

ABRASIVE MATERIALS.

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BUHRSTONES.

PRODUCTION.

Buhrstones or millstones of domestic production are made from a quartz-conglomerate rock occurring in several localities along the eastern slope of the Allegheny Mountains. The production at the present time is limited to three places: One is in New York, in the vicinity of the towns of Accord, Kerhonkson, and Kyserike, in Ulster County; the second is in Lancaster County, Pennsylvania; and the third is in Montgomery County, Virginia. Local designations are applied to the stone in these several districts. The New York product is given the name "Esopus stone;" the Pennsylvania product is termed "Cocalico stone;" while the Virginia stone is known as "Brush Mountain stone." Though this conglomerate rock is used in the manufacture of millstones, and is classed as buhrstone, it is entirely distinct from the imported French, Belgian, and German buhr. Of the imported buhrs the French and Belgian are hard, porous stone composed of small particles of silica cemented by calcareous material, while the German is said to be of basaltic lava.

The buhrstones of commerce made from imported material are composed of comparatively small pieces fitted to one another and bound into solid wheels. The domestic millstones are cut out of the solid rock in one piece. They are used in pairs for the grinding of paint ore, cement rock, phosphate rock, bone, and the coarser cereals. Their use in flouring mills, except in isolated cases, has been supplanted by the modern roller process. The result of the introduction of the roller process in flouring mills is exhibited in the statistics of the production of millstones from domestic rock and the value of buhr and buhrstones imported into this country. In 1880 the value of the millstones made in the United States was placed at \$200,000, while imported buhr and buhrstones were valued at \$125,072. In 1889 the value of the product of domestic millstones had fallen to \$35,155, and the value of the imports

to \$40,884, the total being less than one-fourth of what it was in 1880. In 1894 the domestic product had fallen to a value of only \$13,887, while the imports were worth only \$18,087, the aggregate being about 42 per cent of what it was in 1889 and only 10 per cent of what it was in 1880. Since 1894 there has been a slight increase in production. The value of the millstones made in the United States during 1897 was \$25,932, an increase over 1896 of \$3,365. The value of the imports in 1897 was \$22,956, a decrease as compared with the preceding year of \$4,009. Compared with the production in 1880, that for the last nine years seems hardly worth recording, for, while the value in 1897 was less than \$26,000, it is the largest figure reported since 1889.

In the following table is exhibited the value of the millstones produced in the United States since 1880:

Value of buhrstones produced in the United States from 1880 to 1897.

Year.	Value.	Year.	Value.
1880.....	\$200,000	1889.....	\$35,155
1881.....	150,000	1890.....	23,720
1882.....	200,000	1891.....	16,587
1883.....	150,000	1892.....	23,417
1884.....	150,000	1893.....	16,639
1885.....	100,000	1894.....	13,887
1886.....	140,000	1895.....	22,542
1887.....	100,000	1896.....	22,567
1888.....	81,000	1897.....	25,932

IMPORTS.

The following table gives the value of buhrstones and millstones imported into the United States each year since 1868:

Value of buhrstones and millstones imported into the United States from 1868 to 1897.

Year ended—	Rough.	Made into millstones.	Total.
June 30, 1868.....	\$74,224	.....	\$74,224
1869.....	57,942	\$2,419	60,361
1870.....	58,601	2,297	60,898
1871.....	35,406	3,698	39,104
1872.....	69,062	5,967	75,029
1873.....	60,463	8,115	68,578
1874.....	36,540	43,170	79,710
1875.....	48,068	66,991	115,059
1876.....	37,759	46,328	84,087

Value of buhrstones and millstones imported into the United States from 1868 to 1897—
Continued.

Year ended—	Rough.	Made into mill- stones.	Total.
June 30, 1877.....	\$60,857	\$23,068	\$83,925
1878.....	87,679	1,928	89,607
1879.....	101,484	5,088	106,572
1880.....	120,441	4,631	125,072
1881.....	100,417	3,495	103,912
1882.....	103,287	747	104,034
1883.....	73,413	272	73,685
1884.....	45,837	263	46,100
1885.....	35,022	455	35,477
Dec. 31, 1886.....	29,273	662	29,935
1887.....	23,816	191	24,007
1888.....	36,523	705	37,228
1889.....	40,432	452	40,884
1890.....	32,892	1,103	33,995
1891.....	23,997	42	24,039
1892.....	33,657	529	34,186
1893.....	29,532	729	30,261
1894.....	.....	.....	^a 18,087
1895.....	.....	.....	20,316
1896.....	.....	.....	26,965
1897.....	.....	.....	22,956

^a Not separately classified after 1893.

GRINDSTONES.

OCCURRENCE.

Grindstones of domestic manufacture are obtained from the sandstone deposits which extend along the shores of Lake Erie for some distance east and west of Cleveland, Ohio, and as far inland as Marietta, and on Lake Huron above Detroit, Michigan. In Mineral Resources for 1886 the methods of manufacture and use are given in detail, together with a tabular statement of the several varieties, foreign or domestic, that occur, with their special uses. Five varieties are produced in the United States—four in Ohio and one in Michigan. The four in Ohio are: (1) Berea, fine sharp grit, used specially for sharpening edge tools; (2) Amherst, soft loose grit, for edge tools and saws; (3) Independence, coarse sharp grit, for grinding springs and files and for dry grinding of castings; (4) Massillon, also coarse sharp grit, for large edge tools, springs, files, and dry castings. The Huron (Michigan) stone has a fine sharp grit, and is used for sharpening edge tools when a very fine edge is required.

PRODUCTION.

In the report for 1896 comment was made on the wholesome recovery in the grindstone industry from the depression which marked the trade conditions in 1894 and 1895, the value of the product in 1896 being a little more than 75 per cent of the value of the output in the two previous years combined. The returns for 1897 show that the improved conditions continued, the value of the grindstones made in the year just past exceeding that of any year since 1891. The value of the product during 1897 was \$368,058, against \$326,826 in 1896 and \$205,768 in 1895.

In reporting their production some manufacturers use the ton as a unit of quantity; others report the number of grindstones made and sold, while still others state simply the total value of their output. Under such conditions the only means for obtaining a total statement and for making comparisons is in using the value of the product. In reporting the imports of grindstones the Bureau of Statistics of the Treasury Department also limits the statements to the value, no figures relating to quantities having been published since 1883. The value of the grindstones imported during the decade ending December 31, 1897, has averaged 15.3 per cent of the domestic product. During this period the greatest value for the domestic product was in 1891, when a total of \$476,113 was reported. The value of the imports reached the highest figure (\$66,195) in 1896. The smallest domestic product was in 1895, the value in that year amounting to only \$205,768, and the year of least value of the imports was in 1891, when it amounted to \$21,028.

In the following table is shown the value of grindstones produced in the United States since 1880:

Value of grindstones produced in the United States, 1880 to 1897.

Year.	Value.	Year.	Value.
1880.....	\$500,000	1889.....	\$439,587
1881.....	500,000	1890.....	450,000
1882.....	700,000	1891.....	476,113
1883.....	600,000	1892.....	272,244
1884.....	570,000	1893.....	338,787
1885.....	500,000	1894.....	223,214
1886.....	250,000	1895.....	205,768
1887.....	224,400	1896.....	326,826
1888.....	281,800	1897.....	368,058

IMPORTS.

The amount and value of grindstones imported into the United States since 1868 are as follows:

Grindstones imported and entered for consumption in the United States, 1868 to 1897, inclusive.

Year ended —	Finished.		Unfinished or rough.		Total value.
	Quantity.	Value.	Quantity.	Value.	
	<i>Long tons.</i>		<i>Long tons.</i>		
June 30, 1868		\$25,640		\$35,215	\$60,855
1869		15,878		99,715	115,593
1870		29,161		96,444	125,605
1871	385	43,781	3,957.15	60,935	104,716
1872	1,202	13,453	10,774.80	100,494	113,947
1873	1,437	17,033	8,376.84	94,900	111,933
1874	1,443	18,485	7,721.44	87,525	106,010
1875	1,373	17,642	7,656.17	90,172	107,814
1876	1,681	20,262	6,079.34	69,927	90,189
1877	1,245	18,546	4,979.75	58,575	77,121
1878	1,463	21,688	3,669.41	46,441	68,129
1879	1,603	24,904	4,584.16	52,343	77,247
1880	1,573	24,375	4,578.59	51,899	76,274
1881	2,064	30,288	5,044.71	56,840	87,128
1882	1,705	30,286	5,945.61	66,939	97,225
1883	1,755	28,055	6,945.63	77,797	105,852
1884					^a 86,286
1885					50,579
Dec. 31, 1886					39,149
1887					50,312
1888					51,755
1889					57,720
1890					45,115
1891					21,028
1892					61,052
1893					59,569
1894					52,688
1895					54,276
1896					66,195
1897					49,496

^a Since 1884 classed as finished or unfinished.

CANADIAN PRODUCTION.

The Geological Survey of Canada gives the following statement of the production of grindstones in the Dominion since 1886:

Production of grindstones in Canada since 1886.

Calendar year.	Tons.	Value.
1886.....	4,000	\$46,545
1887.....	5,292	64,008
1888.....	5,764	51,129
1889.....	3,404	30,863
1890.....	4,884	42,340
1891.....	4,479	42,587
1892.....	5,283	51,187
1893.....	4,600	38,379
1894.....	3,757	32,717
1895.....	3,475	31,932
1896.....	3,663	32,810
1897.....		40,000

OILSTONES AND WHETSTONES.

PRODUCTION.

The production of this class of abrasives in 1897 consisted of 846,000 pounds of oilstones and water whetstones, 200,000 pounds of shoe-maker's rubstones, 40,000 pounds of kitchen rubstones, 150,000 pounds of coarser sandstones, and 18,000 gross of scythestones. These represented in value a total of \$149,970, against \$127,098 in 1896. While this shows an increase in 1897 of about 18 per cent over 1896, it was nearly \$6,000 less than the value of the product in 1895.

The rough material from which our oilstones, etc., are made is obtained from various localities in the United States. The finer grades of oilstones are made from two grades of novaculite quarried in the vicinity of Hot Springs, Arkansas, and known, respectively, as "Arkansas" and "Washita" stone. Fine-grained sandstone, called "Hindustan" or "Orange" stone, from Orange County, Indiana; Lake Superior stone, quarried in Cuyahoga County, Ohio, and a similar material, known as Labrador stone, from Cortland County, New York, and chocolate stone, from Lisbon, New Hampshire, are used for whetstones. Scythestones and rubstones are made from Indian Pond and Lamoille stone, quarried in Grafton County, New Hampshire, and Orleans County, Vermont; from Berea, Ohio, grit (which also furnishes grindstones), and from some of the Indiana sandstone.

The principal manufacturer of oilstones, whetstones, etc., in the United States is the Pike Manufacturing Company, of Pike Station, New Hampshire, the output of this company in 1897 being valued at

nearly \$141,000, out of a total of \$149,970. This company owns quarries at French Lick, Georgia, Orangeville and Paoli, Indiana; Haverhill, Piermont, Orford, and Lisbon, New Hampshire; Truxton, New York, and Westmore and Brownington, Vermont; and besides having its own quarries and 1,000 acres of quarry land in Garland County, Arkansas, the company has contracted with all the individual quarrymen for their entire output for a number of years. During 1896 the Pike Company erected a mill at Hot Springs, Arkansas, for cutting and finishing the novaculite quarried in that vicinity, and discontinued the manufacture of Labrador stone from Cortland County, New York.

Under existing circumstances the first uniform selling value that can be placed upon the product is for the finished articles, which for the last six years has been as follows:

Value of oilstones, whetstones, etc., produced in the United States since 1891.

Year.	Value.
1891.....	\$150,000
1892.....	146,730
1893.....	135,173
1894.....	136,873
1895.....	155,881
1896.....	127,098
1897.....	149,970

From 1880 to 1890, inclusive, the product and value of the rough stone has been published in these reports, exception being made in the case of the output for 1890, when the value for the unfinished product was given for the novaculite of Arkansas, and in all other cases the value of the finished stones is quoted. The annual production from 1880 to 1890 was as follows:

Product of oilstones and whetstones from 1880 to 1890.

Year.	Pounds.	Value.
1880.....	420,000	\$8,000
1881.....	500,000	8,580
1882.....	600,000	10,000
1883.....	600,000	10,000
1884.....	800,000	12,000
1885.....	1,000,000	15,000
1886.....	1,160,000	15,000
1887.....	1,200,000	16,000
1888.....	1,500,000	18,000
1889.....	5,982,000	32,980
1890.....	.....	69,909

The reports of production by the Pike Manufacturing Company have been furnished this office annually since 1892, with permission to publish. They may be taken as indicative of the condition of the industry, and are shown in the following table. These figures are not claimed to be exact, but are estimated, though sufficiently approximate for all practical purposes.

Production of oilstones, etc., by the Pike Manufacturing Company since 1892.

Kind.	1892.		1893.		1894.	
	Output.	Value.	Output.	Value.	Output.	Value.
Washita stone.pounds..	400,000	\$60,000	300,000	\$45,000	300,000	\$45,000
Arkansas stone...do....	20,000	12,000	12,000	12,000	15,000	15,000
Labrador stone...do....	500	50	200	20	100	10
Hindostan stone..do....	300,000	15,000	250,000	13,000	300,000	15,000
Sandstone .....do....	100,000	2,000	100,000	2,000	100,000	2,200
Chocolate stone..do....	20,000	2,000	20,000	2,000	25,000	2,500
Seythstones ....gross..	16,000	50,000	13,000	40,000	15,000	45,000
Total value.....	.....	141,050	.....	114,020	.....	124,710

Kind.	1895.		1896.		1897.	
	Output.	Value.	Output.	Value.	Output.	Value.
Washita stone.pounds..	250,000	\$40,000	240,000	\$50,000	500,000	\$75,000
Arkansas stone...do....	15,000	20,000				
Hindostan stone..do....	300,000	12,000	275,000	10,000	320,000	12,800
Sandstone .....do....	100,000	2,000	100,000	2,000	150,000	3,000
Chocolate stone..do....	10,000	1,000	10,000	1,000	5,000	100
Seythstones ....gross..	15,000	47,750	15,000	35,000	16,000	50,000
Total value.....	.....	122,750	.....	98,000	.....	140,900

IMPORTS.

The following table shows the total value of all kinds of hones and whetstones imported since 1880:

Imports of hones and whetstones since 1880.

Year ended—	Value.	Year ended—	Value.
June 30, 1880.....	\$14, 185	Dec. 31, 1889.....	\$27, 400
1881.....	16, 631	1890.....	37, 454
1882.....	27, 882	1891.....	35, 344
1883.....	30, 178	1892.....	33, 420
1884.....	26, 513	1893.....	25, 301
1885.....	21, 434	1894.....	26, 671
Dec. 31, 1886.....	21, 141	1895.....	32, 439
1887.....	24, 093	1896.....	50, 588
1888.....	30, 676	1897.....	34, 485