblende-biotite granite.Carroll county.
Muscovite-biotite gneiss ...Cheshire and Hillsborough counties.
Biotite-epidote gneiss.....Grafton county.

NEW JERSEY.

Biotite gneiss.....Passaic county.
Hornblende granite.....Morris county.
DiabaseHudson county.

NEW YORK.

Biotite granitePutnam county.
Hornblende-mica granite ..Jefferson county.
Norite.....Essex county.
Biotite gneissWestchester and Rockland counties.

NORTH CAROLINA.

Biotite graniteWarren, Franklin, Gaston, Granville, Alamance, Davidson, Mecklenburg, Iredell, Forsyth, Guilford, Richmond, and Anson counties.
Muscovite graniteWarren county.
GraniteRowan and Orange counties.
Biotite-muscovite granite..Rowan county.
Hornblende-biotite granite.Mecklenburg county.
Biotite gneiss.....Cleveland, McDowell, Caldwell, Wilson, Stokes, Iredell, Wake, and Guilford counties.
Hornblende gneiss.....Burke county.

OREGON.

GraniteJackson and Columbia counties.
Diabase.....Linn county.
Basalt.....Clackamas and Columbia counties.
AndesiteMultnomah county.

PENNSYLVANIA.

Biotite gneiss.....Philadelphia and Delaware counties.
Muscovite gneissPhiladelphia and Berks counties.
Biotite-muscovite gneiss..Delaware county.
DiabaseAdams, York, Berks, and Lancaster counties.
DioriteBerks county.
Hornblende gneiss.....Philadelphia county.

RHODE ISLAND.

Biotite graniteWashington, Kent, and Providence counties.
GraniteWashington county.
Biotite gneiss.....Providence county.
Hornblende gneiss.....Providence county.

SOUTH CAROLINA.

Biotite granite.....Fairfield, Charleston, Aiken,
Lexington, Richland, Edge-
field, and Newberry coun-
ties.

Hornblende-biotite granite. Fairfield county.

SOUTH DAKOTA.

Granite.....Minnehaha county.

TEXAS.

Biotite granite.....Burnet county.

Diorite.....El Paso county.

UTAH.

Hornblende-biotite granite. Salt Lake and Weber counties.

VERMONT.

Biotite granite.....Washington and Essex coun-
ties.

Muscovite granite.....Windsor county.

VERMONT—continued.

Biotite-muscovite granite...Caledonia county.
Gabbro.

VIRGINIA.

Biotite granite.....Dinwiddie, Chesterfield, and
Henrico counties.

Muscovite granite.....Spottsylvania county.

Biotite gneiss.....Campbell county.

Biotite schist.....Fauquier county.

Diabase.....Loudoun and Fauquier coun-
ties.

WASHINGTON.

Granite.....Stevens county.

WISCONSIN.

Granite.....Marquette county.

Hornblende granite.....Marathon county.

Quartz porphyry.....Green Lake county.

Biotite gneiss.....Jackson county.

PRODUCTION.

The table of production, pages 9 and 10, shows by states the general condition of the granite industry. Granite was produced in twenty-eight states, ten more than were included in the Tenth Census report. The total value of the output of the United States in 1889 was \$14,464,095, while according to the census of 1880 the total value amounted to \$5,188,998, a gain of \$9,275,097, or 179 per cent, in the decade.

The following table shows the relative standing, according to value of output, of the various productive states in 1880 and 1889:

RANK OF STATES ACCORDING TO THE VALUE OF GRANITE PRODUCT.

	TENTH CENSUS.		ELEVENTH CENSUS.	
	STATES.	Value of output.	STATES.	Value of output.
	Total.....	\$5,188,998	Total.....	\$14,464,095
1	Massachusetts.....	1,329,315	Massachusetts.....	2,503,504
2	Maine.....	1,175,286	Maine.....	2,225,839
3	Rhode Island.....	623,000	California.....	1,329,618
4	Connecticut.....	467,225	Connecticut.....	1,061,292
5	Virginia.....	331,928	Rhode Island.....	931,216
6	New Hampshire.....	303,066	Georgia.....	752,481
7	Maryland.....	224,000	New Hampshire.....	727,531
8	Pennsylvania.....	211,454	Pennsylvania.....	623,252
9	California.....	172,450	Vermont.....	581,870
10	Missouri.....	110,000	Missouri.....	500,642
11	New Jersey.....	99,000	Maryland.....	447,489
12	Georgia.....	64,480	New Jersey.....	425,673
13	Vermont.....	59,675	Minnesota.....	356,782
14	Colorado.....	41,400	Virginia.....	332,518
15	Minnesota.....	13,675	Colorado.....	314,673
16	Delaware.....	12,600	South Dakota.....	304,673
17	New York.....	10,000	Wisconsin.....	266,095
18	Washington.....	1,644	New York.....	222,773
19			Delaware.....	211,194
20			North Carolina.....	146,627
21			South Carolina.....	47,614
22			Oregon.....	44,150
23			Texas.....	22,550
24			Utah.....	8,700
			Other states (a).....	76,000

a The states here grouped, in order that the business of individual establishments may not be disclosed to the public, embrace Arkansas, Montana, Nevada, and Washington.

It will be seen from the foregoing table that Massachusetts and Maine hold the same relative positions, namely, one and two, that they did in 1880, and that to hold these positions the increase in value of output has been very great. A very notable increase in production has raised California from ninth place in the Tenth Census to third place in the Eleventh. Rhode Island has dropped from third to fifth place, thus putting it below Connecticut, which, by more than doubling its output, maintains fourth place. The production in Virginia has changed but very little in the last ten years, so that, remaining constant in value of output, its position in the series has dropped from fifth to fourteenth place. In the case of Georgia a very striking increase raises it from twelfth to sixth place, thus placing it one position above the "Granite state," New Hampshire. The increase in production in Georgia is largely due to the extensive operations at Stone Mountain, near Atlanta, which were begun only a few years ago. Operations in New Hampshire have resulted in an output of more than twice the value of that reported in 1880, but, nevertheless, it has fallen from sixth to seventh place. It is probable that the output in this state during 1890 will show a decided gain, owing to the fulfillment of a number of extensive contracts for Concord granite which have been recently made. Pennsylvania, by nearly tripling its output, maintains eighth place. The great increase in production in California is due to operations at the Folsom granite quarries. The granite produced at this locality is largely used on the spot in constructing a dam to be utilized by the Folsom Water Power Company. It has also been applied to the construction of a canal and the buildings of the power house of the state prison, located near the quarries. This work was done chiefly by convict labor. In Sonoma county granite is extensively quarried for paving blocks. This stone is really basalt, and has given unmistakable satisfaction for paving purposes. Most of the paving blocks of the state come from this county. Missouri maintains tenth place, but as compared with the Tenth Census figures the value of the output is more than quadrupled. This increase is due to extended operations at Graniteville, in Iron county, where a so-called red granite is produced, which has become quite popular in a number of large cities for building purposes. Colorado is in fifteenth place in the Eleventh Census. The growth in this state is due to increased activity in Douglas county, at points thirty to thirty-five miles south of Denver, where the variety known as rhyolite, commonly called lava stone, is produced. Remarkable activity is evident in Minnesota. The output in 1880 was comparatively insignificant, whereas that for 1889 amounts to nearly \$357,000. This notable increase is due chiefly to operations in Sherburne and Stearns counties, in the vicinity of Saint Cloud, and also at Sauk Rapids, in Benton county. Minnesota has made a stride in advance which will probably be permanent. Sixteenth place in the series is now held by South Dakota. Operations in this state date back only a few years, but have developed rapidly. The most important producing locality is Sioux Falls, Minnehaha county, the product being sold under the commercial name of Sioux Falls granite. Indications point to the conclusion that South Dakota will hold its position in the series for some time to come. Although Delaware has fallen from sixteenth to nineteenth place, the increase in production is very remarkable, namely, from \$12,600 in 1880 to \$211,194 in 1889. New York, with a product of \$10,000 in granite in 1880, shows an increase to \$222,773 in 1889. No figures for North Carolina appear in previous reports, but at present it holds twentieth place, with an output valued at \$146,627. South Carolina and Texas, neither of which appears in previous reports, give indications of promising future developments, although the present output is not great. Arkansas, although holding next to last place in the list of states for 1889, will doubtless show a much greater output in the course of a few years, owing to developments already made in the vicinity of Little Rock of what is known as Fourche Mountain granite, which is, strictly speaking, syenite.

The table on the following page is presented for the sake of comparing the eighteen states which were productive in 1880 with those of 1889, from which it appears that 94 per cent of the total value of the product of 1889 is the value of stone taken from the same states reported at the Tenth Census. In other words, the ten states added during the past decade have contributed only 6 per cent of the value of the total output of the country.

COMPARISON OF GRANITE PRODUCT IN STATES PRODUCTIVE IN 1880 AND 1889.

STATES.	VALUE OF OUTPUT.		STATES.	VALUE OF OUTPUT.	
	1880.	1889.		1880.	1889.
Total.....	\$5,188,998	\$13,557,686	Missouri.....	\$10,000	\$500,642
Massachusetts.....	1,329,315	2,501,503	New Jersey.....	99,000	425,673
Maine.....	1,175,286	2,225,839	Georgia.....	61,480	752,481
Rhode Island.....	623,000	931,216	Vermont.....	59,675	581,870
Connecticut.....	407,225	1,061,202	Colorado.....	41,400	314,673
Virginia.....	331,928	332,518	Minnesota.....	13,675	356,782
New Hampshire.....	303,066	727,531	Delaware.....	12,600	211,194
Maryland.....	224,000	447,489	New York.....	10,000	222,773
Pennsylvania.....	211,454	623,252	California and Washington.....	173,394	1,339,018

From this comparison it is evident that the increase in production of states reported by the Tenth Census amounts to \$8,368,688, or 161 per cent. These tables did not include figures pertaining to quarries producing less than \$1,000 worth of stone in the census year, and inasmuch as the figures for the present census include all quarries regardless of magnitude, the following statement, showing the aggregates of granite quarries producing in each case less than \$1,000 worth in 1889, may be found of interest. It is evident that the total value of stone produced from these minor quarries is small, amounting to only \$28,145, or two-tenths of one per cent of the total output.

TOTALS FROM GRANITE QUARRIES PRODUCING LESS THAN \$1,000 WORTH OF STONE IN 1889.

STATES.	Value.	Wages.	Total expenses.	Total capital.
Total.....	\$28,145	\$24,268	\$30,227	\$108,195
California.....	1,750	1,325	1,526	4,680
Colorado.....	225	280	365	11,329
Connecticut.....	5,267	2,485	3,102	6,959
Delaware.....	700	390	1,008	5,920
Georgia.....	887	2,510	2,781	3,129
Iowa.....	400	100	800	820
Maine.....	9,704	6,881	8,705	21,085
Massachusetts.....	2,909	1,761	2,541	11,930
Minnesota.....	338	1,237	1,353	3,750
New Jersey.....	680	3,675	3,241	6,750
North Carolina.....	350	110	110	65
Pennsylvania.....	4,745	4,204	4,755	28,805

It is noteworthy that the total expenses involved in the production of the granite reported in this table exceed the total value by over \$2,000. This is accounted for by the fact that many of these small enterprises were new, and probably in many cases short-lived.

GEOGRAPHICAL DISTRIBUTION.

For convenience, the country may be divided into three sections: Eastern, Middle, and Western. The first includes the following states, named in order of the value of the product: Massachusetts, Maine, Connecticut, Rhode Island, Georgia, New Hampshire, Pennsylvania, Vermont, Maryland, New Jersey, Virginia, New York, Delaware, North Carolina, and South Carolina; the Middle section includes Missouri, Minnesota, South Dakota, Wisconsin, and Arkansas; the Western embraces California, Colorado, Montana, Oregon, Texas, Washington, Utah, and Nevada. From the following table the value of the output of the Eastern section is seen to be \$11,240,812, or 77.71 per cent of the whole; that of the Middle section, \$1,433,192, or 9.91 per cent of the entire output, and of the Western section, \$1,790,091, or 12.38 per cent. In short, the great bulk of the granite output comes from the vicinity of the eastern coast of the United States. Intermediate between the Eastern and the Middle sections is a continuous belt of states, extending from the northern to the southern boundaries of the United States, which is at present totally unproductive of granite. This section includes the states of Michigan, Iowa, Illinois, Indiana, Ohio, Kentucky, West Virginia, Tennessee, Mississippi, Louisiana, and Alabama.

VALUE OF GRANITE PRODUCED IN THE UNITED STATES IN 1889.

SECTIONS.	Value of product.
Total.....	\$14,464,095
Eastern section.....	\$11,240,812
Middle section.....	1,433,192
Western section.....	1,790,091

Further subdividing the Eastern section into two portions, northern and southern, the former including only the New England states and the latter all states south of them, it appears that the New England states produced \$8,031,161 worth, or 55.52 per cent of the entire output of the country. In 1880 the same states produced 75.11 per cent of the total.

The following table shows the percentage of gain in each of the states, arranged in order of greatest gain, which were productive both in 1880 and 1889:

PERCENTAGE INCREASE OF STATES PRODUCTIVE IN 1880.

STATES.	Per cent.	STATES.	Per cent.
Minnesota.....	2,628.73	New Jersey.....	329.97
New York.....	2,127.73	Pennsylvania.....	194.75
Delaware.....	1,576.14	Connecticut.....	160.59
Georgia.....	1,067.09	New Hampshire.....	140.06
Vermont.....	875.06	Maryland.....	99.77
Washington.....	857.85	Maine.....	89.39
California.....	670.67	Massachusetts.....	88.33
Colorado.....	660.03	Rhode Island.....	49.47
Missouri.....	355.13	Virginia.....	0.19

The following table, arranged alphabetically by states, gives all totals relative to the granite output for the calendar year 1889. Considering the totals for the United States, it appears that something over sixty-two million cubic feet of granite, having a total value in round numbers of \$14,500,000, were produced by 22,313 workmen from 874 quarries. To this number of men over \$9,600,000 in wages were paid. The total expense of producing the entire granite output amounts to over \$11,500,000, thus indicating a profit to the producers of about \$3,000,000. The total capital invested is over \$19,000,000, of which something more than one-half is the value of land.

PRODUCTION OF GRANITE IN THE UNITED STATES FOR THE CALENDAR YEAR 1889, BY STATES.

STATES.	Number of firms producing in 1889.	Number of quarries.	PRODUCT.		LABOR.								POWER.			
			Cubic feet.	Total value.	Average number of employes.								Number of boilers.	Total horse power of boilers.	Total horse power of water wheels.	Number of animals employed.
					Foremen.	Quarrymen.	Mechanics and stonecutters.	Laborers.	Boys under sixteen years.	Office force.	Total number employed.					
Total	814	874	62,287,156	\$14,464,095	815	10,006	6,585	4,342	343	222	22,313	556	15,119	80	2,980	
California	76	76	4,761,411	1,329,018	64	1,165	316	225	21	12	1,805	41	1,026		139	
Colorado	10	10	2,677,465	314,673	12	151	13	32		5	213	3	20		39	
Connecticut	49	53	3,835,701	1,061,202	43	694	600	251	10	32	1,630	47	1,101		202	
Delaware	5	5	1,386,431	211,194	9	166	67	6	2	3	253	15	352		13	
Georgia	24	28	2,425,022	752,481	35	442	352	482	51	5	1,367	15	777		98	
Maine	133	153	6,701,346	2,225,839	110	1,453	1,611	483	53	27	3,737	65	1,723	80	501	
Maryland	22	23	3,371,032	447,489	26	513	97	171	30	9	846	24	470		202	
Massachusetts	148	151	9,587,996	2,503,503	136	1,613	903	613	30	38	3,333	123	2,947		484	
Minnesota	10	23	558,200	356,782	18	223	239	64	10	4	558	10	253		32	
Missouri	9	10	1,264,317	500,642	16	228	263	79	19	12	617	19	662		79	
New Hampshire	77	78	2,822,026	727,531	83	519	487	148	8	8	1,253	37	771		286	
New Jersey	20	23	6,374,575	425,673	20	214	57	319	12	5	627	21	1,060		49	
New York	13	13	1,515,511	229,773	19	134	108	130	7	3	401		215		60	
North Carolina	19	22	708,267	146,627	13	110	91	149	22	6	391	9	182		46	
Oregon	4	4	287,400	44,150	2	32	9	10	1		54				2	
Pennsylvania	62	64	5,782,887	623,252	47	562	200	377	11	10	1,297	37	1,246		164	
Rhode Island	35	37	2,878,237	931,216	38	313	614	204	12	14	1,195	30	879		256	
South Carolina	7	9	214,479	47,614	3	40	28	25	2	1	99	5	74		2	
South Dakota	3	3	786,120	201,673	13	93	143	153	3	3	498	3	82		26	
Texas	8	8	20,400	22,550	3	27	19	13	1	1	64	3	72		10	
Utah	3	3	123,500	8,700	2	8	2	4	1	1	18				1	
Vermont	46	53	1,073,936	581,870	60	596	155	128	13	9	961	17	497		131	
Virginia	13	13	1,703,206	332,548	21	333	91	223	24	8	716	17	370		46	
Wisconsin	5	8	1,385,600	266,095	17	345	84	28		4	478	15	340		14	
Other states (c)	4	4	41,488	76,000	5	32	36	9		2	84				8	

^a The states here grouped, in order that the business of individual establishments may not be disclosed to the public, embrace Arkansas, Montana, Nevada, and Washington.

PRODUCTION OF GRANITE IN THE UNITED STATES FOR THE CALENDAR YEAR 1889, BY STATES—CONTINUED.

STATES.	EXPENSES.				CAPITAL INVESTED.				
	Total wages, including salaries paid to office force.	Value of supplies and materials consumed.	All other expenditures for the quarry, such as rent, taxes, interest, insurance, etc.	Total expenses incurred in producing entire amount of granite.	In hand.	In buildings and fixtures.	In tools, live stock, machinery, and supplies on hand.	In cash.	Total capital.
Total.....	\$9,620,485	\$1,446,485	\$437,051	\$11,504,021	\$10,897,417	\$1,580,784	\$3,731,078	\$2,906,170	\$19,116,449
California.....	899,295	131,837	32,234	973,276	1,926,695	124,075	402,348	377,276	2,829,794
Colorado.....	192,700	15,815	5,035	214,180	255,350	20,550	20,385	19,200	315,485
Connecticut.....	697,689	76,047	40,073	813,209	348,660	89,225	262,945	191,119	891,889
Delaware.....	116,216	64,705	10,741	191,662	13,290	4,255	52,869	34,221	104,545
Georgia.....	396,461	56,897	18,839	472,107	1,267,474	28,235	103,415	82,498	1,481,622
Maine.....	1,517,623	252,671	54,879	1,823,976	1,377,735	292,613	698,801	823,168	3,192,317
Maryland.....	275,505	61,352	14,061	351,909	386,850	26,665	77,379	149,554	640,448
Massachusetts.....	1,639,128	278,656	65,545	1,973,229	1,099,563	212,645	567,703	355,848	2,235,759
Minnesota.....	276,859	14,509	3,639	295,007	142,627	17,305	52,936	81,350	294,218
Missouri.....	319,298	55,173	21,286	425,667	460,500	35,100	64,000	33,500	593,100
New Hampshire.....	529,945	52,573	14,973	597,491	366,100	86,380	164,850	144,032	761,362
New Jersey.....	291,281	32,513	3,847	330,641	115,700	15,150	178,400	109,600	418,850
New York.....	182,831	26,515	7,814	217,160	288,300	50,000	44,750	39,650	422,700
North Carolina.....	101,131	20,915	1,888	124,937	129,777	24,758	102,265	7,330	255,130
Oregon.....	29,899	5,150	2,023	37,033	48,000	500	12,100	.....	60,600
Pennsylvania.....	441,231	56,135	13,557	510,923	525,178	155,937	149,891	99,400	930,409
Rhode Island.....	618,013	113,572	57,631	789,219	279,770	54,035	226,646	85,941	646,392
South Carolina.....	22,843	2,488	9,697	35,028	90,634	7,775	34,866	10,000	143,275
South Dakota.....	216,773	1,461	3,955	222,229	288,200	79,528	66,838	10,000	444,566
Texas.....	29,461	7,100	6,174	33,738	184,000	11,975	15,350	1,700	212,125
Utah.....	7,696	100	50	7,846	8,000	5,100	2,650	3,000	18,750
Vermont.....	498,916	48,702	19,496	477,114	683,161	63,741	95,630	125,215	967,750
Virginia.....	218,828	32,297	5,000	256,125	234,900	20,946	89,236	101,568	446,650
Wisconsin.....	221,493	39,292	10,006	261,791	144,700	151,691	236,022	14,000	546,413
Other states (a).....	45,725	10,300	7,065	63,030	242,000	3,500	8,800	7,000	261,300

a The states here grouped, in order that the business of individual establishments may not be disclosed to the public, embrace Arkansas, Montana, Nevada, and Washington.

The following table is presented for the purpose of showing by states as well as for the entire country the distribution of granite for the various important purposes to which it is applied. It will be seen that the purposes considered are as follows: building; street work; cemetery, monumental, and decorative purposes; bridge, dam, and railroad work, and miscellaneous uses. This table will be found of particular interest to quarrymen and others who have reason to be interested in statistics relative to the amount and value of stone used for different purposes. In order that the general uses named above may be understood in detail, the following list is presented:

BUILDING PURPOSES.

Solid fronts.	Lintels.	Pilasters.
Foundations.	Broken range.	Belting or belt courses.
Cellar walls.	Sills.	Rubble.
Underpinning.	Kiln stone.	Range.
Steps.	Capping.	Ashlar.
Buttresses.	Columns.	Ports.
Window sills.	Plinths.	Dimension.

STREET WORK

Paving blocks.	Road making—	Basin heads or catch-basin corners.
Belgian blocks	(a) Macadam.	Sledged stone.
Curbing.	(b) Telford.	Crushed stone.
Flagging	(c) Concrete.	Breaker dust.

CEMETERY, MONUMENTAL, AND DECORATIVE PURPOSES.

Statues.	Gravestone sockets.	Mausoleums.
Monuments (entire).	Grave markers.	Urns.
Monument bases.	Cemetery posts.	Wainscoting.
Monument dies.	Cemetery rails.	Dados.
Monument shafts.	Cemetery coping.	Fountains.

BRIDGE, DAM, AND RAILROAD WORK.

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

MISCELLANEOUS.

Millstones.	Posts.	Refuse stone.
Levelers—rollers.	Engine and machine beds.	Block granite.
Grout.	Random.	Boundary stone.
Walls (fences).	Yard stock.	Horse blocks.
Watering troughs.		

AMOUNTS AND VALUES OF GRANITE ACCORDING TO THE PURPOSES FOR WHICH IT WAS USED.

STATES.	Number of quarries.	BUILDING PURPOSES.			STREET WORK.					
		Cubic feet.	Value.	Value per cubic foot.	Cubic feet, including paving blocks.	Value, including paving blocks.	Value per cubic foot.	Number of paving blocks.	Value of paving blocks.	Value per thousand.
Total.....	874	26,147,338	\$6,166,034	\$0.24	20,683,221	\$1,456,801	\$0.07	61,822,871	\$2,978,172	\$48.17
California.....	76	496,352	419,816	0.85	3,284,232	551,613	0.17	7,393,321	297,296	40.70
Colorado.....	10	2,620,419	294,356	0.11	1,100	230	0.21			
Connecticut.....	53	2,358,286	758,915	0.32	567,860	169,261	0.19	761,160	40,683	53.45
Delaware.....	5	229,066	32,443	0.14	155,500	67,292	0.43	194,333	8,298	78.67
Georgia.....	28	709,939	347,100	0.50	658,693	250,634	0.38	1,593,952	84,951	53.10
Maine.....	153	1,819,741	839,125	0.46	3,736,541	927,949	0.25	17,704,915	824,113	46.55
Maryland.....	23	1,578,872	263,491	0.17	1,051,010	125,958	0.12	286,950	10,310	35.93
Massachusetts.....	151	6,643,703	1,362,451	0.21	1,475,993	466,147	0.32	6,196,016	378,627	62.01
Minnesota.....	23	211,548	209,396	0.99	338,640	141,554	0.42	1,239,060	68,045	54.92
Missouri.....	10	110,468	219,518	1.99	871,269	216,986	0.25	4,323,130	216,986	50.19
New Hampshire.....	78	1,306,331	324,567	0.25	1,157,962	252,256	0.22	2,043,739	87,569	42.85
New Jersey.....	21	324,150	42,175	0.13	2,089,796	236,310	0.11	3,999,912	168,555	42.14
New York.....	13	1,078,203	149,700	0.14	247,962	51,062	0.21	587,120	26,962	45.92
North Carolina.....	22	63,637	33,327	0.52	221,820	42,605	0.19	775,000	34,200	44.13
Oregon.....	4	63,000	6,300	0.10	117,400	30,200	0.26	587,000	30,200	51.45
Pennsylvania.....	61	2,379,875	113,231	0.06	1,996,486	368,323	0.18	3,836,127	241,793	63.03
Rhode Island.....	37	2,349,711	266,400	0.11	213,477	65,817	0.31	781,765	45,817	58.61
South Carolina.....	9	25,777	8,130	0.32	94,489	34,016	0.36			
South Dakota.....	3	185,120	133,978	0.72	601,000	170,635	0.28	3,017,500	170,694	56.57
Texas.....	8	19,700	21,000	1.07						
Utah.....	3	122,900	8,310	0.07						
Vermont.....	53	236,759	45,198	0.19	231,128	48,323	0.21	883,006	45,643	51.69
Virginia.....	13	1,080,873	120,467	0.11	286,916	75,925	0.26	342,895	18,565	53.97
Wisconsin.....	8	100,360	40,640	0.40	1,285,000	223,825	0.17	5,540,000	179,075	32.32
Other states (a).....	4	41,488	76,000	1.83						

a The states here grouped, in order that the business of individual establishments may not be disclosed to the public, embrace Arkansas, Montana, Nevada, and Washington.

AMOUNTS AND VALUES OF GRANITE ACCORDING TO THE PURPOSES FOR WHICH IT WAS
USED—CONTINUED.

STATES.	CEMETERY, MONUMENTAL, AND DECORATIVE PURPOSES.			BRIDGE, DAM, AND RAILROAD WORK.			MISCELLANEOUS USES.			Total number of cubic feet.	Total value.
	Cubic feet.	Value.	Value per cubic foot.	Cubic feet.	Value.	Value per cubic foot.	Cubic feet.	Value.	Value per cubic foot.		
Total.....	2,106,953	\$2,371,911	\$1.13	12,207,244	\$1,238,401	\$0.10	1,142,397	\$230,858	\$0.20	62,287,156	\$14,464,095
California.....	85,927	115,114	1.34	879,900	237,475	0.27	15,000	5,000	0.33	4,761,411	1,329,018
Colorado.....	55,946	20,087	0.36							2,677,465	314,673
Connecticut.....	148,108	111,155	0.75	571,031	65,659	0.11	190,419	16,212	0.09	3,835,704	1,061,202
Delaware.....				995,982	110,849	0.11	5,883	700	0.12	1,386,431	211,194
Georgia.....	189,655	47,997	0.25	876,425	106,750	0.12				2,425,622	752,481
Maine.....	291,972	209,158	1.29	856,786	145,117	0.17	56,306	14,490	0.26	6,701,346	2,225,839
Maryland.....	31,100	19,410	0.62	710,050	38,630	0.05				3,371,032	447,489
Massachusetts.....	503,087	497,438	0.98	252,288	33,040	0.13	707,825	144,427	0.20	9,587,996	2,503,503
Minnesota.....	5,312	4,277	0.81	2,700	1,555	0.58				558,200	350,782
Missouri.....	120	500	4.17	282,529	63,638	0.23				1,264,317	500,042
New Hampshire.....	151,711	135,029	0.89	110,467	8,409	0.08	95,625	7,270	0.08	2,822,026	727,531
New Jersey.....	250	125	0.50	3,960,379	147,063	0.04				6,374,575	425,673
New York.....	121,006	17,261	0.14	67,500	4,750	0.07				1,515,511	222,773
North Carolina.....	25,106	23,345	0.93	378,500	44,240	0.12	19,144	3,110	0.16	708,267	140,027
Oregon.....	2,000	2,350	1.18	105,000	5,300	0.05				287,400	44,150
Pennsylvania.....	15,050	5,725	0.38	1,583,976	101,473	0.07	7,500	4,500	0.60	5,782,887	623,252
Rhode Island.....	110,310	588,199	5.33	204,739	10,800	0.05				2,878,237	931,216
South Carolina.....	4,213	2,528	0.60	90,000	2,940	0.03				214,479	47,614
South Dakota.....										786,120	304,673
Texas.....	700	1,550	2.21							20,400	22,550
Utah.....	600	300	0.65							123,500	8,700
Vermont.....	373,029	412,287	1.11	197,834	41,713	0.21	35,195	34,340	0.98	1,073,936	581,870
Virginia.....	44,620	66,356	1.49	281,167	69,000	0.25	9,600	800	0.08	1,703,206	332,548
Wisconsin.....	240	1,630	6.79							1,385,600	266,095
Other states (a).....										41,488	70,000

a The states here grouped, in order that the business of individual establishments may not be disclosed to the public, embrace Arkansas, Montana, Nevada, and Washington.

Owing to the fact that operations have been under way for only a short period of time, a number of the states named in the table have produced but limited amounts of stone. These states are as follows: Arkansas, Montana, Nevada, South Carolina, Oregon, Texas, Utah, and Washington. Figures representing the value per unit of the product from such states as these can not be regarded as strictly normal; that is to say, the values are in general decidedly higher than those for states in which production has been going on actively for a number of years. The industry being new in these states, and transportation charges on stone from a distance high, it is of course to be expected that a higher price can be obtained than in other states in which competition on stone locally produced is active. The most valuable of the figures representing values per unit are those for states in which the quarrying industry has long been established, such as Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, North Carolina, Pennsylvania, Rhode Island, Vermont, Virginia, and Wisconsin. Considerable variation in the values per unit for these states is evident, and this is due to differences in the quality of the stone and its degree of finish and the transportation charges to which a competing material from a distance would be subjected.

Considering the subject of paving blocks, the value per thousand is found to vary from \$32.32 in Wisconsin to \$78.67 in Delaware. In the most important states which produce paving blocks, namely, California, Maine, Massachusetts, Missouri, New Jersey, and Pennsylvania, the value varies from \$40 to something over \$60 per thousand. The variation in the price for these states, in all of which the production of paving blocks has been going on for some time, is due to the quality of the stone used for these purposes, and also to the special care observed in trimming blocks to certain definite sizes. In some localities surface rock of inferior quality is broken up into paving blocks,

which are sold at low prices. In a number of cities considerable care is taken by municipal authorities in the selection of paving material. This care is exercised both with reference to the quality of stone and to invariability of size, and consequently the price paid is in some cases markedly higher than that paid in other cities more indifferent in regard to the material employed.

Considering cemetery purposes, a very wide variation in price exists, ranging all the way from 14 cents a cubic foot in New York, where comparatively little of such work is done, to \$6.79 in Wisconsin, where also very little, indeed, was done, amounting perhaps to only two or three contracts; so that the reasons for these extremes in prices are at once apparent. In Rhode Island the average price reaches the high figure of \$5.33 per cubic foot, which results from the fact that most of the stone used for these purposes in Rhode Island comes from Westerly, and is unusually well adapted for such work; and, further, the ornamentation and finish put upon the Westerly granite is of a very high order.

The value per unit of the product used for bridge, dam, and railroad work is naturally low, although it shows considerable variation.

Comparing the grand totals for the various purposes, it appears that of the entire output of the country \$6,000,000 worth, or something less than half, is devoted to building purposes, and a little less than one-third to street work, of which more than half is the value of paving blocks. The value of the stone devoted to cemetery, monumental, and decorative purposes is about one-sixth of the entire amount, but its value per cubic foot, namely \$1.13, is naturally vastly in excess of the value per unit of the stone used for any other purpose. Something less than one-tenth of the value of the output is devoted to bridge, dam, and railroad work, while the value for miscellaneous uses is quite small.

Comparing the various states, it appears that for building purposes the value of the product in Massachusetts is decidedly in advance of that for any other state, Maine standing second, Connecticut third, and California fourth. In street work Maine is largely in the lead, California taking second place, while Massachusetts, which for total production heads the whole list, stands third. In connection with cemetery and monumental work it is interesting to notice that Rhode Island stands at the head of the list, the value of its output amounting to nearly \$600,000, Massachusetts coming second, and Vermont third. In Massachusetts and Vermont, respectively, the leading localities producing fine ornamental work are Quincy, in Massachusetts, and Barre, in Vermont. In the latter locality production, although carried on to a limited extent in 1880, has largely developed within the past ten years. In value of granite devoted to bridge, dam, and railroad work California stands first, New Jersey second, Maine third, Delaware fourth, and Georgia fifth.

LABOR.

The table on page 15 includes figures relative to the average wages received and the average number of days employed by the various classes of workmen connected with granite quarrying. Considering the daily wages paid to foremen, it is noticeable that among those states in which the granite industry has long been prosecuted the average is fairly constant, varying from \$3 in Virginia to \$3.41 in New Hampshire. In the western states the average is markedly higher, being \$4.34 in California, \$3.67 in Minnesota, and \$4.34 in Wisconsin. The foremen employed in western states naturally come in great part from the old established quarry regions of the east, and their services therefore command a higher figure in these comparatively undeveloped regions. This statement, together with the fact of increased cost of living, accounts for the higher wages paid in these states. Very much the same condition is found to exist with the other classes of labor, quarrymen, for example, in California receiving \$2.38; in Colorado, \$2.50, and in Utah, \$3. In the older granite-producing states wages for quarrymen amount to about \$1.75 per day, but in the southern states the amount is invariably less. In connection with mechanics, it will be noticed that the number in Maine is almost twice as great as that in Massachusetts. This great difference has been found to be due to the respective methods of classification of mechanics in these two states. In Maine it is a common practice to include stonecutters among mechanics, whereas in Massachusetts engineers, blacksmiths, and the like make up the number of

mechanics. It is interesting to note in this connection that the average value per cubic foot of the total output in Maine is 33 cents, while for Massachusetts it is 26 cents; in other words, a greater output of finished product in Maine than in Massachusetts is indicated, and therefore this serves to explain the greater number of mechanics in the former than in the latter state. Wages for laborers in most of the states are not far from \$1.50 per day, although low figures are noticeable for the southern states. The highest figures paid are in the western states, as, for example, \$2.11 in California and \$1.96 in Colorado. In regard to the number of boys under sixteen years of age employed in connection with the granite industry, it is noted that Maine employs nearly twice as many as Massachusetts. The total number, however, for the whole United States is only three hundred and forty-three. As an explanation of this, it may be stated that in Maine there are a great many small quarries operated by farmers. After the farm work is practically done for the year, attention is devoted to the development of such quarry property as may be included in these farms. Maine and Georgia together employ one hundred and four boys, or nearly one-third of the total number employed in the United States. The wages paid to boys vary considerably, being less than \$1 per day, although in a few cases this amount is exceeded.

It will be noticed that the total wages reported in the table on page 10 as actually paid do not exactly agree with the figures which would result from computing the total wages from the data given in the table on page 15. 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 for total wages actually paid are exact.

The table on page 16 gives the relative standing of the various states according to the value of output and the purposes for which the product was used.

The table on page 17 shows the relative standing according to the number of cubic feet and purposes. It will be observed that the relative standing is quite variable, according to the various uses.

The table on page 18 gives the states in the order of their relative importance with respect to a number of different statistical items. It will be noticed that this order varies considerably. Thus, while Massachusetts and Maine hold first and second places, respectively, both with reference to the value of output as well as the number of cubic feet, New Jersey is third when the number of cubic feet is considered, whereas its position with respect to value of output is twelfth. Inspection of this table will reveal at a glance a number of interesting features which would require some 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 true relative standing of the states is, of course, the value of the output, but for persons specially interested in granite the other items will undoubtedly be found of interest and value. Considering the capital invested in land, Massachusetts and Maine, instead of holding first and second places, respectively, drop to fourth and second places, while California heads the list. Exceedingly high values have been placed on some quarry property, for the reason that the area included was very large, while the value per acre may not have been excessive. It is true that in many places in the west large areas of land have been bought up for the sake of controlling the production of the granite contained in it; and while but a small portion of this area may have been actually worked for granite, still, as land was purchased as quarry property, the purchasers are justified in representing as invested in quarry land all that was paid for the tract, even though it was very large. The reason for such large purchases of land in undeveloped portions of the country is evidently to cut off possible competition by monopolizing the best territory. Thus Texas, which stood in twenty-third place with regard to value of output in 1889, holds sixteenth place according to the capital invested in land.

LABOR AND WAGES CLASSIFIED.

STATES.	FOREMEN.				QUARRYMEN.				MECHANICS.				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 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.	Average number.	Average annual salary.
California	64	\$4.34	214	\$928.76	1,165	\$2.38	217	\$516.46	316	\$3.52	215	\$756.80	225	\$2.11	194	\$409.34	21	\$1.05	230	\$241.50	12	\$1,111.11
Colorado	12	3.42	202	690.84	151	2.50	214	535.00	13	2.98	239	712.22	32	1.96	328	446.88	10	0.86	147	126.42	32	761.22
Connecticut	43	3.15	243	765.45	694	1.70	230	391.00	600	2.67	217	659.40	251	1.48	232	343.36	2	0.50	230	115.00	3	1,266.67
Delaware	9	3.27	242	791.34	166	1.66	229	380.14	67	2.82	232	654.24	6	1.50	240	360.00	2	0.62	224	138.88	5	933.33
Georgia	35	3.72	268	996.96	442	1.36	222	301.92	352	3.59	218	782.62	482	1.05	231	242.55	53	0.92	149	137.08	27	938.75
Maine	110	3.15	215	677.25	1,453	1.78	177	315.06	1,611	2.49	220	547.80	483	1.62	187	302.94	30	0.65	221	142.65	9	677.78
Maryland	26	3.00	232	696.00	513	1.51	244	368.44	97	3.02	247	745.94	171	1.54	196	262.64	30	0.71	224	159.04	38	911.21
Massachusetts	136	3.09	248	766.32	1,613	1.76	221	388.96	903	2.59	247	639.73	613	1.59	240	360.00	10	1.07	198	211.86	4	900.00
Minnesota	18	3.67	204	748.68	223	1.81	196	360.64	239	3.54	206	729.24	64	1.37	200	314.00	19	0.65	229	148.85	12	808.98
Missouri	16	3.19	229	701.80	228	1.74	219	381.66	263	3.15	199	626.85	79	1.48	185	273.80	8	1.20	166	199.20	8	755.00
New Hampshire	83	3.41	170	579.70	519	1.75	178	311.50	487	2.90	223	579.80	148	1.68	163	273.84	12	0.75	300	225.00	5	500.00
New Jersey	20	2.47	250	617.50	214	1.69	231	381.15	57	2.19	238	521.22	319	1.43	224	329.32	7	0.79	185	146.15	3	970.00
New York	19	2.91	245	712.95	134	1.87	200	374.00	108	2.92	178	519.76	130	1.71	258	441.18	22	0.35	192	67.20	6	680.00
North Carolina	13	2.52	241	607.32	110	1.12	208	232.96	91	1.82	197	358.54	149	0.84	202	169.68	1	1.00	150	150.00	10	693.75
Oregon	2	5.00	200	1,000.00	32	2.50	213	532.50	9	3.00	211	633.00	10	2.00	220	440.00	11	0.73	210	153.30	14	1,047.38
Pennsylvania	47	2.36	189	446.04	562	1.75	187	327.25	200	2.64	200	528.00	377	1.37	182	249.34	12	0.69	218	150.42	1	345.00
Rhode Island	38	3.25	255	854.25	314	1.84	212	399.08	614	2.46	257	632.92	204	1.54	227	349.58	2	0.25	265	66.25	3	1,266.67
South Carolina	3	5.75	222	1,276.50	49	0.95	181	171.95	28	2.98	213	634.74	25	0.78	28	21.84	1	1.00	150	150.00	1	200.00
South Dakota	13	3.50	313	1,065.50	36	2.00	200	400.00	143	1.60	200	800.00	153	1.50	200	300.00	1	1.00	200	200.00	1	200.00
Texas	3	2.50	290	690.00	27	1.57	110	172.50	19	3.82	127	485.14	13	1.17	221	252.08	4	2.00	125	250.00	9	854.33
Utah	2	3.50	178	623.00	8	3.00	175	525.00	2	3.50	178	623.00	4	2.00	125	250.00	13	1.00	169	169.00	8	881.43
Vermont	60	3.68	202	743.36	596	1.75	186	325.50	155	2.64	216	579.24	128	1.45	170	246.50	24	0.47	184	86.48	4	630.00
Virginia	21	3.00	240	720.00	333	1.22	189	299.58	91	2.61	222	579.42	239	1.08	216	233.28	2	1.81	80	161.00	2	500.00
Wisconsin	17	4.34	301	1,396.34	345	1.70	274	465.80	84	3.00	216	607.44	28	1.37	156	213.72						
Other states (a)	5	5.77	188	1,084.76	32	2.66	162	430.92	36	4.75	151	717.25	9	1.81	80	161.00						

a The states here grouped, in order that the business of individual establishments may not be disclosed to the public, embrace Arkansas, Montana, Nevada, and Washington.

RELATIVE STANDING OF STATES ACCORDING TO VALUE AND PURPOSES.

BUILDING PURPOSES.		STREET WORK (INCLUDING PAVING BLOCKS).		PAVING BLOCKS.		CEMETERY, MONUMENTAL, AND DECORATIVE PURPOSES.		BRIDGE, DAM, AND RAILROAD WORK.		MISCELLANEOUS USES.	
States.	Value.	States.	Value.	States.	Value.	States.	Value.	States.	Value.	States.	Value.
Total	\$6,166,034	Total	\$4,456,891	Total	\$2,978,172	Total	\$2,371,911	Total	\$1,238,401	Total	\$230,858
1 Massachusetts	1,362,451	Maine	927,949	Maine	824,113	Rhode Island	588,199	California	237,475	Massachusetts	144,427
2 Maine	839,125	California	551,613	Massachusetts	378,027	Massachusetts	497,438	New Jersey	147,063	Vermont	34,349
3 Connecticut	758,915	Massachusetts	466,147	California	297,236	Vermont	412,287	Maine	145,117	Connecticut	16,212
4 California	419,816	Pennsylvania	368,323	Pennsylvania	241,793	Maine	299,158	Delaware	110,849	Maine	14,490
5 Georgia	347,100	New Hampshire	252,256	Missouri	216,986	New Hampshire	135,029	Georgia	106,750	New Hampshire	7,270
6 New Hampshire	324,567	Georgia	250,634	Wisconsin	179,075	California	115,114	Pennsylvania	101,473	California	5,000
7 Colorado	294,356	New Jersey	236,310	South Dakota	170,094	Connecticut	111,155	Virginia	69,000	Pennsylvania	4,500
8 Rhode Island	266,400	Wisconsin	223,825	New Jersey	168,555	Virginia	66,356	Connecticut	65,659	North Carolina	3,110
9 Maryland	263,491	Missouri	216,986	New Hampshire	87,569	Georgia	47,997	Missouri	63,638	Virginia	800
10 Missouri	219,518	South Dakota	170,695	Georgia	84,951	North Carolina	23,345	North Carolina	44,240	Delaware	700
11 Minnesota	209,396	Minnesota	141,554	Minnesota	68,045	Colorado	20,087	Vermont	41,713		
12 New York	149,700	Maryland	125,958	Rhode Island	45,817	Maryland	19,410	Maryland	38,630		
13 Pennsylvania	143,231	Connecticut	109,261	Vermont	45,643	New York	17,261	Massachusetts	33,040		
14 South Dakota	133,978	Virginia	75,925	Connecticut	40,683	Pennsylvania	5,725	Rhode Island	10,800		
15 Virginia	120,467	Delaware	67,202	North Carolina	34,200	Minnesota	4,277	New Hampshire	8,409		
16 Vermont	45,198	Rhode Island	65,817	Oregon	30,200	South Carolina	2,528	Oregon	5,300		
17 New Jersey	42,175	New York	51,062	New York	26,962	Oregon	2,350	New York	4,750		
18 Wisconsin	40,640	Vermont	48,323	Virginia	18,505	Wisconsin	1,630	South Carolina	2,940		
19 North Carolina	33,327	North Carolina	42,605	Maryland	10,310	Texas	1,550	Minnesota	1,555		
20 Delaware	32,443	South Carolina	34,016	Delaware	8,208	Missouri	500				
21 Texas	21,000	Oregon	30,200			Utah	390				
22 Utah	8,310	Colorado	230			New Jersey	125				
23 South Carolina	8,130										
24 Oregon	6,300										
Other states (a)	76,000										

a The states here grouped, in order that the business of individual establishments may not be disclosed to the public, embrace Arkansas, Montana, Nevada, and Washington.

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

BUILDING PURPOSES.		ALL CLASSES OF STREET WORK.		PAVING BLOCKS.		CEMETERY, MONUMENTAL, AND DECORATIVE PURPOSES.		BRIDGE, DAM, AND RAILROAD WORK.		MISCELLANEOUS USES.	
States.	Cubic feet.	States.	Cubic feet.	States.	Number.	States.	Cubic feet.	States.	Cubic feet.	States.	Cubic feet.
Total.....	26,147,338	Total.....	20,683,224	Total.....	61,822,871	Total.....	2,106,953	Total.....	12,207,244	Total.....	1,142,397
1 Massachusetts	6,643,703	Maine.....	3,736,541	Maine.....	17,704,915	Massachusetts.....	509,087	New Jersey.....	3,960,379	Massachusetts.....	707,825
2 Colorado.....	2,620,419	California.....	3,284,232	California.....	7,303,321	Vermont.....	373,020	Pennsylvania.....	1,383,976	Connecticut.....	190,419
3 Pennsylvania.....	2,379,875	New Jersey.....	2,089,796	Massachusetts.....	6,106,016	Maine.....	231,972	Delaware.....	995,982	New Hampshire.....	95,525
4 Connecticut.....	2,358,286	Pennsylvania.....	1,996,486	Wisconsin.....	5,540,000	Georgia.....	189,655	California.....	879,900	Maine.....	56,306
5 Rhode Island.....	2,349,711	Massachusetts.....	1,475,693	Missouri.....	4,323,130	New Hampshire.....	151,711	Georgia.....	876,425	Vermont.....	35,195
6 Maine.....	1,819,741	Wisconsin.....	1,285,000	New Jersey.....	3,999,912	Connecticut.....	148,108	Maine.....	856,786	North Carolina.....	19,144
7 Maryland.....	1,578,872	New Hampshire.....	1,157,992	Pennsylvania.....	3,836,127	New York.....	121,906	Maryland.....	710,050	California.....	15,000
8 New Hampshire.....	1,306,331	Maryland.....	1,051,010	South Dakota.....	3,017,500	Rhode Island.....	110,310	Connecticut.....	571,031	Virginia.....	9,000
9 Virginia.....	1,080,873	Missouri.....	871,209	New Hampshire.....	2,013,739	California.....	85,927	North Carolina.....	378,500	Pennsylvania.....	7,500
10 New York.....	1,078,203	Georgia.....	658,603	Georgia.....	1,599,952	Colorado.....	55,946	Missouri.....	282,520	Delaware.....	5,883
11 Georgia.....	700,939	South Dakota.....	601,000	Minnesota.....	1,239,000	Virginia.....	44,620	Virginia.....	281,167		
12 California.....	496,352	Connecticut.....	567,860	Vermont.....	882,096	Maryland.....	31,100	Massachusetts.....	252,288		
13 New Jersey.....	324,150	Minnesota.....	338,640	Rhode Island.....	781,765	North Carolina.....	25,106	Rhode Island.....	294,739		
14 Vermont.....	236,759	Virginia.....	286,946	North Carolina.....	775,000	Pennsylvania.....	15,050	Vermont.....	197,834		
15 Delaware.....	229,066	New York.....	247,902	Connecticut.....	761,100	Minnesota.....	5,312	New Hampshire.....	110,467		
16 Minnesota.....	211,548	Vermont.....	231,128	New York.....	587,120	South Carolina.....	4,213	Oregon.....	105,000		
17 South Dakota.....	185,120	North Carolina.....	221,820	Oregon.....	587,000	Oregon.....	2,000	South Carolina.....	90,000		
18 Utah.....	122,900	Rhode Island.....	213,477	Virginia.....	342,895	Texas.....	700	New York.....	67,500		
19 Missouri.....	110,468	Delaware.....	155,500	Maryland.....	286,950	Utah.....	000	Minnesota.....	2,700		
20 Wisconsin.....	100,330	Oregon.....	117,400	Delaware.....	101,333	New Jersey.....	250				
21 North Carolina.....	63,697	South Carolina.....	94,489			Wisconsin.....	240				
22 Oregon.....	63,000	Colorado.....	1,100			Missouri.....	120				
23 South Carolina.....	25,777										
24 Texas.....	19,700										
Other states (a).....	41,488										

a The states here grouped, in order that the business of individual establishments may not be disclosed to the public, embrace Arkansas, Montana, Nevada, and Washington.

RELATIVE STANDING OF STATES ACCORDING TO VARIOUS STATISTICAL ITEMS.

TOTAL NUMBER OF CUBIC FEET PRODUCED.		TOTAL VALUE OF PRODUCTION.		TOTAL CAPITAL INVESTED IN LAND.		TOTAL CAPITAL.	
States.	Cubic feet.	States.	Value.	States.	Amount.	States.	Amount.
Total	62,287,156	Total	\$14,461,095	Total	\$10,897,417	Total	\$19,115,449
1 Massachusetts	9,587,996	Massachusetts	2,593,593	California	1,926,095	Maine	3,192,317
2 Maine	6,791,316	Maine	2,235,839	Maine	1,377,735	California	2,829,794
3 New Jersey	6,374,575	California	1,329,018	Georgia	1,267,474	Massachusetts	2,235,769
4 Pennsylvania	5,782,887	Connecticut	1,061,202	Massachusetts	1,099,563	Georgia	1,481,622
5 California	4,761,411	Rhode Island	931,216	Vermont	683,164	Vermont	967,750
6 Connecticut	3,835,704	Georgia	752,481	Pennsylvania	525,178	Pennsylvania	930,409
7 Maryland	3,371,032	New Hampshire	727,531	Missouri	460,500	Connecticut	891,889
8 Rhode Island	2,878,237	Pennsylvania	623,252	Maryland	386,850	New Hampshire	761,362
9 New Hampshire	2,822,026	Vermont	581,870	New Hampshire	366,100	Rhode Island	646,392
10 Colorado	2,677,465	Missouri	500,642	Connecticut	348,600	Maryland	640,448
11 Georgia	2,425,622	Maryland	447,489	New York	288,360	Missouri	593,100
12 Virginia	1,703,206	New Jersey	425,673	South Dakota	288,200	Wisconsin	546,413
13 New York	1,545,511	Minnesota	356,782	Rhode Island	279,770	Virginia	446,650
14 Delaware	1,385,431	Virginia	322,548	Colorado	255,350	South Dakota	444,666
15 Wisconsin	1,385,600	Colorado	314,673	Virginia	234,900	New York	422,700
16 Missouri	1,264,317	South Dakota	304,673	Texas	184,000	New Jersey	418,850
17 Vermont	1,053,936	Wisconsin	266,095	Wisconsin	144,700	Colorado	315,465
18 South Dakota	786,120	New York	222,773	Minnesota	142,627	Minnesota	294,218
19 North Carolina	708,267	Delaware	211,194	North Carolina	120,777	North Carolina	255,130
20 Minnesota	558,260	North Carolina	146,627	New Jersey	115,700	Texas	212,125
21 Oregon	287,400	South Carolina	47,614	South Carolina	90,634	South Carolina	143,275
22 South Carolina	214,479	Oregon	44,150	Oregon	48,000	Delaware	101,545
23 Utah	123,500	Texas	22,550	Delaware	13,200	Oregon	69,600
24 Texas	20,400	Utah	8,700	Utah	8,000	Utah	18,750
Other states (a)	41,488	Other states	76,000	Other states	242,000	Other states	261,300

TOTAL NUMBER OF EMPLOYÉS.		TOTAL AMOUNT OF WAGES PAID EMPLOYÉS.		TOTAL COST OF SUPPLIES.		TOTAL EXPENSE.	
States.	Number.	States.	Amount.	States.	Amount.	States.	Amount.
Total	22,313	Total	\$9,620,485	Total	\$1,446,485	Total	\$11,504,021
1 Maine	3,737	Massachusetts	1,630,128	Massachusetts	278,056	Massachusetts	1,973,729
2 Massachusetts	3,333	Maine	1,517,026	Maine	252,071	Maine	1,823,976
3 California	1,803	California	809,205	California	131,827	California	973,276
4 Connecticut	1,630	Connecticut	697,080	Rhode Island	113,572	Connecticut	813,200
5 Georgia	1,367	Rhode Island	618,013	Connecticut	76,047	Rhode Island	789,219
6 New Hampshire	1,253	New Hampshire	529,945	Delaware	64,705	New Hampshire	597,491
7 Pennsylvania	1,207	Pennsylvania	441,231	Maryland	61,352	Pennsylvania	516,923
8 Rhode Island	1,195	Vermont	408,916	Georgia	56,807	Vermont	477,114
9 Vermont	961	Georgia	396,461	Pennsylvania	56,135	Georgia	472,107
10 Maryland	846	Missouri	349,298	Missouri	55,173	Missouri	425,667
11 Virginia	716	New Jersey	294,284	New Hampshire	52,573	Maryland	351,909
12 New Jersey	627	Minnesota	276,859	Vermont	48,762	New Jersey	330,644
13 Missouri	617	Maryland	275,566	New Jersey	32,513	Minnesota	295,067
14 Minnesota	558	Wisconsin	221,493	Virginia	32,297	Wisconsin	261,791
15 Wisconsin	478	Virginia	218,828	Wisconsin	30,292	Virginia	256,125
16 South Dakota	468	South Dakota	216,773	New York	26,515	South Dakota	222,229
17 New York	401	Colorado	192,700	North Carolina	20,915	New York	217,160
18 North Carolina	391	New York	182,831	Colorado	15,815	Colorado	214,180
19 Delaware	253	Delaware	116,216	Minnesota	14,509	Delaware	191,662
20 Colorado	213	North Carolina	101,134	Texas	7,100	North Carolina	123,927
21 South Carolina	99	Oregon	29,860	Oregon	5,150	Oregon	37,033
22 Texas	61	South Carolina	22,843	South Carolina	2,488	South Carolina	35,028
23 Oregon	54	Texas	20,461	South Dakota	1,461	Texas	33,738
24 Utah	18	Utah	7,696	Utah	100	Utah	7,846
Other states (a)	84	Other states	45,725	Other states	10,300	Other states	63,030

a The states here grouped, in order that the business of individual establishments may not be disclosed to the public, embrace Arkansas, Montana, Nevada, and Washington.

The following table gives a number of deductions from the figures of the table on production, such as the percentages of profit on capital, and also on sales in the different states. It will be noticed that in a few instances loss is reported, but in all these cases the operations have been quite limited and only recently begun. Initial operations in the quarrying industry are invariably attended by loss for some time after making the first opening, due to the considerable amount of stripping which is inevitable in almost every case. To this statement there are occasional exceptions, among which may be specially noted the granite obtained from Stone mountain, in Georgia, where no stripping is necessary, and even the surface stone is suitable for the manufacture of paving blocks, to which purpose alone it is applied. This is also true of a number of New England quarries. It will be noticed that in the older productive states the percentages of profit on capital and sales are fairly constant. The cost per cubic foot of the total product shows a decided variation, as would, of course, be expected from the complexity of the causes involved, such as ease or difficulty of quarrying, quality of stone, transportation facilities, cost of labor, and the great variation in the amount of manufacturing done upon the rough product. In the matter of the proportion which wages bear to the total expense of production, it will be seen that in nearly all cases this is above 80 per cent, and in a few cases it constitutes almost the entire item of expense. In regard to the amount of wages paid per cubic foot, it should be borne in mind that these wages include all paid on the product up to the time it was sold by the producer, and inasmuch as it has been sold in all stages of finish, there is a correspondingly great variation in the wages paid per unit. Excessively high figures were paid in several western states in which production is just beginning, and in each of which there are only a very few operators. In the matter of ratio of wages to total value, the figures for the various states, except in those states where actual loss occurred, do not show a very great variation.

GENERAL DEDUCTIONS.

STATES.	Total number of cubic feet.	Total value of product.	Total wages.	Total expenses.	Total capital.	PERCENTAGE OF PROFIT OR LOSS.		Cost of product per cubic foot.	Percentage of wages to total expense.	Wages paid per cubic foot.	Percentage of wages to total value.	Value per cubic foot.
						On capital.	On value of products.					
Total.....	62,287,166	\$14,464,095	\$9,620,485	\$11,504,021	\$19,115,449	15.49	20.46	\$0.18	83.63	\$0.15	66.51	\$0.23
California.....	4,761,411	1,329,018	809,205	973,276	2,829,794	12.57	26.77	0.20	83.14	0.17	69.89	0.28
Colorado.....	2,677,465	314,673	192,700	214,180	315,485	31.85	31.94	0.08	89.97	0.07	61.24	0.12
Connecticut.....	3,835,704	1,061,202	697,080	813,200	801,889	27.81	23.37	0.21	85.72	0.18	65.69	0.28
Delaware.....	1,386,431	211,194	116,216	191,662	164,545	18.68	9.25	0.14	66.64	0.08	55.63	0.15
Georgia.....	2,425,622	752,481	306,461	472,107	1,481,622	18.92	37.26	0.19	83.98	0.16	52.69	0.31
Maine.....	6,701,346	2,225,849	1,517,026	1,823,976	3,192,317	12.59	18.05	0.27	83.17	0.23	68.16	0.23
Maryland.....	3,371,032	447,489	275,566	351,909	640,448	11.92	21.36	0.16	78.31	0.08	61.58	0.13
Massachusetts.....	9,587,936	2,503,503	1,630,128	1,973,729	2,235,759	23.70	21.16	0.21	82.59	0.17	65.11	0.26
Minnesota.....	558,200	356,782	276,859	295,007	294,218	21.90	17.31	0.53	63.85	0.59	77.09	0.64
Missouri.....	1,264,317	500,642	349,208	425,667	563,109	12.64	14.98	0.34	82.04	0.28	69.75	0.40
New Hampshire.....	2,822,026	727,531	529,945	597,431	761,362	17.08	17.87	0.21	88.70	0.19	72.84	0.25
New Jersey.....	6,374,575	425,673	294,284	339,644	418,850	22.69	22.32	0.65	89.00	0.65	69.13	0.97
New York.....	1,515,511	222,773	182,831	217,199	422,700	1.33	2.52	0.14	84.19	0.12	82.07	0.15
North Carolina.....	708,267	146,627	101,134	123,937	255,130	8.89	15.47	0.17	81.60	0.14	68.97	0.21
Oregon.....	287,400	44,150	29,869	37,023	60,600	11.74	16.12	0.13	80.63	0.10	67.63	0.15
Pennsylvania.....	5,782,887	623,252	441,231	516,323	930,499	11.43	17.06	0.09	85.56	0.08	79.79	0.11
Rhode Island.....	2,878,237	931,216	618,013	789,219	616,392	21.97	15.25	0.27	78.31	0.21	66.67	0.32
South Carolina.....	214,479	47,614	23,843	35,028	143,275	8.78	26.43	0.16	65.21	0.11	47.98	0.22
South Dakota.....	780,120	304,673	216,773	222,229	444,566	18.54	27.06	0.28	97.54	0.28	71.15	0.39
Texas.....	20,400	22,550	20,464	33,738	212,125	65.27	849.61	1.05	69.66	1.00	99.75	1.11
Utah.....	123,500	8,700	7,696	7,816	18,750	4.55	9.82	0.06	98.09	0.06	88.46	0.07
Vermont.....	1,073,936	581,870	498,916	477,114	967,730	19.82	18.00	0.41	85.71	0.38	79.28	0.51
Virginia.....	1,703,203	332,518	218,828	256,125	416,650	17.11	22.98	0.15	85.41	0.13	65.89	0.20
Wisconsin.....	1,385,600	266,095	221,493	261,791	546,413	9.79	1.92	0.19	81.61	0.16	83.24	0.19
Other states (a).....	41,488	76,000	45,725	63,030	261,300							

a The states here grouped, in order that the business of individual establishments may not be disclosed to the public, embrace Arkansas, Montana, Nevada, and Washington.

b Loss.

METHODS OF QUARRYING GRANITE.

STRUCTURE OF GRANITE IN PLACE.—The successful and economical working of granite quarries depends upon an intelligent application of a knowledge of the structure of the rock and its natural divisions in the mass, as well as upon improved methods, tools, and machinery for quarrying. The topographical location of the quarry and its relation to facilities for transportation are important factors that affect the productiveness and greatly modify the actual cost of operations in a given place.

In regions of great dynamic movement, such as most granite localities possess, very large rock masses without seams or fissures do not occur; but these fractures, extending as they do in certain definite directions to each other in the mass, form systems of inchoate joints, which divide it into roughly rectangular and rhombic forms, thus rendering valuable assistance to the quarryman. It is probable that the fissures were caused by pressure operating in certain directions during the origin or uplifting of the rock, and it is even possible for it to have been sufficient to change the molecular arrangement of the component minerals. Even those granites which are apparently normal, and which reveal no traces of stratification or parallel arrangement of mica or hornblende, are found by quarrymen and stonecutters to split more easily and with a smoother surface in one or more directions than in others. An unequal pressure operating on the mass would have caused certain directions or lines of weakness and account for this, or it may have produced the apparent rearrangement of the feldspar crystals, as found in a few of the granites.

In northern New England particularly most of the fissures, as revealed by quarry openings, are slightly curved, parallel partings conforming in general to the direction of the slope upon which the quarry may be located. They produce a sheeted arrangement of the rock, which bends in ridges or curves in hilltops like anticlinal or quaquaversal folds of sedimentary strata. In addition to these divisional planes there occur one or more systems of vertical joints, the joints of each system running approximately parallel to each other, though the systems cross at varying angles.

It is interesting to note that the direction of easiest cleavage, called by quarrymen the "rift," is parallel to the most numerous natural fractures, and that at right angles to this another direction of cleavage, called the "grain," is parallel to the system having the next greatest number of joints. When the rift of the rock in place is horizontal, or more nearly horizontal than perpendicular, it is customarily called the "lift." The grain, although important, is not generally an eminent feature, and its direction may remain unknown even for a long time after the quarry is opened. These systems of fracture, and the unequal ease of splitting in different directions, are points generally well understood and advantageously used by experienced granite workers.

OPENING THE QUARRY.—Granite quarries are nearly always started in natural outcroppings of the ledge, but as they are entirely open workings, and necessarily cover large areas, considerable development work is needed at first and from time to time, as the quarry is enlarged, in stripping or clearing away the timber and soil and in removing the weathered portions or cap rock. It sometimes happens, especially in the northeastern region, that a ledge is found showing sound granite at the top, ready for quarrying, having been ground smooth by glacier movement and left bare of soil; but usually long exposed outcroppings have a softer outer portion, called "sap," resulting chiefly from the partial decomposition of the feldspar. This also occurs to a less extent along the seams and fissures, and where the rock contains iron the sap is stained by its oxidation to a brownish or reddish color. The sap may be merely a thin coating, scarcely discernible, or it may be that the rock is rendered unsound for thirty feet or more in depth, as is the case with a certain coarse-grained granite occurring in the Rocky mountains. The observation of such points in the field will serve as indications of the probable durability of the stone and the stability of its color.

BLASTING.—Owing to great diversity in the structure of the rocks classed here as granite, the operations of quarrying necessarily vary considerably, even in different openings of the same region. The object desired is, however, the same in all, namely, the removal of large rectangular blocks with the least outlay of time and labor compatible with keeping the quarry in good

working shape and avoiding waste. Ordinarily, to break the rock into sizes which can be handled, blasting is necessary. In doing this the object is to direct the force of the powder so that it may break the rock in the desired direction without shattering either the piece removed or the standing rock, but it can be successful only when it is detached at the ends and bottom and has a chance to move out in front. As the rift in the rock in the majority of quarries approaches the horizontal the first breaks are obviously made either with or across the grain. The method most generally used for doing this is called "lewis-ing," from the shape of the blast hole. A lewis hole is made by drilling close together holes about an inch and a half in diameter and in breaking down the partition between them by means of a flat steel bar, called a "set." This wide hole determines the direction of the required fracture. A "complex" lewis hole is the combination of three ordinary drill holes; a "compound" one, of four; but the latter is seldom used, for if a very long break is to be made a series of lewis holes is drilled at considerable distances apart, and after being charged are fired simultaneously by means of an electric battery.

Another process occasionally used in a few quarries is as follows: A single round hole having been drilled, the explosive is put in, and on top of it an inverted iron wedge, placed between two half-rounds, is carefully lowered; then the tamping is proceeded with in the usual way. When the powder is exploded, the wedge, which is driven forcibly up between the half-rounds, breaks the rock in a direction corresponding to its thin end. One of the worst results of this procedure is that considerable rock near the top of the hole is apt to be huffed or flaked up.

Within a few years past the Knox system of blasting rock has been introduced and successfully used with general satisfaction in many of the larger quarries. The results obtained are those which were sought for by lewis-ing, but the process is safer, quicker, takes less powder, and, as it never shatters the rock, not only gives good sound blocks as the product of the blast, but also leaves the standing rock with a perfectly sound, clean face for future operations. A round hole is first drilled to the required depth, and into this is driven a reamer, which produces V-shaped grooves at opposite sides to the entire depth of the hole. The charge is then inserted, and the tamping is done in the usual manner, except that instead of driving the tamping down upon the top of the charge an air space or cushion is reserved between the charge of powder and the tamping and as far above the charge as possible. The explosive has therefore the greatest possible chance for expansion before actually breaking the rock, the tamping being put down only to a sufficient depth to insure firmness of position. The result of this method is that the force of the explosive is directed in the line of the grooves, and no shattering of the rock occurs if it be solid, such as is common in ordinary blasting operations, and, as a consequence, quarrymen are enabled to get out stone of rectangular shape without waste or loss of valuable rock.

Very large blasts or mines are sometimes fired in quarrying granite. A shaft is sunk to the required depth, and from it drifts are run in various directions. These chambers, or drifts, are then charged with explosives and fired. In 1887, at Granite Bend, Missouri, stone enough was broken with one blast to supply the demands of a firm for fifty years. The shaft, which was eighty-five feet deep, had chambers running in several directions from the bottom, and was charged with 32,700 pounds of black powder.

The explosive used for breaking out dimension stone is black blasting powder, as its action is somewhat slower than that of the various forms of nitro-glycerine, and there is consequently less danger of shattering the rock or of weakening it by starting incipient fractures, that may not be detected until it is in place in a building; but for breaking up poor stone, or for getting out rock regardless of size or form, giant powder is frequently employed.

In a quarry having rather thin sheets and numerous vertical joints very good splits may be made with wedges driven between half-rounds (plug and feather) into small holes drilled a few inches apart along a prescribed line, every few feet a deeper hole of a somewhat larger dimension being drilled to guide the fracture; but this process is chiefly used for subdividing the blocks after they have been loosened by powder and for initial splits in quarries where the drift is vertical.

Drills driven either by steam or compressed air are in use for making blast holes in all the principal quarries. The drill is connected with the piston, which is supported by a portable iron tripod, carrying the necessary appliances for regulating its movements. A flexible pipe conveys the motive power in the form of compressed air or steam.

In smaller quarries these holes are drilled by the "jumper" drill, a long, flat-edged steel bar, which a man holds and turns as it rebounds slightly after each of the swinging blows dealt it by heavy sledges.

Steam channeling machines, common in large marble and sandstone quarries, are used on granite by a few quarriers chiefly for making end cuts in stone of exceptional structure, but only to a limited extent, since the great hardness of granite renders the process very slow and expensive.

The large blocks loosened by blasting are broken and split into sizes of the required approximate dimensions by the plug and feather method. The holes, which are of small diameter, generally not more than three-fourths of an inch, and a few inches only in depth, are made by a drill and hand hammer. Into each hole is inserted two half-rounds or "feathers," tapering pieces of iron, flat on one side and rounded on the other, between which is placed a steel plug or wedge. The wedges are then driven in with a sledge till the strain is sufficient to split the rock.

METHODS OF CUTTING, POLISHING, AND ORNAMENTS GRANITE.

Only a small percentage of granite in rough blocks as it leaves the quarry proper is available for use in this form. Most of it has to be cut to the desired dimensions and brought to the degree of finish required for the special purposes for which it is to be used. Very large blocks and stone designed for uses not requiring fine finish are often worked in the open air, but most quarries have cutting sheds erected near the openings, in which the blocks are worked into their intended form. These sheds vary from merely a rough covering of boards to extensive buildings.

To produce good results great skill is needed by the stonecutter in the manipulation of his tools, and considerable artistic ability is required for the finer kinds of work. From the rough work of simply splitting a block or rudely spalling an ashlar face to the artistic working of highly embellished and complicated statuary carving a knowledge of the rift and grain is important, as it indicates where heavy blows may be struck and where lighter ones are required.

Owing to the great obduracy of this stone, and the fact that the different minerals composing it vary greatly in hardness, the chief work of shaping it is still performed by hand, probably by much the same process that was used by Egyptian stonecutters more than three thousand years ago. Improvements and inventions have, however, been made from time to time in hand tools, and extensive machinery is now in use for producing certain forms and kinds of finish.

RECENT IMPROVEMENTS.—The most important improvements of the last decade include the more extended adoption of lathes for turning and polishing columns, urns, etc., and new devices in power machinery for plain polishing. Greater economy and speed are now obtained by the general use of chilled iron globules and crushed steel as abrasive materials and of the pneumatic tool for the ornamentation of surfaces.

GRANITE FOR BUILDING PURPOSES.—By reference to the table giving the output of granite according to purposes, it will be seen that more stone was used for building than for any other purpose. A great amount of labor by the stonecutter is necessary to fit it for its destined place, but much of this work consists in merely squaring up or subdividing the large blocks as hauled from the quarry opening. Much more work is needed on the stone to be used for fronts, trimmings, and certain portions of superstructures, while for special parts, such as polished columns and ornate keystones and capitals, the greatest skill and longest time are required. The general processes of finer finish will, however, be mentioned further on in connection with cemetery, monumental, and decorative purposes, although all stone designed for superstructures, whether rough or finely wrought, has been tabulated under the heading "building purposes."

IMPLEMENTS FOR CUTTING.—The implements used by stoncutters to produce common forms and ordinary finish are as follows:

Chisel.—Various forms and sizes are employed in cutting border drafts, moldings, letters, and ornamental work.

Point.—A piece of steel bar drawn out to a pyramidal end; used for "roughing out" surfaces and removing "bunches."

Hand drills, wedges and half-rounds.—Used for splitting out blocks.

Hand hammer.—Used in one hand for driving chisels, points, and drills, which are held and guided by the other.

Spalling hammer.—A heavy square-cornered sledge, used for roughly reducing a block by breaking off large chips or spalls from the edges, thus bringing it closer to its intended form.

Peen hammer.—Shaped like a double-edged wedge, with a handle running parallel with the edges; used to remove irregularities by striking squarely upon a surface and wedging or bruising off small chips.

Bush hammer.—Made of rectangular steel plates brought to an edge, bolted together, and attached to a long handle; used in the same manner as the peen hammer, but produces a smoother surface, the degree of smoothness depending upon the number of steel plates in the particular hammer used. These hammers, which are all of the same thickness, are called 4-cut, 5-cut, 6-cut, 8-cut, 10-cut, and 12-cut, according to the number of plates used in their construction.

The size, shape, and finish of a stone depend upon the particular place it is to occupy in a building and the style of architecture. Fronts or walls are laid up in various kinds of ranges, usually designated as coursed range, broken range, broken ashlar, random range, and rubble work. The kind of finish given the face of the stone is called either bush hammered, peen hammered, pointed work, or rock face. These may or may not have a border draft chiseled around their margins. Other kinds of finish are chiseled moldings and carved or polished faces.

The usual process followed by stoncutters in shaping blocks may be generalized as follows: The block, having been split out to about the right size by the plug and feather method, is brought to a plane surface on one side, which is accomplished by knocking off overhanging edges and projections with the spalling hammer or spalling tool. Drafts or ledges are then chiseled along two opposite edges. One draft being completed, the workman lays upon it a wooden strip or rule having parallel edges. A second rule is then sunk in the draft made on the opposite side until the two drafts are in the same plane, which is determined by sighting across the upper edges of the rules. The whole face is then worked down to this plane with the tools necessary for the required fineness of finish, a straightedge being applied from time to time as the work progresses. The point is used for removing rougher projections. This is followed by the peen hammer, and, if a smoother surface is required, it is made by bush hammering, the hammer having the fewest number of plates being used first. The required size of the face being marked out upon this surface, the position of a second face may be determined by chiseling drafts across the ends of an adjacent surface, using for the purpose either a square or a bevel, depending upon the angle it is desired to make with the first face. The projecting rock between the drafts having been removed in the manner used in forming the first surface, a third face may be projected. A winding surface is formed by using in one draft a rule or strip having its opposite edges not parallel, the amount of divergence depending upon the amount of warp required. This rule is sunk till its upper edge is even with the upper edge of the strip, having parallel edges placed upon the opposite edge of the stone.

A cylindrical surface is worked by using curved rules in one direction, and is not as hard a matter as might at first seem. Much difficulty is, however, encountered in laying out and working spiral, conical, and spherical surfaces, as it is first necessary to form plane and cylindrical faces on which to apply the necessary bevels and templates.

GRANITE FOR STREET WORK.

PAVING BLOCKS.—Experience has demonstrated that the best and most enduring streets for heavy traffic in large cities are those paved with stone blocks of proper material and size laid upon a specially prepared bed. The very hard and tough rocks frequently used, though capable of withstanding a maximum amount of wear, soon become smooth and glazed under traffic, and are therefore inferior to a stone which, wearing roughly, affords a better foothold for horses. Many of the granitic rocks possess the right degree of hardness and brittleness, and are largely used for this purpose. This industry has increased largely since 1880, the number of granite blocks made in 1889 in the various states aggregating nearly 62,000,000.

Streets paved with the large-sized block used at first were found to be more difficult to keep in repair, worse for horses, and rougher on vehicles than pavements made of the smaller blocks now in general use. There is no uniform standard of size, as specifications of the various cities call for different sizes, but the variations are not great, and blocks $3\frac{1}{2}$ to $4\frac{1}{2}$ inches wide, 6 to 7 inches deep, and 8 to 12 inches long are generally preferred. In New York city, Brooklyn, and Philadelphia blocks a trifle longer are more commonly used, while in many of the western and southern cities the length does not exceed 10 inches. New Orleans, owing to the peculiar nature of its streets, takes blocks much larger.

The manufacture of paving blocks, though an important adjunct of the granite business, varies nevertheless for obvious reasons in many of its details from the ordinary methods of granite cutting. The high skill and fine workmanship of the stonemason are not needed, but a quickness in seeing and taking advantage of the directions of cleavage, as well as a deftness in handling the necessary tools, is requisite.

Specifications call for blocks so quarried or dressed as to present substantially rectangular faces with practically straight edges. The corresponding dimensions of opposite faces must not vary more than one-half inch, and the surface must be free from bunches, depressions, and inequalities exceeding one-half inch.

The tools used for making blocks are knapping hammers, opening hammers, hand hammers, reels, chisels, and, for initial splits, drills, wedges, and half-rounds. When the block maker quarries his own stock it is called "motion work," and the same process is used as in quarrying stone for other purposes, except that, as large blocks are not required, most of it can be done with plug and feather.

Slabs, having been split out in the usual manner to sizes that may be easily turned over and handled by one man, are subdivided into pieces corresponding approximately to the dimensions of the required blocks. This is done by striking repeated blows upon the rock along the line of the desired break with heavy knapping and opening hammers. When a break is to be made crosswise the grain, it is frequently necessary to chisel a light groove across one face, and commonly across the adjacent sides, to guide the fracture produced by striking on the opposite surface with the opening hammer. Good splits can, however, be made along either the rift or grain by the skillful use of the opening hammer alone. Blocks broken out in the manner described are trimmed and finished with the reel, which is a hand hammer having a long, flat, steel head attached to a short handle. Block breakers become very expert in the use of this instrument, and without making any measurements turn out in a surprisingly short time a large number of blocks. In Maine, which is far ahead of any other state in the number of blocks made, the entire product of many quarries is used for this exclusive purpose. This is also the case in California, which comes second, though the blocks are manufactured chiefly from the surface "boulders" or detached masses of basalt so common in Sonoma county. Other quarries, however, in various parts of the country utilize only the "grout," small or irregular shaped pieces, for making paving block, and haul the stock to the breakers, who work in sheds; but the greatest number of blocks are made on the spot where the rock is quarried, the workmen being protected during the hottest months by a temporarily spread canvas fly.

Blocks are counted as they are thrown into the cart, which is usually needed to haul them to the shipping point. Several paving-block quarries in Maine are situated on steep mountain slopes so near water communication that blocks may be slid in long board chutes from the quarry directly into the hold of the vessel used for their transportation.

Paving breakers seldom work by the day, but are paid a certain sum per thousand for making the blocks, the price paid in 1889 ranging from twenty-two to thirty dollars, according to the size of block made, kind of stone used, locality, and whether the tools were furnished and the blocks quarried by their employers. Workmen using their own tools are commonly paid one dollar more per thousand for the blocks made, and when they quarry the stock they use, from two to five dollars per thousand is allowed in addition.

CURBING AND BASIN HEADS.—Next in importance to the manufacture of paving blocks, in the division of granite for street work, is the production of long granite slabs for curbstone. Granite,

having a free rift, is preferred for this purpose on account of its better working qualities. The dimensions of ordinary curbstones are from 6 to 12 feet long, 6 to 8 inches thick, and about 2 feet deep. The top edge is made full and square and neatly bush hammered; the face is also bush hammered down about a foot from the top. The ends are dressed smooth, so as to make close joints, and the back of the stone, which is placed next to the sidewalk, is also dressed a few inches from the top.

OTHER USES.—Other applications of granite to street work are for flagstone, for crosswalks laid at the intersection of streets, and for gutter stone, but these are dressed, when required, in the usual manner, and need no special comment here.

Granite is largely used for making macadam and telford roads and concrete and artificial stone pavements, though it is seldom quarried expressly for this purpose, but made of spalls, grout, and waste from other quarries. The pieces are broken with sledges where coarse stones are needed, or run through power rock-breakers when a finer subdivision is required.

GRANITE FOR CEMETERY, MONUMENTAL, AND DECORATIVE PURPOSES.—A considerable portion of the stone for these uses, especially for small-sized monuments, tombstones, and grave markers, is shipped from the quarries in rough blocks, which are suitably shaped and finished by masons working in town shops or stone yards. Large monuments and large polished blocks for buildings, columns, pilasters, and statuary are generally worked at quarry sheds, polishing mills, or shops not far distant.

There has been a decided increase in the use of polished granite for cemetery purposes since the introduction of machinery for its polishing, which has greatly decreased the price for this kind of finish. For these, as well as for all purposes where a polished surface is desired, as bottom courses in buildings, columns, pilasters, wainscoting, etc., the red, pink, dark-gray, and black varieties are in high favor, since they have a richer look and present a much greater contrast between a hammered or chiseled surface and a polished one; but for granite statuary and ornately carved building blocks, and for all purposes where it is desirable to present fine detail, it is necessary that the granite be of a light color, fine grained, and easily worked to secure the best results.

POLISHED GRANITE.—The varieties of granite susceptible of the highest and most enduring polish are those containing the largest percentages of the hard minerals, quartz and feldspar, quartz being especially important. Hornblende, however, takes a fairly good polish, and contributes largely to the coloring of most dark granites. Pyroxene of the type occurring in the Quincy granites is rather bad, since, owing to its brittleness, it cracks out more or less and leaves small pits in the finished face. Much mica, especially in large plates, is objectionable, as it will not polish, but remains dull and lusterless except where the direction of its cleavage planes happen to coincide with the face of the stone.

After being prepared by bush hammering, the block is transported to the shop or mill to receive further smoothing and its final finish. The surface to be worked upon is brought to a horizontal position and ground smooth with an abrasive material mixed with water and moved about by a revolving iron or steel disk perforated with holes or made of concentric rings. This disk, which is 12 or 14 inches across, is revolved by an upright shaft, to the bottom of which it is fastened, and the power is communicated through a main shaft running overhead. Joints in the upright or counter shaft and its peculiar attachment to the main shaft allow its lower end to be swung over a considerable area, thus permitting the workman who guides it to move it over a surface of stone many times larger than the disk itself.

The abrasive material now almost exclusively used for grinding granite is either chilled-iron globules, steel emery, or crushed steel. A coarse grade is used at first, then a finer kind, and for the last grinding fine emery is often used. Polishing is done in much the same way as grinding, except that a felt-covered disk is used in place of an iron one, and putty powder, mixed with a little water, instead of coarser grinding materials. Before the final polish, however, the surface is usually given a dull gloss or "skin coat" by the disk and water alone. A polish is sometimes produced by the use of oxalic acid instead of putty powder, but the polish thus made is less durable. Moldings are ground and polished by means of blocks fitting the grooves dragged back and forth either by power or hand.

Granite for columns, balusters, round posts, and urns is now worked chiefly in lathes, which, for the heaviest work, are made large enough to handle blocks 25 feet long and 5 feet in diameter. Instead of being turned to the desired size by sharp cutting instruments, as in ordinary machines for turning wood and metal, granite is turned or ground away by the wedge-like action of rather thick steel disks, rotated by the pressure of the stone as it slowly turns in the lathe. The disks, which are six or eight inches in diameter, are set at quite an angle to the stone, and move with an automatic carriage along the lathe bed. Large lathes have four disks, two on each side, and a column may be reduced some two inches in diameter the whole length of the stone by one lateral movement of the carriages along the bed. The first lathes for turning granite cut only cylindrical or conical columns, but an improved form is so made that templates or patterns may be inserted to guide the carriages, and columns having any desired swell may be as readily turned. For fine grinding and polishing the granite is transferred to another lathe, where the only machinery used is to produce a simple turning or revolution of the stone against iron blocks carrying the necessary grinding or polishing materials.

Blocks are prepared for lathe work by being roughed out with a point, and by having holes chiseled in their squared ends for the reception of the lathe dog and centers. This principle of cutting granite by means of disks revolved by contact with the stone has been also applied to the dressing of plain surfaces, the stone worked upon being mounted upon a traveling carriage and made to pass under a series of disks mounted in a stationary upright frame.

Tracery and lettering for polished granite are usually first drawn upon paper, which is firmly pasted to the surface and the design chiseled through it to the requisite depth in the rock.

CARVED GRANITE.—Statues, capitals, keystones, and, in general, all highly ornamental designs, are worked out with chisels from detail drawings or plaster casts. It is necessarily a slow process, owing to the hardness of the rock, and the cost of such work is consequently great. The MacCoy pneumatic tool, however, which has been recently patented and successfully applied to this purpose, gives promise of superseding much of the tediousness of the hand process. This instrument is connected to a flexible pipe, supplying the compressed air or steam by which it is driven, and works at a remarkably high rate of speed. It may be moved to any part of a surface, and works with a celerity unapproached by other means.

The use of granite for sculpture is steadily increasing, particularly for outdoor statuary. The white fine-grained muscovite-biotite granite found at Hallowell, Manchester, and Augusta, in Maine, is particularly well adapted for this purpose. Statues made of the Hallowell granite are to be found in nearly every state, though possibly the stone is not superior to varieties found in other localities.

The following directory is arranged alphabetically by states, each state including the quarries operated. It will be noticed that in many cases the post-office address of the firm operating the quarry is not identical with the location of the quarry. The number of names included in this directory is greater than the number of firms which were in operation in 1889 and whose statistics are tabulated, the object being to give a directory of firms operating up to the time the report went to press. Some of the firms included in the directory commenced operations since 1889, but of course no statistics relative to such firms are included in the report.

DIRECTORY OF GRANITE PRODUCERS.

ARKANSAS.

NAMES OF FIRMS.	POST-OFFICE ADDRESS.	LOCATION OF QUARRY.
Fourche Mountain Granite Co.....	Little Rock, Pulaski county.....	Sections 24 and 26 north, range 12 west, Pulaski county.

CALIFORNIA.

M. K. Cady.....	Agua Caliente, Sonoma county.....	1½ mile east of Agua Caliente, Sonoma county.
C. F. Faber.....	.....do.....	1¼ mile north of Agua Caliente, Sonoma county.
Mary T. Hayes.....	.....do.....	2½ miles from Agua Caliente, Sonoma county.
Muggie Read.....	.....do.....	2½ miles north of Agua Caliente, Sonoma county.
W. B. Read.....	.....do.....	1½ mile north of Agua Caliente, Sonoma county.
Allen Taylor.....	Angel's Camp, Calaveras county.....	Angel's township, Calaveras county.
E. Turner.....	Arcata, Humboldt county.....	Mad river, 6 miles east of Arcata, Humboldt county.
J. J. Dunn.....	Berkeley, Alameda county.....	1½ mile northeast of Berkeley, Alameda county.
J. D. Slemmons.....	Butte City, Montana.....	1 mile northeast of Monrovia, Los Angeles county.
A. McNaughton.....	Cordelia, Solano county.....	Green valley, 1½ mile east of Cordelia, Solano county.
Los Angeles Granite and Marble Works.....	Declzville, San Bernardino county.....	Declzville, San Bernardino county.
Rocky Point Granite Works.....	Exeter, Tulare county.....	2½ miles northeast of Exeter, Tulare county.
David Blower.....	Folsom City, Sacramento county.....	2¼ miles north of Folsom City, Sacramento county.
E. McCue & Bro.....	.....do.....	2 miles east of Folsom City, Sacramento county.
State Prison.....	Folsom, Sacramento county.....	2 miles east of Folsom, Sacramento county.
Ahearn Bros.....	Grass Valley, Nevada county.....	4 miles west of Grass Valley, Nevada county.
George Kane.....	La Cañada, Los Angeles county.....	6 miles northwest of Pasadena, Los Angeles county.
Chyanaca Granite Co.....	Lakeside, San Diego county.....	4½ miles north of Lakeside, San Diego county.
T. L. Coffey.....	Lincoln, Placer county.....	Seventh district, Placer county.
Byrno Bros.....	.....do.....	1½ mile east of Lincoln, Placer county.
H. W. Calderwood.....	.....do.....	2 miles east of Lincoln, Placer county.
F. R. Fretcher.....	.....do.....	Foot-hills of Sierra mountains, 2 miles east of Lincoln, Placer county.
Thomas H. Jeter.....	.....do.....	2 miles southeast of Lincoln, Placer county.
McCue & Johnson.....	.....do.....	.....do.....
Wm. Cook & Sons.....	Loomis, Placer county.....	1¼ mile east of Loomis, Placer county.
M. J. Healey.....	.....do.....	½ mile southwest of Loomis, Placer county.
Patrick Hoy.....	.....do.....	2 miles southeast of Loomis, Placer county.
M. Craig.....	2020 Michigan avenue, Los Angeles, Los Angeles county.	5 miles northwest of Riverside, San Bernardino county.
The Porphyry Paving Co.....	54 Baker Block, Los Angeles, Los Angeles county.	2 miles southeast of Riverside, San Bernardino county.
Conrad Scheerer.....	622 West Sixth street, Los Angeles, Los Angeles county.	2½ miles east of Victor, San Bernardino county.
M. W. Griswold.....	Los Guillicos (mail South Los Guillicos, Sonoma county).	1 mile west of South Los Guillicos, Sonoma county.
E. D. Bridges.....	Nevada City, Nevada county.....	¾ mile northeast of Nevada City, Nevada county.
Charles Treleven.....	.....do.....	½ mile east of Nevada City, Nevada county.
Patrick Gallagher.....	Novato (mail Black Point), Marin county.	5 miles from Black Point, Marin county.
Alameda Macadamizing Co.....	Oakland, Alameda county.....	2½ miles northeast of Oakland, Alameda county.
California Improvement Co.....	1003½ Broadway, Oakland, Ala- ameda county.	¼ mile north of Mills College, Alameda county.
Oakland Paving Co.....	Oakland, Alameda county.....	½ mile east of Temescal, Alameda county.
Wilkinson & Kellos.....	Penn's Grove, Sonoma county.....	Penn's Grove, Sonoma county.
Gatt & Gatt.....	Penryn, Placer county.....	1½ mile east of Penryn, Placer county.
David Griffith.....	.....do.....	Penryn, Placer county.
Roberts Bros.....	.....do.....	½ mile west of Penryn, Placer county.
G. Schwalenberg.....	.....do.....	1½ mile east of Penryn, Placer county.
Peter Clarke.....	Petaluma, Sonoma county.....	6 miles northeast of Petaluma, Sonoma county.
John Lynch.....	.....do.....	.....do.....
S. Stacey.....	.....do.....	6 miles east of Petaluma, Sonoma county.
Day Granite Co.....	Raymond, Fresno county.....	4 miles south of Raymond, Fresno county.
F. E. Knowles.....	.....do.....	2½ miles east of Raymond, Fresno county.
Arlington Granite Works.....	Riverside, San Bernardino county.....	5½ miles southwest of Riverside, San Bernardino county.
Ward & Clark.....	.....do.....	4 miles southeast of Riverside, San Bernardino county.
Copp & Waters.....	Rocklin, Placer county.....	¾ mile southeast of Rocklin, Placer county.
I. L. Delano & Co.....	.....do.....	½ mile east of Rocklin, Placer county.
John L. Grant.....	.....do.....	½ mile south of Rocklin, Placer county.
Matt Lahly & Co.....	.....do.....	½ mile east of Rocklin, Placer county.
Matt Lomber.....	.....do.....	1 mile southeast of Rocklin, Placer county.

DIRECTORY OF GRANITE PRODUCERS—CONTINUED.

CALIFORNIA—CONTINUED.

NAMES OF FIRMS.	POST-OFFICE ADDRESS.	LOCATION OF QUARRY.
Samuel Kenter & Co	Rocklin, Placer county	1 mile south of Lincoln, Placer county.
Thomas Quinn	do	½ mile southeast of Rocklin, Placer county.
John M. Taylor	do	¼ mile east of Rocklin, Placer county.
Oscar Wikeman	do	1½ mile southeast of Rocklin, Placer county.
Carlaw Bros	Tenth and R streets, Sacramento	1 mile southeast of Loomis, Placer county.
Excelsior Paving Co	San Diego, San Diego county	6 miles east of National City, San Diego county.
San Diego Granite Co	do	3 miles south of Temecula, San Diego county.
American River Land and Lumber Co	320 Sansome street, San Francisco	2½ miles east of Folsom, Sacramento county
Degan & Brady	Eleventh and Bryant streets, San Francisco.	Rocklin, Placer county.
Folsom Water Power Co	320 Sansome street, San Francisco	1 mile east of Folsom, Sacramento county.
Wm. Kennedy	507 Fell street, San Francisco	2 miles north of Penn's Grove, Sonoma county.
J. W. McDonald	234 Montgomery street, San Francisco	Sonoma, Sonoma county.
Pacific Stone Co	Sixth and King sts., San Francisco	2 miles east of Raymond, Fresno county.
E. R. Thomason	Phelan Building, San Francisco	2 miles east of Cordelia, Solano county.
Western Granite and Marble Co	San José, Santa Clara county	Near Loomis, Placer county.
C. G. Borg	Santa Rosa, Sonoma county	8 miles east of Santa Rosa, Sonoma county.
A. Ducharm	do	2½ miles east of Santa Rosa, Sonoma county.
L. Laurent	do	5 miles east of Santa Rosa, Sonoma county.
James Warner	do	2 miles north of Santa Rosa, Sonoma county.
William Trudgen	Sonoma, Sonoma county	4 miles northeast of Sonoma, Sonoma county.
H. C. Manuel	do	3 miles north of Sonoma, Sonoma county.
S. Schrocken	do	1 mile north of Sonoma, Sonoma county.
Henry Weyl	do	2 miles north of Sonoma, Sonoma county.
Ferdinand Doda	South Los Guilleos, Sonoma county	2 miles west of Los Guilleos, Sonoma county.
C. N. Fernald & Son	Temecula Station, San Diego county	1½ mile south of Temecula, San Diego county.
A. C. St. John	Victor, San Bernardino county	Section 10, range 5, San Bernardino county.

COLORADO.

John L. Chasteen	Arkins, Larimer county	Arkins, Larimer county.
Larimer County Granite Quarry Co	do	1 mile west of Arkins, Larimer county.
George Weaver	Buena Vista, Chaffee county	3 miles north of Nathrop, Chaffee county.
James M. Curry	1319 Sixteenth street, Denver	5 miles southeast of Castle Rock, Douglas county.
Geddis & Secrie	Box 2873, Denver	On Beaver creek, near Aberdeen, Gunnison county.
Roy & Savard	Cor. West Thirtieth avenue and South Sixth street, Denver.	Castle Rock, Douglas county.
The Castle Rock Stone Co	1304 Seventeenth street, Denver	2 miles northeast of Castle Rock, Douglas county.
The Douglas Stone Quarry Co	1510 Seventeenth street, Denver	2 miles south of Castle Rock, Douglas county.
W. A. Hamill	Georgetown, Clear Creek county	Griffith Mining District, Clear Creek county.
J. W. Tumbleson	Lyons, Boulder county	1 mile south of Lyons, Boulder county.

CONNECTICUT.

C. B. Wooster	Ansonia, New Haven county	¾ mile northeast of Ansonia, New Haven county.
F. W. Beers	Bridgeport, Fairfield county	1½ mile north of Bridgeport, Fairfield county.
Patrick Garvey	do	North Bridgeport, Fairfield county.
B. D. Pierce, Jr	do	3 miles northwest of Bridgeport, Fairfield county.
J. W. Southey	do	2 miles north of Bridgeport, Fairfield county.
Martin Collins	Danbury, Fairfield county	1¼ mile south of Danbury, Fairfield county.
Henry Brooks	East Glastonbury, Hartford county	½ mile north of East Glastonbury, Hartford county.
A. N. Curtis	do	2 miles west of East Glastonbury, Hartford county.
Lester Holmes	do	1½ mile west of East Glastonbury, Hartford county.
Henry T. Lingner	do	¼ mile north of East Glastonbury, Hartford county.
Nelson Slater	do	1 mile west of East Glastonbury, Hartford county.
Joseph Galley	East Killingly, Windham county	¾ mile northeast of East Killingly, Windham county.
Joseph G. Mead	Greenwich, Fairfield county	½ mile west of Greenwich, Fairfield county.
George H. Ritch & Bros	Port Chester, Westchester county, N. Y.	2½ miles south of Greenwich, Fairfield county.
Thomas Ritch & Son	Greenwich, Fairfield county	1¼ mile southwest of Greenwich, Fairfield county.
John Voorhis	do	2½ miles southwest of Greenwich, Fairfield county.
Henry Webb	do	½ mile northwest of Greenwich, Fairfield county.
James Scully & Son	Groton, New London county	½ mile east of Groton, New London county.
Darwin N. Benton	Guilford, New Haven county	Guilford township, Sachem's Head Point, New Haven county.
Seth Belden & Son	Hartford, Hartford county	(a) 1 mile northwest of Bolton, Tolland county. (b) 2 miles southeast of East Glastonbury, Hartford county.
Alexander Dallas	do	¼ mile northwest of Cobalt, Middlesex county.

DIRECTORY OF GRANITE PRODUCERS—CONTINUED.
CONNECTICUT—CONTINUED.

NAMES OF FIRMS.	POST-OFFICE ADDRESS.	LOCATION OF QUARRY.
John Beattie.....	Leete's Island, New Haven county.....	Leete's island, New Haven county.
Haddam Granite Quarry Co.....	Middletown, Middlesex county.....	$\frac{1}{2}$ mile east of Haddam, Middlesex county.
Scovill & Murphy.....	do.....	3 miles north of Higganum, Middlesex county.
Whitmore Bros.....	do.....	do.
Thomas M. Clark.....	Milford, New Haven county.....	$1\frac{1}{2}$ mile northwest of Milford, New Haven county.
Alexander Murray.....	Westerly, R. I.....	Stonington township, New London county, 1 mile west of Westerly, R. I.
Opie & Caddy.....	Mystic, New London county.....	$1\frac{1}{2}$ mile from Mystic, New London county.
Trevena Bros.....	Mystic Bridge, New London county.....	Stonington township, $1\frac{1}{2}$ mile northeast of Mystic, New London county.
John Hanna.....	New Britain, Hartford county.....	(a) $\frac{1}{2}$ mile north of Stony creek, New Haven county. (b) 2 miles west of Guilford, New Haven county.
Charles F. Stoll.....	New London, New London county.....	$\frac{1}{4}$ mile south of Groton, New London county.
Frank P. Bolles.....	New Milford, Litchfield county.....	$1\frac{1}{2}$ mile northeast of Warren, Litchfield county.
James H. Hummel.....	153 Fulton street, New York city.....	$\frac{3}{4}$ mile northwest of Branchville, Fairfield county.
Booth Bros. (a).....	Niantic, New London county.....	1 mile southeast of Niantic, New London county.
Winter Davis.....	do.....	$1\frac{1}{2}$ mile south of Waterford, New London county.
James V. Luce.....	do.....	$2\frac{1}{2}$ miles west of Niantic, New London county.
David McNaughton.....	do.....	$1\frac{1}{2}$ mile southeast of Niantic, New London county.
The Millstone Granite Co.....	do.....	1 mile southeast of Niantic, New London county.
The White Granite Co.....	do.....	Waterford township, 1 mile east of Niantic, New London county.
O. F. Gibson.....	Oneco, Windham county.....	1 mile west of Oneco, Windham county.
Garvey Bros. (b).....	9 Custom House street, Providence, R. I.....	1 mile southwest of Oneco, Windham county.
E. Mower & Co.....	Roxbury Station, Litchfield county.....	$\frac{1}{4}$ mile north of Roxbury station, Litchfield county.
Gorman Bros.....	South Manchester, Hartford county.....	3 miles south of South Manchester, Hartford county.
Reilly & Bunty.....	Stamford, Fairfield county.....	1 mile northeast of Stamford, Fairfield county.
J. W. Boswell.....	Sterling, Windham county.....	$\frac{1}{2}$ mile northeast of Sterling, Windham county.
John L. Derblo & Co.....	Stony Creek, New Haven county.....	$1\frac{1}{2}$ mile north of Stony creek, New Haven county.
Noreross Bros.....	Worcester, Mass.....	$1\frac{1}{4}$ mile northeast of Stony creek, New Haven county.
The Branford Granite Co.....	Stony Creek, New Haven county.....	2 miles east of Stony creek, New Haven county.
Kenneth McKay (b).....	Valley Falls, R. I.....	$\frac{1}{2}$ mile east of Sterling, Windham county.
L. R. Lull.....	West Stafford, Tolland county.....	3 miles west of West Stafford, Tolland county.
Edson & Calkins.....	Willimantic, Windham county.....	$1\frac{1}{4}$ mile northwest of Willimantic, Windham county.
W. H. Osborn.....	do.....	$\frac{1}{2}$ mile east of Willimantic, Windham county.

DELAWARE.

A. G. Morris & Co.....	Avondale, Chester county, Pa.....	Baltimore and Ohio railroad, Philadelphia division, New Castle county.
George W. Phillips.....	Bellevue, New Castle county.....	Eastern district, Brandywine hundred, New Castle county.
Daniel Dougherty.....	Wilmington, New Castle county.....	Southwest of Wilmington, New Castle county.
John H. Flamer.....	416 East Eleventh street, Wilmington.....	Wilmington, New Castle county.
McKendrick & Scott.....	do.....	$\frac{1}{4}$ mile west of Wilmington, New Castle county.
Philip P. Tyre.....	do.....	$\frac{3}{4}$ mile from Edgemoor station, New Castle county.
The Brandywine Granite Co.....	Ninth and Market streets, Wilmington.....	Christiana and Brandywine hundreds, New Castle county.

GEORGIA.

A. V. Gude.....	Atlanta, Fulton county.....	(a) 1 mile south of Conyers, Rockdale county. (b) $1\frac{1}{4}$ mile east of Lithonia, De Kalb county.
Liddell & Johnsons.....	12 Lloyd street, Atlanta.....	Conley, Henry county.
M. E. Maher.....	Atlanta, Fulton county.....	1 mile south of Stockbridge, Henry county.
The Southern Granite Co.....	do.....	2 miles west of Lithonia, De Kalb county.
Yonable Bros.....	Old Capitol Building, Atlanta.....	(a) 2 miles northwest of Lithonia, De Kalb county. (b) $2\frac{1}{2}$ miles northeast of Stone mountain, De Kalb county.
Alexander Currie.....	Conyers, Rockdale county.....	(a) 3 miles northeast of Conyers, De Kalb county. (b) $1\frac{1}{2}$ mile southeast of Conyers, De Kalb county.
Freeman Bros.....	Covington, Newton county.....	2 miles southeast of Covington, Newton county.
Wm. Doyle.....	Crawford, Oglethorpe county.....	1 mile east of Crawford, Oglethorpe county.
Swift & Wilcox.....	Ellberton, Elbert county.....	$\frac{1}{4}$ mile south of Ellberton, Elbert county.
H. H. Jones & Co.....	Griffin, Spalding county.....	$\frac{3}{4}$ mile northwest of Griffin, Spalding county.
W. G. Finlayson.....	Lithonia, De Kalb county.....	In Rockdale county, $2\frac{1}{2}$ miles south of Lithonia.
Edward Goddard & Co.....	do.....	$\frac{1}{2}$ mile east of Lithonia, De Kalb county.
S. D. Jenkins.....	do.....	3 miles south of Lithonia, De Kalb county.

a See also Maine. b See also Rhode Island.

DIRECTORY OF GRANITE PRODUCERS—CONTINUED.

GEORGIA—CONTINUED.

NAMES OF FIRMS.	POST-OFFICE ADDRESS.	LOCATION OF QUARRY.
E. G. New	Lithonia, De Kalb county	1 mile northeast of Lithonia, De Kalb county.
Wilson Bros.	do	2½ miles northwest of Lithonia, De Kalb county.
T. J. Carling & Co. Granite Co.	Macon, Bibb county	(a) 3 miles from Sparta, Hancock county. (b) Holton, Bibb county.
The Georgia Quincy Granite Co.	do	Sparta, Hancock county.
J. R. Hightower	Monticello, Jasper county	Jones county.
Central Railroad and Banking Co.	Savannah, Chatham county	1 mile northwest of Griffin, Spalding county.
J. X. Beauchamp & Co.	Stone Mountain, De Kalb county	3 miles from station, Stone mountain, De Kalb county.
R. M. Thompson	do	3 miles east of Stone mountain, De Kalb county.

MAINE.

Manufacturers' Granite Co. (limited)	40 Court street, Brooklyn, N. Y.	6 miles southwest of Addison, Washington county.
Pleasant River Granite Co. of Maine	Addison, Washington county	4 miles south of Addison Point post office, Washington county.
Theodore Bennett	Alfred, York county	1¼ mile south-southwest of Alfred, York county.
F. N. Joaquin	Athens, Somerset county	3 miles southeast of Athens, Somerset county.
Maine and New Hampshire Granite Co. (a)	Auburn, Androscoggin county	North Jay, Franklin county.
Edwards Manufacturing Co.	Augusta, Kennebec county	Fourth ward, Augusta, Kennebec county.
F. E. Garland	do	Belgrade road, 2 miles north of Augusta, Kennebec county.
Howard S. Robie	do	2 miles south of Augusta, Kennebec county.
Wm. A. Wall & Son	do	¾ mile west of Augusta, Kennebec county.
Daniel S. Young	do	3 miles northeast of Augusta, Kennebec county.
Jewell Granite Co.	Bangor, Penobscot county	1 mile northeast of Lincoln, Penobscot county.
Kodick Bros.	Bar Harbor, Hancock county	Mount Desert, Hancock county, east side Somes sound, near Sound post office.
Adams Oak Hill Granite Co.	Belfast, Waldo county	3 miles north of City Point post office, Belfast, Waldo county.
Cyrus J. Hall	do	(a) 2¼ miles south of Mount Desert post office, Hancock county. (b) Otter creek, 6 miles south of Bar Harbor, Hancock county.
W. O. Sargent	do	3 miles northeast of Swanville, Waldo county.
C. H. Andrews	Biddeford, York county	1 mile south-southwest of Biddeford, York county.
C. H. Bragdon & Sons	do	¾ mile southwest of Biddeford, York county.
Day Bros.	do	4 miles west of Biddeford, York county.
C. H. & A. Goodwin	do	3 miles southeast of Biddeford, York county.
L. B. Howe & Co.	do	2¼ miles southwest of Biddeford, York county.
Gordon & Michie	do	Alfred road, 2 miles from Biddeford, York county.
J. B. Palmer	do	4 miles west of Biddeford, York county.
Geo. W. Ross	do	3 miles south of Biddeford, York county.
James B. Smith	do	1 mile south of Biddeford, York county.
Wm. P. Bissett	Blue Hill, Hancock county	3 miles south of Orland, Hancock county.
Geo. W. Clay	do	1½ mile east of Blue Hill, Hancock county.
Blue Hill Granite Co.	do	1¼ mile east of Blue Hill, Hancock county.
Howard & Green	do	1 mile northeast of Blue Hill, Hancock county.
The White Granite Co.	do	1¼ mile east of Blue Hill, Hancock county.
J. E. Allen & Sons	Bridgton, Cumberland county	8 miles north of Harrison, Cumberland county.
Albion P. Woodside	Brunswick, Cumberland county	3 miles northeast of Brunswick, Cumberland county.
Eben H. Fernald	Camden, Knox county	Lincolntown, Waldo county, 5 miles north of Camden.
S. L. Fowler	Canaan, Somerset county	3 miles northwest of Canaan, Somerset county.
Atherton & Sperry	East Blue Hill, Hancock county	1 mile south of East Blue Hill, Hancock county.
Dugdale, Stansfield & Co.	do	½ mile east of East Blue Hill, Hancock county.
Ellsworth and East Blue Hill Granite Co.	do	East Blue Hill, Hancock county.
Johnson & Long	do	do.
John Love	do	1½ mile west of East Blue Hill, Hancock county.
John T. Miller	do	½ mile west of East Blue Hill, Hancock county.
Campbell & Macomber	Billsworth, Hancock county	Mount Desert, west shore of Somes sound, 2½ miles south of Mount Desert post office, Hancock county.
Hayward Pierce	Frankfort, Waldo county	¾ mile from Frankfort, Waldo county.
The Mount Waldo Granite Works	do	1 mile from Frankfort, Waldo county.
T. M. Blaisdell	Franklin, Hancock county	1½ mile southeast of Franklin, Hancock county.
Blaisdell & Donnell	do	4 miles south of Franklin, Hancock county.
Frank Bradbury	do	¾ mile northeast of West Franklin post office, Hancock county.
John Paul Gordon	do	On Taunton bay, 1 mile from Franklin post office, Hancock county.
West & Wentworth	do	2 miles south of Franklin, Hancock county.
G. D. Weeks	Gorham, Cumberland county	1 mile south of Gorham, Cumberland county.
Calvin Ames	Green's Landing, Hancock county	Deer isle, ½ mile east of Green's Landing, Hancock county.
James Clegg	do	On eastern end of Moose island, 1 mile west from Green's Landing, Hancock county.

a See also New Hampshire.

DIRECTORY OF GRANITE PRODUCERS—CONTINUED.

MAINE—CONTINUED.

NAMES OF FIRMS.	POST-OFFICE ADDRESS.	LOCATION OF QUARRY.
Jos. Dufore & Co.	Green's Landing, Hancock county.	Western end Crotch island, near Green's Landing, Hancock county.
Herman Eaton	do	Scott's island, Hancock county.
Thomas H. Eaton	do	Potato island, $\frac{3}{4}$ mile south-southeast from Green's Landing, Hancock county.
Eaton, Grant & Martin	do	Crotch island, near Green's Landing, Hancock county.
J. Goss, jr.	do	Crotch island, 1 mile southeast of Green's Landing, Hancock county.
Goss & Small	do	Green's island, 1 mile south of Green's Landing, Hancock county.
Sullivan, Green & Co.	do	Northwest side of Green's island, Hancock county.
S. A. McDonald & Co.	do	Just east of Green's Landing, Hancock county.
P. G. Merrill	do	Crotch island, 1 mile southeast of Green's Landing, Hancock county.
Neelon & Shields	do	(a) Green's Landing, Hancock county. (b) Devil island, $3\frac{1}{2}$ miles southeast from Green's Landing, Hancock county.
J. H. Robbins	do	Scott's island, 1 mile south of Green's Landing, Hancock county.
T. Snow & Co.	do	Green's Landing, Hancock county.
H. M. Thayer	do	Russ island, near Green's Landing, Hancock county.
E. S. Thurlow & Co.	do	Northeast point of Thurlow's island, $\frac{1}{4}$ mile southwest of Green's Landing, Hancock county.
Thos. Warren & Co.	do	(a) Deer isle, $\frac{1}{4}$ mile west of Green's Landing, Hancock county. (b) Crotch island, $\frac{1}{2}$ mile southwest of Green's Landing, Hancock county.
Hallowell Central Granite Works	Hallowell, Kennebec county	$2\frac{1}{2}$ miles northwest of Hallowell, Kennebec county.
Hallowell Granite Works	do	2 miles west of Hallowell, Kennebec county.
Alonzo Abbott	Hancock, Hancock county	(a) Mount Desert, east side Somes sound, $\frac{1}{2}$ mile northeast of Sound post office, Hancock county. (b) West Sullivan, Hancock county.
N. W. Fish	Jonesborough, Washington county	1 mile northwest of Jonesborough, Washington county.
Marston & Gilman	do	$1\frac{1}{2}$ mile west of Jonesborough, Washington county.
Lewiston Monumental Works	Lewiston, Androscoggin county	4 miles south of Lewiston, Androscoggin county.
Millbridge Paving Co.	Millbridge, Washington county	1 mile northeast of Millbridge, Washington county.
Richard R. Babbidge	Mount Desert, Hancock county	West shore Somes sound, $2\frac{1}{2}$ miles south of Mount Desert post office, Hancock county.
Seth W. Babbidge	do	do.
Blaisdell & Joy	do	do.
Brown & Freeman	do	West shore Somes sound, $2\frac{1}{4}$ miles south of Mount Desert post office, Hancock county.
John J. Carr	do	3 miles south of Somesville, Hancock county.
J. P. & T. W. Gordon	do	West shore Somes sound, 3 miles south of Mount Desert post office, Hancock county.
W. J. Richardson	do	Mount Desert, west shore Somes sound, Hancock county.
Whiting & Allen	do	Somes sound, $2\frac{1}{4}$ miles south of Mount Desert post office, Hancock county.
B. A. Parker	North Berwick, York county	South Berwick, York county.
Graves Bros.	Northeast Harbor, Hancock county	Mount Desert, $\frac{3}{4}$ mile northwest of Northeast Harbor, Hancock county.
F. L. Billings	North Jay, Franklin county	1 mile east of North Jay, Franklin county.
Bryant Bros.	do	$\frac{1}{2}$ mile east of North Jay, Franklin county.
L. L. Howard, jr.	Norway, Oxford county	Pike's hill, Norway, Oxford county.
J. E. Long	do	Norway, Oxford county.
M. M. O'Connor	do	2 miles north of Norway, Oxford county.
Casco Bay Granite Co.	Portland, Cumberland county	White's cove, Casco bay, 10 miles from Portland, Cumberland county.
Maine Central Railroad Co.	do	North Jay, Franklin county.
F. P. Freeman	Pretty Marsh, Hancock county	Mount Desert, $\frac{3}{4}$ mile southeast of Pretty Marsh, Hancock county.
A. L. Heagan	do	Mount Desert, 1 mile west of Pretty Marsh, Hancock county.
Maine Red Granite Co.	Red Beach, Washington county	$\frac{1}{2}$ mile west of Red Beach, Washington county.
S. Almond	Saint Stephen, New Brunswick	4 miles southeast of Calais, Washington county.
Booth Bros. and Hurricane Isle Granite Co. (a)	60 Bank street, New York city	Two quarries in Saint George, Knox county. One quarry in Hurricane island, Penobscot bay, Knox county. One quarry in Long Cove, Saint George, Knox county.
Bodwell Granite Co.	Rockland Knox county	Eight quarries in Vinal Haven, Knox county. One quarry in South Thomaston, Knox county. One quarry in Saint George, Knox county. One quarry in Jonesborough, Washington county.
Wm. P. Hurley	do	(a) South Thomaston, Knox county. (b) Saint George, Knox county. (c) Clark's island, near Saint George, Knox county.
H. K. Griggs	Saccarappa, Cumberland county	2 miles north of Saccarappa, Cumberland county.

a See also Connecticut.

DIRECTORY OF GRANITE PRODUCERS—CONTINUED.

MAINE—CONTINUED.

NAMES OF FIRMS.	POST-OFFICE ADDRESS.	LOCATION OF QUARRY.
Clark's Island Granite Works.....	Saint George, Knox county.....	Clark's island, Knox county.
Robinson & Gilchrist.....	do.....	1½ mile east of Saint George, Knox county.
J. Whitney Grindell.....	Sargentville, Hancock county.....	3 miles northwest of Sargentville, Hancock county.
A. L. Brown.....	Sound, Hancock county.....	East side Somes sound, 1 mile southwest of Sound post office, Hancock county.
Higgins & Graham.....	do.....	Mount Desert, Sound post office, Hancock county.
Arthur A. Murphy.....	do.....	East side Somes sound, ¾ mile southwest of Sound post office, Hancock county.
E. P. Gamage.....	South Bristol, Lincoln county.....	2 miles north of South Bristol, Lincoln county.
Chatto & Condon.....	South Brooksville, Hancock county.....	South Brooksville, near post office, Hancock county.
Lawton Emmons & Co.....	South Norridgewock, Somerset Co.....	3 miles south of Norridgewock, Somerset county.
Joseph Taylor.....	do.....	3 miles south of Norridgewock, Somerset county.
J. H. Linscott.....	South Paris, Oxford county.....	5 miles west of North Norway, Oxford county.
Anderson & Conant.....	South Thomaston, Knox county.....	¾ mile south of South Thomaston, Knox county.
H. P. Babl.....	do.....	South Thomaston, near Weskeag river, Knox county.
N. C. Bassick & Sons.....	do.....	2 miles south of South Thomaston, Knox county.
Brown & Wade.....	do.....	1 mile southwest of South Thomaston, Knox county.
Thos. R. Draw & Sons.....	do.....	(a) 1½ mile east of South Thomaston, Knox county. (b) 1 mile southwest of South Thomaston, Knox county.
George Green & Co.....	do.....	Saint George, Knox county.
Patrick Maloney & Co.....	do.....	1½ mile southwest of South Thomaston, Knox county.
Merrick Sawyer.....	do.....	Spruce Head island, 1½ miles from Spruce Head post office, Knox county.
Wm. D. Barrell.....	South Turner, Androscoggin county.....	¼ mile from South Turner post office, Androscoggin county.
Fresman's Granite Co.....	Southwest Harbor, Hancock county.....	West shore Somes sound, 2½ miles south of Mount Desert post office, Hancock county.
Dunbar Bros.....	Sullivan, Hancock county.....	West Sullivan, Hancock county.
J. P. Armbrust.....	Vinal Haven, Knox county.....	Vinal Haven, Knox county.
A. J. Barton.....	do.....	do.
Black & Monroe.....	do.....	do.
Fred. Brown.....	do.....	2 miles north of Vinal Haven, Knox county.
George Smith.....	do.....	Argy's harbor, South Fox island, 1½ miles east of Vinal Haven post office, Knox county.
Dodlin Granite Co.....	Waterville, Kennebec county.....	2½ miles southwest of South Norridgewock, Somerset county.
J. F. Gordon.....	Wayne, Kennebec county.....	1½ mile southeast of Wayne, Kennebec county.
R. H. Williams.....	West Franklin, Hancock county.....	¼ mile west of West Franklin, Hancock county.
Craibtree & Havey.....	West Sullivan, Hancock county.....	½ mile northwest of West Sullivan, Hancock county.
Hooper & Havey.....	do.....	¾ mile northwest of West Sullivan, Hancock county.
G. W. Pettengill & Son.....	do.....	(a) 1½ mile northwest of West Sullivan, Hancock county. (b) Burnt Coat harbor, Swan's island, ¼ mile from Swan's Island post office, Hancock county.
C. A. Stimson.....	do.....	¾ mile northeast of West Sullivan, Hancock county.
Alexander Taylor.....	do.....	West Sullivan, District No. 1, Hancock county.
Brown, McAllister & Co.....	431 West Fourteenth street, New York city.....	¾ mile east of Round pond, Lincoln county.
E. C. Jewett.....	Whitefield, Lincoln county.....	2 miles north of King's Mills post office, Whitefield, Lincoln county.
Waldoboro' Granite Co.....	Waldoboro', Lincoln county.....	Waldoboro', Lincoln county.
E. D. Freeman.....	Yarmouth, Cumberland county.....	3 miles north from Yarmouthville, Cumberland county.
C. H. Hodsdon & Son.....	Yarmouthville, Cumberland county.....	2 miles southwest of Pownal Centre, Cumberland county.
Horace G. Ross.....	do.....	3½ miles northeast from Yarmouthville post office, Cumberland county.

MARYLAND.

James H. Atkinson.....	14 North street, Baltimore.....	Northern limits of Baltimore, Baltimore county.
Bergman & Peddicord.....	Cor. Washington street and Boundary avenue, Baltimore.....	Hall spring, ¼ mile west of Harford road, Baltimore county.
John Curley.....	1007 Park avenue, Baltimore.....	¼ mile north of Md. C. R. R. station, Baltimore, Baltimore co.
H. Fox.....	25 Jackson street, Baltimore.....	3 miles north of city limits, on Harford road, Baltimore county.
Guilford and Waltersville Granite Co.....	1416 North Charles street, Baltimore.....	(a) ¼ mile east of Granite, Baltimore county. (b) 4 miles north of Annapolis Junction, Howard county.
J. Harris.....	1327 Park avenue, Baltimore.....	Falls road, Baltimore, Baltimore county.
Jones & Thorne.....	Baltimore.....	½ mile north of Md. C. R. R. station, Hillen road, Baltimore co.
D. Leonard.....	329 Old Frederick road, Baltimore.....	¼ mile west of Baltimore, Baltimore county.
John G. Schwind.....	712 Rayner avenue, Baltimore.....	Calverton, 2 miles west of Baltimore, Baltimore county.
A. H. Wight & Co.....	7 North Calvert street, Baltimore.....	Northern limits of Baltimore, near Huntingdon avenue, Baltimore county.
Woodstock Granite Co.....	700 West Pratt street, Baltimore.....	In Baltimore county, 1½ mile north of Woodstock station, B. & O. R. R.

DIRECTORY OF GRANITE PRODUCERS—CONTINUED.
MARYLAND—CONTINUED.

NAMES OF FIRMS.	POST-OFFICE ADDRESS.	LOCATION OF QUARRY.
C. F. Rappanior	Ellicott City, Howard county	In Baltimore county, $\frac{1}{2}$ mile from Ellicott City.
Werner Bros.	do	In Baltimore county, $\frac{1}{4}$ mile east of Ellicott City.
J. J. McCann	Govanstown, Baltimore county	Govanstown, 2 miles north of Baltimore, Baltimore county.
Oliver & Peach	Granite, Baltimore county	$\frac{1}{2}$ mile north of Granite, Baltimore county.
Wm. F. Wellor	do	In Baltimore county, $1\frac{1}{4}$ mile east of Woodstock station, B. & O. R. R.
H. E. Shimp	Greenwood, Baltimore county	$1\frac{1}{4}$ mile east of Summerfield, Baltimore county.
Benjamin Kepner	Port Deposit, Cecil county	Port Deposit, Cecil county.
McClenahan & Bro.	do	do.
M. C. Pyle & Son	Pylesville, Harford county	$\frac{1}{4}$ mile southeast of Pylesville, Harford county.
Wm. E. Cavey	Woodstock, Howard county	1 mile north of Woodstock, in Baltimore county.
A. G. Morris & Co.	Avondale, Chester county, Pa.	$\frac{1}{2}$ mile southeast of Leslie, Cecil county.

MASSACHUSETTS.

Massachusetts Agricultural College	Amherst, Hampshire county	3 miles east of Amherst, Hampshire county.
John Shaw & Son	do	do.
William Hogan	Ashland, Middlesex county	$1\frac{1}{2}$ mile west of Ashland, Middlesex county.
Cape Ann Granite Co.	Bay View, Essex county	$\frac{3}{4}$ mile east of Bay View, Essex county.
Asa Hood	do	$\frac{1}{2}$ mile east of Bay View, Essex county.
Thomas Fitzgibbon	Beverly, Essex county	$1\frac{1}{2}$ mile southwest of Beverly, Essex county.
Connolly Bros.	Beverly Farms, Essex county	$\frac{1}{2}$ mile southwest of Beverly Farms, Essex county.
D. Linnahan & Son	do	do.
Lawrence Watson	do	do.
Granite Railway Company (a)	31 Pemberton square, Boston	West Quincy, Norfolk county.
S. A. Lovejoy	7 Exchange place, Boston	$1\frac{1}{2}$ mile north of Braintree, Norfolk county.
Wm. Sherman	Braggville, Middlesex county	$\frac{1}{2}$ mile south of Braggville, Middlesex county.
T. N. Sherman & Co.	do	$1\frac{1}{4}$ mile east of Milford, Worcester county.
Chester Granite Works	Chester, Hampden county	3 miles south of Chester, Hampden county.
Timothy Keefe	do	Berkshire county, 3 miles west of Chester.
J. H. Adams	Dalton, Berkshire county	$1\frac{1}{2}$ mile east of Becket, Berkshire county.
Horace M. Scott	Danvers, Essex county	$\frac{1}{2}$ mile south of Peabody, Essex county.
Richard Delaney	Dedham, Norfolk county	$1\frac{3}{4}$ mile west of Dedham station, Norfolk county.
John Frawley	Erving, Franklin county	Warwick, Franklin county.
Wm. Beattie	Fall River, Bristol county	1 mile east of Fall River, Bristol county.
Fall River Granite Co.	do	7 miles northeast of Fall River, Bristol county.
Chauncey H. Sears	do	1 mile southeast of Fall River, Bristol county.
Nathaniel G. Thurston	do	Ward 8, Fall River, Bristol county.
J. B. Wilnot	do	$1\frac{1}{2}$ mile northeast of Fall River, Bristol county.
G. A. Ferrell	Fitchburg, Worcester county	Rollstone hill, Fitchburg, Worcester county.
F. A. Hale	do	do.
James Kane	do	do.
Litchfield Bros.	do	Fitchburg, Worcester county.
F. A. McCauliff & Co.	do	Rollstone hill, Fitchburg, Worcester county.
John Landy & Bro.	Florence, Hampshire county	$\frac{1}{2}$ mile from Florence, Hampshire county.
W. P. Latham	do	Florence, Hampshire county.
Smith & Daniels	Foxborough, Norfolk county	2 miles southeast of Wrentham, Norfolk county.
Joseph C. Cloyes	Framingham, Middlesex county	2 miles southwest of Framingham, Middlesex county.
D. Rusk & Co.	Gloucester, Essex county	$\frac{3}{4}$ mile west of Gloucester, Essex county.
A. B. Loomis	Goshen, Hampshire county	3 miles west of Goshen, Hampshire county.
E. W. Willcutt	do	Goshen township, Hampshire county.
C. M. Cummings	Graniteville, Middlesex county	1 mile west of Graniteville, Middlesex county.
M. F. Downs	do	$1\frac{1}{2}$ mile west of North Chelmsford, Middlesex county.
Samuel Fletcher	do	1 mile west of Forge Village, Middlesex county.
Lewis P. Palmer	do	$\frac{1}{2}$ mile northwest of Graniteville, Middlesex county.
Wm. Reed	do	do.
Hammitt D. Wright	do	$\frac{1}{2}$ mile north of Graniteville, Middlesex county.
Daniel Phipps	Holliston, Middlesex county	2 miles north of Holliston, Middlesex county.
Milford Granite Co.	Hopedale, Worcester county	$1\frac{1}{2}$ mile northeast of Milford, Worcester county.
E. J. Prescott	Hudson, Middlesex county	1 mile northeast of West Acton, Middlesex county.
John B. Dodd	Jeffersonville, Worcester county	1 mile west of Holden, Worcester county.
Daniel Cahill	Lanesville, Essex county	$\frac{1}{4}$ mile southwest of Lanesville, Essex county.
Wm. R. Cheves	do	1 mile south of Lanesville, Essex county.
John G. Chick, jr.	do	$\frac{3}{4}$ mile south of Lanesville, Essex county.

a See also New Hampshire.

DIRECTORY OF GRANITE PRODUCERS—CONTINUED.
MASSACHUSETTS—CONTINUED.

NAMES OF FIRMS.	POST-OFFICE ADDRESS.	LOCATION OF QUARRY.
John D. Courcey, jr.	Lanesville, Essex county	$\frac{3}{4}$ mile southeast of Lanesville, Essex county.
Henry Moorings	do	$\frac{1}{2}$ mile south of Lanesville, Essex county.
Francis Reid	do	$\frac{1}{2}$ mile southeast of Lanesville, Essex county.
Rowley & Hanscome	do	$\frac{3}{4}$ mile south of Lanesville, Essex county.
Ezra Sherburne	do	$\frac{1}{2}$ mile east of Lanesville, Essex county.
James J. Vernon	do	$\frac{1}{2}$ mile northeast of Bay View, Essex county.
Lock & Jones	Lawrence, Essex county	(a) 3 miles southwest of Lawrence, Essex county. (b) $\frac{1}{2}$ mile southwest of Lawrence, Essex county.
W. D. Blanchard & Co.	Leominster, Worcester county	$1\frac{1}{2}$ mile southwest of Leominster Centre, Worcester county.
Kittredge & Leavitt	do	$2\frac{1}{2}$ miles west of Leominster Centre, Worcester county.
Sweatt & Davis	Lowell, Middlesex county	$2\frac{1}{2}$ miles west of North Chelmsford, Middlesex county.
S. L. Ward	do	On line between Lowell and Dracut, Middlesex county.
A. R. Blethen & Co.	Lynn, Essex county	3 miles south of Peabody, Essex county.
James Heath	do	3 miles north of Lynn, Essex county.
John Sheehan	do	$3\frac{1}{2}$ miles northeast of Peabody, Essex county.
James A. Rumsdell	Lynnfield, Essex county	1 mile west of Lynnfield, Essex county.
Martin Hawkins	Medford, Middlesex county	$1\frac{1}{2}$ mile north of Medford, Middlesex county.
Samuel B. Tay	do	$1\frac{1}{4}$ mile west of Medford, Middlesex county.
Nicholas White	do	$\frac{1}{8}$ mile northwest of Medford, Middlesex county.
G. Crofton	Milford, Worcester county	1 mile north of Milford, Worcester county.
John Cuddihy	do	1 mile northeast of Milford, Worcester county.
Milford Pink Granite Co.	do	$1\frac{1}{2}$ mile northeast of Milford, Worcester county.
Peter Ross	do	$2\frac{1}{2}$ miles north of Milford, Worcester county.
James S. Sherman	do	Worcester county, 1 mile west of Braggville.
Henry J. Rice	Milton, Norfolk county	$1\frac{1}{2}$ mile south of Milton, Norfolk county.
W. N. Flynt Granite Co.	Monson, Hampden county	1 mile north of Monson, Hampden county.
Lemay & Tetro	Nashua, N. H.	$1\frac{1}{4}$ mile north of Dunstable station, Middlesex county.
John Bertram	New Bedford, Bristol county	3 miles northwest of New Bedford, Bristol county.
Brownell & Murkland	do	do.
Abiathar Rogers	do	do.
Thomas McCarty	North Acton, Middlesex county	1 mile west of North Acton, Middlesex county.
North Acton Granite Co.	do	$\frac{1}{2}$ mile north of North Acton, Middlesex county.
Samuel Fowler	Northbridge, Worcester county	Northbridge, Worcester county.
Brown Bros.	North Chelmsford, Middlesex county	$1\frac{1}{2}$ mile southeast of Tyngsborough, Middlesex county.
C. W. Carkin	do	2 miles west of North Chelmsford, Middlesex county.
Perley A. Carkin	do	$2\frac{3}{4}$ miles southwest of North Chelmsford, Middlesex county.
Marinell & Willsteed	do	2 miles northwest of North Chelmsford, Middlesex county.
J. F. Allen	Northfield Farms, Franklin county	Northfield Farms, Franklin county.
B. J. Blanchard	North Uxbridge, Worcester county	$\frac{1}{4}$ mile from North Uxbridge station, Worcester county.
Lamson & Woodbury	Oxford, Worcester county	$4\frac{1}{2}$ miles from Oxford, Worcester county.
John Linchan	Peabody, Essex county	$1\frac{3}{4}$ mile southwest of Peabody, Essex county.
Henry A. Newhall	do	2 miles west of Peabody, Essex county.
Bryant, Lurvey & Co.	Pigeon Cove, Essex county	$\frac{1}{4}$ mile west of Pigeon Cove, Essex county.
Edward Canney	do	Pigeon Cove, Essex county.
James Edmunds	do	$\frac{1}{2}$ mile south of Pigeon Cove, Essex county.
Charles Guidet	do	1 mile southeast of Lanesville, Essex county.
Norman E. Mayo	do	$\frac{1}{4}$ mile northwest of Pigeon Cove, Essex county.
Stephen M. Morse	do	Pigeon Cove, Essex county.
Pratt & Stuart	do	$\frac{1}{2}$ mile southwest of Pigeon Cove, Essex county.
H. A. Story	do	$\frac{1}{2}$ mile west of Pigeon Cove, Essex county.
George Umlah & Co.	do	1 mile southwest of Pigeon Cove, Essex county.
S. N. Waite & Son	do	$\frac{3}{4}$ mile west of Pigeon Cove, Essex county.
J. T. Tank	Providence, R. I.	1 mile east of Whitinsville, Worcester county.
Wm. P. Barker, successor to Henry Barker & Sons	Quincy, Norfolk county	$\frac{3}{4}$ mile southeast of Lanesville, Essex county.
Churchill & Hitchcock	do	(a) $1\frac{1}{2}$ mile southwest of Quincy, Norfolk county. (b) $\frac{1}{2}$ mile northeast of West Quincy, Norfolk county.
Craig & Richards Granite Co.	do	1 mile northwest of South Quincy station, O. C. R. R., Norfolk county.
Frederick & Field	do	$\frac{3}{4}$ mile southwest of Quincy, Norfolk county.
Galvin Granite Co.	do	Quincy, Norfolk county.
Glencoe Granite Co.	do	3 miles southwest of West Quincy, Norfolk county.
G. H. Hardwick & Co.	do	$\frac{3}{4}$ mile west of Quincy, Norfolk county.
Charles Johnson & Bro.	do	Quincy, Norfolk county.
McDonnell & Sons	do	1 mile west of Quincy, Norfolk county.
McDonald & Turner	do	$\frac{1}{2}$ mile west of West Quincy, Norfolk county.

DIRECTORY OF GRANITE PRODUCERS—CONTINUED.

MASSACHUSETTS—CONTINUED.

NAMES OF FIRMS.	POST-OFFICE ADDRESS.	LOCATION OF QUARRY.
McKenzie & Patterson	Quincy, Norfolk county	1½ mile west of Quincy, Norfolk county.
Merry Mountain Granite Co.	do	1½ mile northwest of Quincy, Norfolk county.
Milne, Chalmers & Co.	do	2 miles west of West Quincy, Norfolk county.
Swithin Bros.	do	On southwest line, between West Quincy and Milton, Norfolk county.
S. B. Corliss	Randolph, Norfolk county	1½ mile southeast of Randolph, Norfolk county.
Lanesville Granite Co.	Rockport, Norfolk county	¼ mile east of Lanesville, Essex county.
Pigeon Hill Granite Co.	Rockport, Essex county	Rockport, Essex county.
Rockport Granite Co.	do	¾ mile northwest of Rockport, Essex county.
J. H. Merrill & Son	Salem, Norfolk county	2½ miles west of Peabody, Essex county.
James Welch	do	(a) 1¼ mile east of Beverly, Essex county. (b) ¾ mile west of Beverly, Essex county.
John Moyle	Sharon, Norfolk county	3 miles southeast of South Sharon, Norfolk county.
Ambrose Gilman	Shelburne Falls, Franklin county	1 mile west of Shelburne Falls, Franklin county.
Lewis Brown	South Peabody, Essex county	1½ mile west of Peabody, Essex county.
C. W. & G. W. Davis	do	1 mile west of South Peabody, Essex county.
Wright, Lyons & Co.	Springfield, Hampden county	1 mile west of Shelburne Falls, Franklin county.
Thomas R. Newhall	Wakefield, Essex county	½ mile southeast of Lynnfield, Essex county.
Jeremiah Sheehan	Warnersville, Middlesex county	¼ mile east of Concord Junction station, Middlesex county.
Arthur F. Hiscox	Webster, Worcester county	4 miles northwest of Webster, Worcester county.
William Y. Woodbury	do	4 miles west of Oxford, Worcester county.
H. E. Fletcher & Co.	West Chelmsford, Middlesex county	1¾ mile northwest of West Chelmsford, Middlesex county.
Nathan P. Prescott & Son	Westford, Middlesex county	3 miles northwest of North Chelmsford, Middlesex county.
Badger Bros.	West Quincy, Norfolk county	West Quincy, Norfolk county.
Chrystall Bros.	do	do.
Elecock & Sons	do	do.
Jones & Desmond	do	¾ mile southwest of West Quincy, Norfolk county.
Quincy Granite Co.	do	1 mile west of West Quincy, Norfolk county.
Alphonso Reinhalter	do	West Quincy, Norfolk county.
John B. Reinhalter	78 Copeland street, West Quincy, Norfolk county.	do.
O. T. Rogers Granite Co.	West Quincy, Norfolk county	¼ mile north of West Quincy, Norfolk county.
Rouleau Bros.	do	¾ mile southwest of West Quincy, Norfolk county.
Townsend & Clements	do	½ mile west of West Quincy, Norfolk county.
George M. Blanchard	Whitinsville, Worcester county	¼ mile south of Whitinsville, Worcester county.
Clark & Aronson	Wilmington, Middlesex county	1 mile west of Wilmington, Middlesex county.
J. S. Ballard	Worcester, Worcester county	¾ mile east of Worcester, Worcester county.
Darling Bros.	do	2 miles north of Milford, Worcester county.
Norcross Bros.	do	1½ mile north of Milford, Worcester county.
George D. Webb	do	1¼ mile northeast of Worcester, Worcester county.

MINNESOTA.

M. M. Williams	Little Falls, Morrison county	1½ mile northwest of Little Falls, Morrison county.
James Baxter & Son	Minneapolis, Hennepin county	1¼ mile east of Ortonville, Big Stone county.
Minnesota Granite and Polishing Co.	315 Rochester Block, Minneapolis	Section 19, township 124, range 28, Stearns county.
New Ulm Stone Co.	New Ulm, Brown county	2 miles east of New Ulm, Nicollet county.
Anderson & Co.	Saint Cloud, Stearns county	2 miles west of Saint Cloud, Stearns county.
Carlston Bros. & Co.	do	3 miles southwest of Saint Cloud, Stearns county.
Northern Granite Co.	do	2 miles north of Sauk Rapids, Benton county.
A. Gustafsson	do	In Sherburne county, 2½ miles southeast of Saint Cloud.
G. J. Hilder	do	In Sherburne county, 2 miles southeast of Saint Cloud.
Holes Bros.	do	4 miles west of Saint Cloud, Stearns county.
Minnesota State Reformatory	do	3 miles southeast of Saint Cloud, Stearns county.
John Nevins' Son & Ashworth	do	3 miles southwest of Saint Cloud, Stearns county.
J. B. Robinson	do	(a) 4 miles southwest of Saint Cloud, Stearns county. (b) 4½ miles southwest of Saint Cloud, Stearns county.
Saint Cloud Granite Co.	do	4 miles southwest of Saint Cloud, Stearns county.
Saint Paul Granite Co.	Saint Paul, Ramsey county	Ortonville, Big Stone county.
T. M. Breen	do	(a) In Sherburne county, 4 miles east of Saint Cloud. (b) 5 miles west of Saint Cloud, Stearns county.
Drake Co.	do	(a) In Benton county, 3 miles east of Saint Cloud. (b) ½ mile east of Sauk Rapids, Benton county.
Cameron & Co.	Sauk Rapids, Benton county	In Benton county, east of Saint Cloud.

DIRECTORY OF GRANITE PRODUCERS—CONTINUED.

MISSOURI.

NAMES OF FIRMS.	POST-OFFICE ADDRESS.	LOCATION OF QUARRY.
J. S. Benson	Annapolis, Iron county	4 miles southeast of Annapolis, Iron county.
Sheahan Bros.	Graniteville, Iron county	Graniteville, Iron county.
Syenite Granite Co.	do	3½ miles west of Middlebrook, Iron county.
The Ph. W. Schneider Granite Co.	do	Tenth district, Iron county.
La Motte Granite Co.	Kansas City	Sicranka, Madison county.
Shehan Bros.	Piedmont, Wayne county	1½ mile north of Piedmont, Wayne county.
Sicranka Construction Co.	404 Market street, Saint Louis	Knob Lick, Saint François county.
Stifel & Rackert	Saint Louis	Granite bend, Kerrigan post office, Wayne county.
Milne & Gordon	Syenite, Saint François county	(a) ¼ mile from Syenite, Saint François county. (b) ¾ mile west of Cornwall station, Madison county.

MONTANA.

Montana Granite Co.	Helena, Lewis and Clarke county	10 miles northeast of Helena, Lewis and Clarke county.
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NEVADA.

John Barrett	Reno, Washoe county	½ mile west of Washoe City, Washoe county.
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NEW HAMPSHIRE.

F. J. Fuller	Amherst Station, Hillsborough county.	½ mile west of Amherst station, Hillsborough county.
B. A. Haselton	Auburn, Rockingham county	¼ mile west of Auburn, Rockingham county.
G. W. Reed & Co.	do	¼ mile southwest of Auburn, Rockingham county.
F. R. Freuch	Bedford, Hillsborough county	½ mile north of Bedford, Hillsborough county.
Ola Anderson	Concord, Merrimack county	2 miles northwest of Concord, Merrimack county.
Collins Bros.	do	2 miles north of Concord, Merrimack county.
Granite Railway Company (a)	do	Concord, Merrimack county.
New England Granite Works.	Hartford, Conn	1 mile west of Concord, Merrimack county.
W. H. Perry	Concord, Merrimack county	1½ mile north of Concord, Merrimack county.
J. F. Rooney & Co.	do	1 mile from Grafton Centre, Grafton county.
Sargent & Sullivan	do	1 mile west of Concord, Merrimack county.
J. S. Abbott	Dover, Strafford county	1 mile east of Durham, Strafford county.
William L. Elder	do	Between Rochester and Dover, Strafford county.
George & Langmaid	do	Rockingham county, 2 miles southeast of Leo hill.
Hall & Emerson	do	5 miles south of Dover, Strafford county.
D. & C. P. Chesley	Durham, Strafford county	1 mile southwest of Durham, Strafford county.
Wells & Flanders	Enfield, Grafton county	1¼ mile east of Enfield post office, Grafton county.
P. T. Pride & Son	Farmington, Strafford county	½ mile east of Farmington post office, Strafford county.
J. E. Fisher	Fitzwilliam, Cheshire county	½ mile southeast of Fitzwilliam, Cheshire county.
D. T. Hayden & Co.	do	1¼ mile southeast of Fitzwilliam, Cheshire county.
Daniel H. Read	do	¾ mile southwest of Fitzwilliam Depot, Cheshire county.
R. L. Angier & Co.	Fitzwilliam Depot, Cheshire county.	¾ mile north of Fitzwilliam Depot, Cheshire county.
E. Blodgett & Co.	do	1 mile southwest of Fitzwilliam Depot, Cheshire county.
Dunn Bros.	do	½ mile east of Fitzwilliam Depot, Cheshire county.
H. C. White	do	1½ mile from Fitzwilliam Depot, Cheshire county.
Peter Dana	Franklin, Merrimack county	3½ miles from Grafton, Grafton county.
Spence & Coombs	Great Falls, Strafford county	1 mile west of Great Falls, Strafford county.
Huntington & Sullivan	Hanover, Grafton county	1 mile east of Hanover, Grafton county.
Stephen C. Leazer	Haverhill, Grafton county	1 mile south of Haverhill, Grafton county.
D. J. Winn	do	1½ mile from Haverhill, Grafton county.
George D. Webb	Worcester, Mass	(a) 1¼ mile west of Fitzwilliam, Cheshire county. (b) 1½ mile southeast of Marlborough, Cheshire county.
Roxbury Granite Co.	Keene, Cheshire county	2 miles east of Keene, Cheshire county.
Troy Granite Co.	Worcester, Massachusetts	Troy, Cheshire county.
P. H. Fresto	Lebanon, Grafton county	1¼ mile north of Lebanon, Grafton county.
F. B. Kendrick	do	1½ mile north of Lebanon, Grafton county.
Amoskeag Manufacturing Co.	Manchester, Hillsborough county	1½ mile northeast of Manchester, Hillsborough county.
Frank S. Bodwell	do	2 miles northeast of Manchester, Hillsborough county.
Fitchburg Railroad Co.	Boston, Mass	½ mile northwest of Pratt's station, Hillsborough county.
M. Fitzgerald	Manchester, Hillsborough county	3½ miles southwest of Manchester, Hillsborough county.
Warren Harvey	do	2 miles northeast of Manchester, Hillsborough county.

a See also Massachusetts.

DIRECTORY OF GRANITE PRODUCERS—CONTINUED.
NEW HAMPSHIRE—CONTINUED.

NAMES OF FIRMS.	POST-OFFICE ADDRESS.	LOCATION OF QUARRY.
Waterman Smith	Manchester, Hillsborough county	1 mile east of Manchester, Hillsborough county.
R. P. Stevens & Co.	do	4 miles west of Manchester, Hillsborough county.
Horace Willey	do	1½ mile north of Manchester, Hillsborough county.
John B. Bishop	Milford, Hillsborough county	2 miles northwest of Milford, Hillsborough county.
Bishop & Shaloo	do	Milford, Hillsborough county.
Albert E. Carlton	do	1½ mile northwest of Milford, Hillsborough county.
Fields & McGregor	do	1½ mile southeast of Milford, Hillsborough county.
L. K. Hutchinson	do	1¾ mile northwest of Milford, Hillsborough county.
Edward G. Kittredge	do	2 miles northwest of Milford, Hillsborough county.
E. G. Kittredge & Co.	do	2 miles southwest of Milford, Hillsborough county.
George McFarlane	Quincy, Mass.	1 mile northeast of Milford, Hillsborough county.
John B. Melendy	Milford, Hillsborough county	2 miles south of Milford, Hillsborough county.
Nathan Merrill	do	2 miles southwest of Milford, Hillsborough county.
Miller & Luce	West Quincy, Mass.	1½ mile south of Milford, Hillsborough county.
George F. Parker	Milford, Hillsborough county	2 miles northwest of Milford, Hillsborough county.
Newton Perham	do	1 mile north of Amherst, Hillsborough county.
Jerome Sawyer (estate of)	do	½ mile north of Milford, Hillsborough county.
W. H. Young & Son	do	2 miles southeast of Milford, Hillsborough county.
Alexander McDonald & Son	Mount Auburn, Cambridge, Mass.	1¼ mile east of Mason, Hillsborough county.
V. C. Gilman	Nashua, Hillsborough county	¾ mile northeast of South Lyndeborough, Hillsborough county.
Charles W. Stevens	do	1 mile southwest of Nashua, Hillsborough county.
S. S. Ordway & Co.	North Enfield, Grafton county	4 miles northwest of North Enfield, Grafton county.
Frank Blasdell	North Conway, Carroll county	2½ miles from North Conway, Carroll county.
Thomas Lalay	Haverhill, Mass.	1½ mile south of Conway, Carroll county.
White Mountain Granite Co.	Quincy, Grafton county	¼ mile southeast of Quincy, Grafton county.
Maline and New Hampshire Granite Co (a)	Redstone, Carroll county	2½ miles southeast of North Conway, Carroll county.
Silas Hussey	Rochester, Strafford county	2 miles southeast of Rochester, Strafford county.
W. H. Keniston & Son	Rumney, Grafton county	1¾ mile north of Rumney, Grafton county.
Sunapee Granite Co.	Sunapee, Sullivan county	¼ mile south of Sunapee, Sullivan county.
Charles A. Bailey	Suncook, Merrimack county	1½ mile east of Suncook, Merrimack county.
Frank C. Blodgett	West Concord, Merrimack county	¼ mile south of West Concord, Merrimack county.
Crowley & Quinn	do	¼ mile south of West Concord, Merrimack county.
Gay Bros.	do	1½ mile south of West Concord, Merrimack county.
Abijah Hollis	do	½ mile south of West Concord, Merrimack county.
A. J. Holmes	do	¾ mile southwest of West Concord, Merrimack county.
Benjamin T. Putney	do	½ mile south of West Concord, Merrimack county.
Swenson & French	do	1½ mile northwest of Concord, Merrimack county.
H. F. Trussell & Son	do	2½ miles north of Concord, Merrimack county.
Charles Hesselton	Wilton, Hillsborough county	1 mile southwest of Wilton, Hillsborough county.
Boston and Maine Railroad Co.	Wolfborough Junction, Carroll county.	2½ miles southwest of Conway, Carroll county.
NEW JERSEY.		
York & Bittenbender	Belvidere, Warren county	2½ miles south of Oxford, Warren county.
C. A. De Camp	Boonton, Morris county	1 mile north of Boonton, Morris county.
Lyman H. Pierson	Chester, Morris county	¼ mile northwest of German valley, Morris county.
James H. Murphy	Flemington, Hunterdon county	3 miles northwest of Hopewell, Mercer county.
C. A. Lighthipe & Son	Milburn, Essex county	½ mile northeast of Milburn station, Essex county.
B. M. & J. F. Shanley (b)	Newark, Essex county	(a) Berger Cut, Jersey City, Hudson county. (b) 1 mile north of Kingston, Somerset county. (c) 1 mile southeast of Lambertville, Hunterdon county. (d) Byram, Hunterdon county.
Waterloo Ice Co.	30 Plane street, Newark	2 miles southeast of Andover, Sussex county.
Thomas Novins & Son	Orange, Essex county	(a) ½ mile north of Dover, Morris county. (b) ¼ mile north of Summit, Union county. (c) 1¼ mile north of West Orange, Essex county.
John O'Rourke	do	¾ mile west of West Orange, Essex county.
Wright & Lindsley	do	2 miles east of Little Falls, Passaic county.
McKiernan & Bergin	60 Prince street, Paterson, Passaic county.	(a) 3 miles northwest of Paterson, Passaic county (b) Paterson, Passaic county.
Philadelphia and Reading Railroad	227 South Fourth street, Philadelphia, Pa.	1½ mile west of Hopewell, Mercer county.
Fanwood Stone Crushing Co.	Scotch Plains, Union county	1½ mile northwest of Fanwood, Union county.
Stewart Hartshorn	Short Hills, Essex county	Springfield mountain, Union county.
Estate of Hugh Allen	Stanhope, Sussex county	1½ mile north of Waterloo, Sussex county.

a See also Maine. b See also Pennsylvania.

DIRECTORY OF GRANITE PRODUCERS—CONTINUED.

RHODE ISLAND—CONTINUED.

NAMES OF FIRMS.	POST-OFFICE ADDRESS.	LOCATION OF QUARRY.
Thompson & Platt	Westerly, Washington county	Westerly township, near Burden pond, Washington county.
Stewart & McDonald	do	1 mile southeast of Westerly, Washington county.
John P. Olney	Wickford, Washington county	1 $\frac{1}{2}$ mile south of Davisville post office, Washington county.
Patrick Bullock & Amasa Sweet	Woonsocket, Providence county	4 miles southwest of Woonsocket, Providence county.
Fairmount Farm Co.	do	$\frac{1}{2}$ mile west of Woonsocket, Providence county.

SOUTH CAROLINA.

The Winsborough Granite Co.	Charleston, Charleston county	4 miles south of Rockton, Fairfield county.
Columbia Granite Construction and Manufacturing Co.	Columbia, Richland county	Columbia, Richland county.
J. D. Hardin & Co.	do	$\frac{1}{3}$ mile south of Columbia, Richland county.
Leavell & Speer	Newberry, Newberry county	(a) 4 miles north of Newberry, Newberry county. (b) 5 miles north of Newberry, Newberry county.
A. R. Stewart	Windsborough, Fairfield county	(a) Near Windsborough, Fairfield county. (b) Near Columbia, Richland county.
York Granite Co.	Yorkville, York county	Near Yorkville, York county.

SOUTH DAKOTA.

Dell Rapids Granite Co.	Dell Rapids, Minnehaha county	$\frac{1}{4}$ mile east of Dell Rapids, Minnehaha county.
Sioux Falls Granite Co.	Sioux Falls, Minnehaha county	Sioux Falls, Minnehaha county.
John Loftus	Burlington, Iowa	do.

TEXAS.

Burnet Steam Granite Co.	Burnet, Burnet county	6 $\frac{1}{2}$ miles west of Burnet, Burnet county.
Texas Capitol Granite Co.	Granite Mountain, Burnet county	At Granite mountain, on Austin and Northwestern railroad, Burnet county.
C. O'Keefe	do	1 mile from Granite Mountain station, Burnet county.
J. K. Finlay	Llano, Llano county	3 $\frac{1}{2}$ miles southwest of Llano, Llano county.
John Goodman	do	3 $\frac{3}{4}$ miles southwest of Llano, Llano county.
Texas Mining and Improvement Co.	Marble Falls, Burnet county	1 mile from Marble Falls, Burnet county.
Frank Feich	313 Houston street, San Antonio, Bexar county.	Guadalupe mountain range, Gillespie county.

VERMONT.

James G. Brown	Barre, Washington county	$\frac{1}{2}$ mile west of East Barre, Washington county.
Carnes & Ainsworth	do	4 miles south of Barre, Washington county.
Draw, Parkhurst & Co.	do	do.
H. A. Duffy	do	do.
Empire Granite Co.	do	do.
Forsyth & Ingram	do	In Washington county, 2 $\frac{1}{2}$ miles northeast of Williamstown.
Green Mountain Granite Co.	do	$\frac{3}{4}$ mile southwest of Barre, Washington county.
Jones Bros.	do	In Washington county, 3 miles northeast of Williamstown.
S. Kimball	do	1 mile east of East Barre, Washington county.
J. W. Magoon	do	$\frac{1}{2}$ mile west of East Barre, Washington county.
Mann Bros.	do	4 miles south of Barre, Washington county.
Marr & Gordon	do	do.
Milne & Wylie	do	do.
Monumental Granite Co.	do	do.
A. D. Morse	do	Barre, Washington county.
O'Rourke & Cleary	do	4 miles south of Barre, Washington county.
H. N. Parkhurst	do	do.
E. L. Smith & Co.	do	$\frac{1}{4}$ mile northeast of Graniteville, Washington county.
Jacob B. Taylor	do	Southeast base of Millstone mountain, Washington county.
Vermont Granite Co.	do	3 miles from Barre, Washington county.
H. Webster & Son, successors to B. G. Webster	do	4 miles south of Barre, Washington county.
Wells, Lamson & Co.	do	(a) Near Barre, Washington county. (b) Williamstown, Orange county.
P. O. Wheaton	do	2 $\frac{1}{4}$ miles southeast of Barre, Washington county.
C. Dingman	Bethel, Windsor county	In Windsor county, 2 $\frac{1}{2}$ miles north of Pittsfield.
Geo. E. Lyons Granite Co.	Brattleboro', Windham county	1 mile south of West Dummerston, Windham county.

DIRECTORY OF GRANITE PRODUCERS—CONTINUED.
VERMONT—CONTINUED.

NAMES OF FIRMS.	POST-OFFICE ADDRESS.	LOCATION OF QUARRY.
Guy N. Willard	Burlington, Chittenden county	Burlington, Chittenden county.
E. G. Hutchinson	Chester Depot, Windsor county	4½ miles north of Chester, Windsor county.
Curtis Willey	Derby Centre, Orleans county	2½ miles northwest of Derby Centre, Orleans county.
Wm. M. Carnes	East Barre, Washington county	½ mile south of East Barre, Washington county.
Harlan I. Cheney	do	do.
Guy Brothers	do	4 miles south of Barre, Washington county.
James Gazely	Albany, N. Y.	Graniteville, Washington county.
John McAulay	Graniteville, Washington county	4 miles south of Barre, Washington county.
Brush & Curtis	Hardwick, Caledonia county	2½ miles north of Woodbury, Washington county.
Hardwick Granite Co	do	1½ mile west of Hardwick, Caledonia county.
Excelsior Granite Co	Montpelier, Washington county	Near Barre mountain, Washington county.
The Wetmore & Morse Granite Co	do	Graniteville, Washington county.
C. E. Tayntor & Co	239 Broadway, New York	3 miles from Barre, Washington county.
Blue Mountain Granite Co	South Ryegate, Caledonia county	(a) 3 miles north of Ryegate, Caledonia county. (b) Groton township, Caledonia county.
Ryegate Granite Works Co	do	(a) 2½ miles north of South Ryegate, Caledonia county. (b) 1½ mile east of Hardwick, Caledonia county.
Carrick Bros. Granite Co	Saint Johnsbury, Caledonia county	Williamstown, Orange county.
R. W. Laird	do	(a) Brunswick, Essex county. (b) Barre, Washington county. (c) Woodbury, Washington county. (d) Greensboro', Orleans county. (e) Ryegate, Caledonia county.
Story & Damon	Victory, Essex county	1 mile northwest of Victory, Caledonia county.
Lester Cleveland	West Derby, Orleans county	1½ mile east of West Derby, Orleans county.
Clark Bros	West Dummerston, Windham county	1 mile east of West Dummerston, Windham county.
Williamstown Granite Co	Williamstown, Orange county	In Orange county, 1 mile south of Graniteville post office.
Woodbury Granite Co	Woodbury, Washington county	1½ mile northeast of Woodbury, Washington county.

VIRGINIA.

H. P. Gilbert	Georgetown, D. C.	Potomac river, south side, Alexandria county.
James M. Casey	Lynchburg, Campbell county	(a) 1 mile south of Lynchburg, Campbell county. (b) 2 miles southeast of Lynchburg, Campbell county.
Wm. H. Ford	do	1½ mile east of Lynchburg, Campbell county.
Wood & Co	1525 Main street, Lynchburg, Campbell county.	Brookville district, on Virginia Midland R. R., Campbell county.
A. B. Cook	Petersburg, Dinwiddie county	In Chesterfield county, 2 miles north of Petersburg.
D. W. Lassiter	do	2 miles from Petersburg, Dinwiddie county.
Petersburg Granite Quarrying Co	38 Wall street, New York city	1½ mile from Petersburg, Dinwiddie county.
Peter Copland	Richmond, Henrico county	3½ miles west of Richmond, Henrico county.
Middendorf & Donald	Virginia street, Richmond	In Chesterfield county, 3½ miles west of Richmond.
Richmond Granite Co	911 Main street, Richmond	4½ miles west of Richmond, Henrico county.
The Standard Granite Co	P. O. Box 271, Richmond	In Chesterfield county, 2½ miles southwest of Richmond.
Westham Granite Co. of Virginia	P. O. Box 177, Richmond	In Chesterfield county, 6½ miles from Richmond.

WASHINGTON.

Columbia Marble and Granite Co	Spokane Falls, Spokane county	4 miles east of Colville, Stevens county.
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WISCONSIN.

Amberg Granite Co	119 La Salle street, Chicago, Ill.	(a) 2 miles northwest of Amberg, Marinette county. (b) ½ mile south of Amberg, Marinette county. (c) 1½ mile northwest of Amberg, Marinette county.
Berlin Granite Co	Berlin, Green Lake county	2 miles northeast of Berlin, Green Lake county.
Berlin and Montello Granite Co	Room 21, 162 Washington street, Chicago, Ill.	(a) ¾ mile east of Berlin, Green Lake county. (b) ¼ mile east of Montello, Marquette county.
Green Lake Granite Co	Utley, Green Lake county	Utley, Green Lake county.
R. N. Roberts	Waupaca, Waupaca county	4 miles north of Waupaca, Waupaca county.