

ABRASIVE MATERIALS.

BUHRSTONES.

BY WILLIAM A. RABORG.

Granular masses of flint and quartz suitable for making millstones are found more or less in all the range of the Alleghany mountains. In New York these masses are called "Esopus stone;" in Pennsylvania "Cocalico stone," and in North Carolina "North Carolina grit."

The value of the output at the above localities for the years 1883 to 1886 is estimated as follows:

Estimated value of the buhrstones produced in the United States from 1883 to 1886.

Year.	Esopus.	Cocalico.	North Carolina grit.	Total value.
1883.....	\$120,000	\$30,000	.....	\$150,000
1884.....	110,000	40,000	.....	150,000
1885.....	90,000	19,000	.....	109,000
1886.....	100,000	10,000	(a)\$30,000	140,000

a for 300 complete sets.

Foreign buhrstones.—The reasons for the small development of the buhrstone industry in the United States are, first, it is not a growing one, being reduced by the substitution of the roller process of grinding grain; again, the foreign supply is well established and capable of supplying the best known quality of stone at satisfactory rates. The best buhrstone is found in France, in the mineral basin of Paris and in a few adjoining districts, where it occurs in great masses. The stone has a straight fracture, and is not so brittle as flint, though its hardness is nearly the same. It has a white, gray, yellow, or bluish color, and varies in texture from the most open and porous to the closest quality possible. The stone sometimes appears to be filled with fresh water shells or land shells, and vegetable matter of inland growth. Some of the stone contains no organic forms at all. The stone is quarried in the open air and sold in solid stones, blocks, quarters, panels, and half panels, and is usually imported in this condition, to be finished in this country.

German buhrstone comes from a district on the Rhine, near Cologne. It is a basaltic lava, and is found near the old craters of extinct volcanoes, at a depth of from 100 to 150 feet under ground. A shaft is sunk and the stone quarried out so as to leave natural columns to support

the earth above. The stones increase in size with the depth. The structure is very uniform and of a dark blue color. It is too soft for grinding wheat.

These foreign buhrstones, principally French, are shipped to the United States in all sizes from 16 up to 54 inches, and weighing from 500 to 5,000 pounds per pair. The average weight is 3,500 pounds per pair. The average price is \$60 for the unfinished and \$125 for the finished stones per pair.

Buhrstones and millstones imported and entered for consumption in the United States, 1868 to 1886 inclusive.

Fiscal years ending June 30—	Rough.	Made into millstones.	Total.	Fiscal years ending June 30—	Rough.	Made into millstones.	Total.
1868	\$74,224	.....	\$74,224	1878	\$87,679	\$1,928	\$89,607
1869	57,942	\$2,410	60,361	1879	101,484	5,088	106,572
1870	58,601	2,297	60,898	1880	120,441	4,631	125,072
1871	35,406	3,698	39,104	1881	100,417	3,495	103,912
1872	69,062	5,967	75,029	1882	103,287	747	104,034
1873	60,463	8,115	68,578	1883	73,413	272	73,685
1874	36,540	43,170	79,710	1884	45,837	263	46,100
1875	48,068	66,991	115,059	1885	35,022	455	35,477
1876	37,759	46,328	84,087	1886	40,722	676	41,398
1877	60,857	23,068	83,925				

GRINDSTONES.

BY WILLIAM A. RABORG.

The sandstone deposits of this country from which grindstones are obtained are found along the shores of Lake Erie, and extending for a considerable distance east and west of Cleveland, Ohio, and inland as far as Marietta, on the Ohio river. They are also found on the shores of Lake Huron, above Detroit, Michigan.

The total value of the domestic grindstones produced in 1886 may be put at, roundly, \$250,000.

The most important feature in the grindstone industry of the United States during 1886 was the consolidation of the following firms into the Cleveland Stone Company, which produces nearly all the grindstones used in the United States: The McDermott and Berea Stone Company, Worthington & Sons, James Nicholl, the J. McDermott Company, the Clough Stone Company, the Berea and Huron Stone Company, the Clough, Haldeman and Atlantic Stone Company, the Atlantic Stone Company, L. Haldeman & Son, the Berea Stone Company, the Ohio Grindstone Company, the Nickel Plate Stone Company, and the Columbia Stone Company.

Almost all the Ohio grindstones are made by machinery driven by steam power. The blocks of stone being loosened from the quarry bed, are roughly hewn out with a square hole in the center; they are then placed on a heavy square iron shaft furnished with a 9-inch collar, against which the stone is securely fastened by means of another collar

keyed against the stone. The shaft and stone being driven by steam power, two men on opposite sides of the stone turn it off perfectly true by means of soft iron bars 6 feet long and 2 inches by one-half inch thick, which are drawn out to a thin edge which is curved upward. This was formerly a very unhealthy operation, owing to the dust being inhaled by the work man, but this difficulty is now obviated by means of blowers.

The following analyses represent the general composition of the Ohio grindstones:

Analyses of Amherst and Berea grindstones.

BUFF AMHERST STONE, (a)

	Per cent.
Silica	97.00
Lime	1.15
Alkalies .....	.64
Sesqui-oxide of iron.....	1.00
Moisture .....	.17
Loss .....	.04
Total.....	100.00

BEREA STONE, (b)

	Per cent.
Silica	96.90
Carbonate of iron.....	1.68
Carbonate of calcium.....	.55
Alkalies .....	.55
Water .....	.30
Loss .....	.02
Total	100.00

Specific gravity 2.335. Weight per cubic foot (dry) 140 pounds.

a Prof. J. H. Salesbury, State Geologist, analyst.

b John Eisenmann, Professor of Civil Engineering Case School of Applied Science, Analyst.

Uses.—There are specialties in the mechanic arts which are the results of many years of practice, and in nothing more than in the varied and important uses to which grindstones are applied. Formerly their operations were confined to sharpening tools only, but this is now only a small part of the uses to which they are put, as it has been found by experience that almost every kind of steel, iron, and brass work used in finished machines can be ground better and cheaper than by filing. Almost every part of the locomotive engine is now finished on the grindstone, which leaves the metal in the best possible condition to receive the polish or paint in finishing.

The Ohio, English, and Nova Scotia grindstones are the principal kinds in use, but each of these sorts is subdivided into an endless variety of sizes and “grits.” The following table will serve to show

the different qualities of the various stones, and the principal uses to which they are put :

Table showing the various kinds of sandstones made into grindstones and the special purposes for which they are used.

Name.	Color.	Structure.	Special purposes for which used.
UNITED STATES.			
<i>Ohio.</i>			
Berea	White	Fine and sharp grit...	For sharpening edge tools generally.
Amherst	Brownish-white ..	Soft loose grit	For edge tools, and the very soft ones for saws.
Independence	Grayish-white	Coarse sharp grit	For grinding springs and files, and for dry grinding of castings.
Massillon	Yellowish-white ..	.....do	For edge tools, springs, files, and nail cutter's face stones, and for dry grinding of castings.
<i>Michigan.</i>			
Huron	Blue	Fine sharp grit	For sharpening tools when a very fine edge is required.
ENGLISH.			
Newcastle	Yellow	Sharp grit	The fine soft ones for grinding saws and the coarse and the harder ones for sad irons and springs, pulleys, and shafting (instead of turning), and for head and face stones in nail works, and for castings (dry grinding).
Wickersly	Grayish-yellow ..	.....	For grinding saws, squares, bevels, and cutter's work generally. A very soft grit to avoid taking out the temper.
Liverpool	Red	Very sharp grit	For saws and edge tools generally. An excellent grit for sharpening axes in ship-yards.
Nova Scotia	Blue or yellowish-gray.	All grits from the finest and hardest to the coarsest and softest.	The large ones for grinding sad irons and hinges, springs, and edge tools. The medium and small sizes for machine shops, and for sharpening edge tools generally.
Bay Chaleur, New Brunswick.	Blue	Soft sharp grit.	For manufacturing table cutlery, and for machinists' tools, and for sharpening edge tools generally, when a fine edge is required.

Foreign sources.—The sandstones overlying the coal beds of England furnish the grindstones of that country, the principal quarries being located at Newcastle-on-Tyne and at Wickersly. The quarries are worked by hand, and all the grindstones are made with mallet and chisel; they have been imported into this country for over one hundred years. The grindstones from the provinces of Nova Scotia and New Brunswick are, also, the overlying sandstones of the coal district and border on the Bay of Fundy; extending across the province to the Gulf of Saint Lawrence. These immense deposits contain a great variety of grits, and are generally worked by the French people, known as Acadians. The tides of the Bay of Fundy rise and fall from 60 to 70 feet every twelve hours, and these people avail themselves of this power to work the quarries, which extend from a high bluff on the mainland down to low-water mark in the bay. At low water a huge mass of stone is loosened from its bed and a heavy chain is passed under it and over a large boat which is placed alongside. As the tide rises the stone attached to the bottom of the boat

is floated into a sand cove at high water, and made into grindstones after the tide recedes. This is done with mallet and chisel, the rough parts being first chopped off with a heavy axe. The introduction of machinery has enabled them to turn the small grindstones in a lathe by steam power.

Grindstones imported and entered for consumption in the United States, 1868 to 1886 inclusive.

Fiscal years ending June 30—	Finished.		Unfinished or rough.		Total value.
	Quantity.	Value.	Quantity.	Value.	
	<i>Long tons.</i>		<i>Long tons.</i>		
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					86,286
1885					50,579
1886					(a) 45,713

a Classed as finished or unfinished.

CORUNDUM.

BY WILLIAM. A. RABORG.

The Laurel Creek mine, situated in the northwestern part of Rabun county, Georgia, and the Corundum Hill mine, which is about 8 miles southeast of the town of Franklin, Macon county, North Carolina, are the principal localities from which American corundum is obtained. The mines at both localities are owned by the Hampden Emery Company, of Chester, Massachusetts, and are operated under the direction of Dr. H. S. Lucas. A detailed description of the deposits is given in the 1883-'84 report of this series. The following table shows the output for the year 1886:

Production of corundum during 1886.

	Short tons.	Value.
Corundum hill.....	290	\$52,200
Laurel creek.....	355	63,990
Total	645	116,190

The Laurel Creek mine is located about 20 miles from the nearest railroad station, Walhalla, South Carolina, on a branch of the Rich-

mond and Danville railroad. The corundum is packed in bags and hauled to the station in wagons, the price of hauling being 35 cents per hundredweight.

The corundum from the Cullasagee or Corundum Hill mine, after being packed in bags, is hauled 30 miles to Sylva station, on the Western North Carolina railroad, at 40 cents per hundredweight. The entire product of both mines is shipped to Chester, Massachusetts. At present, works are being erected near the mine to crush and grade the corundum, so as to ship it from the mine in marketable form.

In addition to the localities mentioned, corundum has been found at numerous points in western North Carolina, and indeed it has been mined at some other localities to a slight extent. No mines are known to have been regularly operated in 1886 except the two mentioned. A small quantity of impure corundum was taken from a mine near Webster, Jackson county, North Carolina, but was found not suitable for shipment. The Burch Creek mine, in Clay county, North Carolina, has passed into new hands, and will probably be operated during the present year. Mining operations have been commenced near Democrat, in Buncombe county, North Carolina, and a small quantity of corundum (about 20 tons) was taken out during the present year.

Emery imported and entered for consumption in the United States, 1867 to 1886 inclusive.

Fiscal years ending June 30—	Grains.		Ore or rock.		Pulverized or ground.		Powdered.	Total.
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.		
	<i>Pounds.</i>		<i>Tons.</i>		<i>Pounds.</i>			
1867.....			428	\$14,373	924,431	\$38,131		\$52,504
1868.....			85	4,531	834,286	33,549		38,080
1869.....			964	35,205	924,161	42,711		77,916
1870.....			742	25,335	644,080	29,531		54,866
1771.....			615	15,870	613,624	28,941		44,811
1872.....			1,641	41,321	804,977	36,103		77,424
1873.....	610,117	\$29,706	755	26,065	343,828	15,041	107	70,919
1874.....	331,580	16,216	1,281	43,886	69,890	2,167	97	62,366
1875.....	487,725	23,345	961	31,972	85,853	2,990	20	58,327
1876.....	385,246	18,999	1,395	40,027	77,382	2,533	94	61,653
1877.....	343,697	16,615	852	21,964	96,351	3,693		42,182
1878.....	334,291	16,359	1,475	38,454	65,068	1,754	34	56,601
1879.....	496,633	24,456	2,478	58,065	133,556	4,985		87,506
1880.....	411,340	20,066	3,460	76,481	223,855	9,292	145	105,894
1881.....	454,790	22,101	2,884	67,781	177,174	7,497	53	97,432
1882.....	520,214	25,814	2,765	69,432	117,008	3,708	241	98,695
1883.....	474,105	22,767	2,447	59,282	93,010	3,172	269	85,490
1884.....	143,267	5,802	4,145	121,719	513,161	21,181	(a).....	148,702
1885.....	228,329	9,885	2,445	55,368	194,314	8,789	(a).....	74,043
1886.....	184,366	7,751	3,430	83,808	335,161	14,877		105,496

a Not specified.

Exports of manufactured emery.

Fiscal years ending June 30—	Value.	Fiscal years ending June 30—	Value.
1878.....	\$813	1883.....	1,857
1779.....	\$1,608	1884.....	3,565
1880.....	1,265	1885.....	99,232
1881.....	1,312	1886.....	38,820
1882.....	1,242		

INFUSORIAL EARTH.

The deposits of infusorial earth on the Patuxent river, near Dunkirk, Calvert county, Maryland, continued to be worked with satisfactory results during 1886. The production for the year amounted to 1,200 short tons, with a spot value of \$6,000. The shipments were made principally to New York city, Philadelphia, and Chester, Pennsylvania.

The above deposit is the only one in the United States which produces infusorial earth to an extent worth mentioning. The well-known deposit near Richmond, Virginia, is not worked even for local use.

New Jersey.—The following statement is made by Mr. J. W. McKelvey, regarding the occurrence of infusorial earth near Drakesville, New Jersey. In a small basin on the farm of Mr. D. Judson Cook, which is located near Drakesville, Morris county, New Jersey, there is a deposit of infusorial earth that covers about 3 acres. The first stratum, which begins at the surface, is peaty to a depth of about 1 foot. The next is infusorial earth to a depth of 3 feet, and then come 7 feet of a white, sandy clay. At the bottom of this there is a deposit of gravel and cobblestone drift. The white clay seems to be a mixture of clay and infusorial earth. Near the edge of the bed it grows thin, and the upper 15 inches of the 3-foot layer are more porous than the rest.

This infusorial earth is of a grayish-white color, and on igniting becomes perfectly white. It contains small fragments of leaves and twigs. The specific gravity of the sample was 1.11. On analysis it gave:

Analysis of infusorial earth from Morris county, New Jersey.

	Per cent.
Silica	80.66
Alumina	3.84
Lime .....	.58
Loss on ignition	14.61
Total	99.69

New Mexico.—Regarding the deposit of infusorial earth near Socorro, New Mexico, the following statement is made by Mr. George H. Thwaites:

A uniform horizontal deposit of infusorial earth, known locally as tripolite, occurs in Socorro county, New Mexico, within 12 miles of the city of Socorro. It crops out in section for about 1,500 feet in length, at an elevation of about 20 feet above the sloping plain below it. The deposit is about 6 feet thick. Its composition is uniform and homogeneous, containing no mechanical mixture of any impurity. It is infusorial earth of a very high grade, of grayish-white color, soft but com-

compact, and apparently composed solely of diatoms impacted by simple pressure of a superincumbent layer of natural cement also about 6 feet thick. Its specific gravity is very low, and it appears to be an excellent absorbent. Blocks cut out of the face of the vein with a common hand-saw make perfect filter stones. The powdered tripolite is obtained by rubbing two blocks together; it is washed in water, poured off in suspension, settled, and dried in the sun. This makes a polishing powder said to be equal, if not superior, to the best commercial article. The layer of cement referred to above is also soft and compact, composed of carbonate of lime, silica, and alumina, the three essential elements of hydraulic cement.

Underneath the strata of tripolite there is a layer a few inches in thickness of soft unctuous clay, and beneath this is a deposit of unknown depth of coarse, light brown inferior tripolite, harder than the one above, and from which experimental scouring bricks have been made with satisfactory results.

Pacific Coast States.—The following facts concerning the occurrence of infusorial earth in the Pacific States have been ascertained from the explorations of Mr. J. S. Diller, of the U. S. Geological Survey:

“Perhaps the most extensive deposits of infusorial earth yet discovered in any country occur in our Pacific States. During a very recent geologic epoch numerous lakes of considerable size existed in California, Oregon, Washington Territory, Nevada, and Idaho and furnished especially favorable conditions for the development of infusorial forms of life. Many of the lake beds, consisting in large part of infusorial earth, are yet covered, but in other cases where modern streams have carved cañons through them they are well exposed and easily accessible. One of the most important deposits of this sort occurs along Pitt river, California, between Great Bend and Fall River mills. The deposit has a length of about 16 miles and is a mile or more in width, with a thickness at some places of over 300 feet. The best exposures occur near the Pitt river free bridge, north of Burney valley, Shasta county, where it appears to be composed wholly of infusorial remains. On Winter’s toll road, near the California State fish station, there are good exposures, but the deposit does not appear to be so purely infusorial. In both localities the exposures are near good wagon roads and about 75 miles from the nearest railroad station (Redding, in the Sacramento valley).

“A similar deposit occurs along the Klamath river on the stage road from Yreka, California, to Linkville, Oregon. At this locality the deposit is much less extensive than on Pitt river and perhaps on the whole of an inferior quality. It is only about 12 miles from the railroad, which can be reached by a good road for wagons.”

NOVACULITE.

BY GEORGE M. TURNER.

According to its present use, the term novaculite is applied to a class of siliceous rocks valuable as whetstones because of their grit or sharpening qualities. This peculiar sharpening quality is due in some cases to crystalline silica; in others, according to a German writer, to minute crystals of garnet or rutile. In order that a whetstone may be efficient, it should combine with the hardness of its particles the property of not glazing. Stones having these two properties in the highest degree serve best the purpose of a whetstone.

Occurrence.—Quarries of novaculite are at present worked in Hot Springs and Garland counties, Arkansas; in Orleans and Orange counties, Vermont; in Grafton county, New Hampshire; in Onondaga county, New York, and in Orange county, Indiana.

Arkansas.—Arkansas produces two varieties of whetstone known as the "Washita" and "Arkansas." Both are composed of nearly pure silica in the form of minute crystals interpenetrating each other. These two varieties differ from each other only in the minuteness of the crystals and correspondingly compact arrangement. The large number of edges exposed, together with the number of very small cavities, gives to the rock its power as a whetstone. Both kinds of rock are to be found in the same quarry. Quarries are located in Montgomery, Saline, Hot Springs, and Garland counties, although the best stone comes from Garland county. The quality of the rock varies greatly in different parts of the same quarry. All gradations are to be found between the perfect whetstone, of even grit and uniform crystallization, and worthless rock of glassy and vitreous structure. The Washita, which in appearance is a white opaque stone, is found and quarried in much larger quantities than the Arkansas stone. The quality of the stone taken from the quarries during 1886 was about the same as that taken out in 1885. No new quarries were opened during the year, but several which had been lying idle for some years were reopened.

About 650,000 pounds—150,000 pounds more than in 1885—of the rough Washita stone were placed on the market in 1886. The Arkansas stone, which is white and very finely grained, is quite translucent in comparatively thin pieces. This rock, which occurs only at intervals in the quarry, is found in a similar manner to the pockets of minerals in mines. These sections, which are rarely over 100 feet in length, contain the rock much broken up by natural forces. As a result this rock is never found in very large pieces. The market prices are about the same as those in 1885. The increased demand for the Washita in 1886 was chiefly in New York and Chicago. The call was for the low-grade stones; that is, whetstones containing more or less vitreous quartz. The prices for 1886, as quoted by George Chase, of New York;

J. J. Sutton, Hot Springs, Arkansas, and the A. F. Pike Manufacturing Company, of Pike Station, New Hampshire, are as follows:

Dimensions and cost of Washita and Arkansas stones.

Grade and dimensions.	Per pound.
Washita oil stones:	
No. 1 (extra), 8 by 2 by $1\frac{1}{8}$ inches	\$0.25
No. 1, 8 by 2 by $1\frac{1}{4}$ inches .....	.20
No. 2, 8 by 2 by $1\frac{1}{8}$ inches .....	.12
Washita slips:	
Round edge (extra) .....	.50
Round edge (No. 1) .....	.40
Wheels, per inch .....	.40
Arkansas oil stone:	
No. 1, 4 to 6 inches long	1.25
No. 1, 6 to 9 inches long	1.50
No. 1, 8 to 12 inches long	2.50
No. 2 .....	.70
Round-edge slips	1.30
Powder .....	.20
Wheels, 2 to 4 inches and $\frac{1}{8}$ inch thick, per inch ..	1.00

New Hampshire.—Schists capable of being used as whetstones are to be found at Piermont, Lisbon, and Littleton, Grafton county; Tamworth, Carroll county; and Connecticut Lake, Coos county. The deposits of Grafton county are the only ones worked to any extent. The stone from these quarries is placed on the market under the names of the "Indian Pond," "chocolate," and "White Mountain." These three varieties are all argillitic mica schists, with varying color and hardness.

The chocolate is a very compact finely-grained form and is of a dark gray color. Its value as a whetstone lies in the small crystals of garnet and rutile which are to be found in its structure as well as the little quartz crystals that lie with their axes parallel to each other.

The Indian Pond stone is of a light gray color. It is somewhat softer and more schistose than the other two. It serves well the purpose of cutting an edge rapidly, and hence answers as a forerunner of the chocolate. This stone has been quarried for about fifty years. Not until quite recently, however, have the quarries of Grafton county been worked to any considerable extent.

The White Mountain stone bears a close relation to the Indian Pond. It is, however, somewhat lighter in color and more massive than the Indian Pond variety.

Vermont.—Just over the State line from Grafton county, New Hampshire, into Orleans county, Vermont, is found the so-called Lamoille stone. This schist is quite similar to the forms found in New Hampshire. It has about the same relation to the chocolate that the White Mountain bears to the Indian Pond. This stone is not as finely grained as the chocolate, but it is more massive and resembles it in color.

All the principal quarries from which these four varieties come are controlled by the A. F. Pike Manufacturing Company, of Pike Station, New Hampshire. Their estimates and prices are given below.

The chocolate and White Mountain stones find their market principally in this country. In 1886 about 80,000 pounds of the chocolate and 40,000 pounds of the White Mountain rock were taken from the quarries.

Prices for Chocolate stone.

	Per pound.
Scythe stone:	
No. 1.....	\$0.16
No. 2.....	.10
Axe stone:	
No. 1.....	.12
No. 2.....	.08
Penknife stone.....	.25
Carpenter's bench stone:	
No. 1.....	.25
No. 2.....	.15

Prices for White Mountain oil and water stones.

	Per pound.
Joiner's, 8 by 2 by 1½ inches.....	\$0.12½
Axe, 3 by 2 by ¾ inches.....	.12½
Slips.....	.25
Penknife pieces.....	.25

During the year 1886 between 2,000,000 and 3,000,000 pounds of rough Indian Pond stone were taken from the quarries. Nearly all this stone was made up into scythe stones according to the following prices:

Prices for Indian Pond stone.

	Per gross.
Extra.....	\$3.75
No. 1.....	3.50
No. 2.....	2.50

The Lamoille is also cut chiefly into scythe stones which sell for about \$5.50 per gross.

New York.—But little accurate information could be obtained concerning the so-called Labrador oil stone of this State. The stone, which is a fine-grained sandstone having very sharp angular grains of quartz and a few of feldspar cemented by argillaceous matter, is of a light slate color, with a hardness, according to Mohr's scale, between 3 and 4. The quarries of the stone are located in Cortland county. The demand for it is not great, since only about 5,000 pounds of finished stone find a market annually.

The stone is quoted as follows :

Prices for Labrador oil stone.

	Per pound.
Size 8 by 2 by 1½ inches	\$0.12
Axe stone .....	.10
Slips .....	.24

Indiana.—About forty-five years ago a bluish white whetstone, which now bears the name “Hindostan,” was first placed on the market. It came from a town of the same name in Martin county, Indiana. The town, which was situated near the White river, has since passed out of existence. A stone similar in structure to the Hindostan, but differing in color and hardness, is also to be found in Indiana. It is called “Orange stone;” it is of a light buff shade. The fact that it bears the name of the county in which it occurs most abundantly may account for its title. At present nearly all the Hindostan and Orange whetstones come from Orange county. Quarries are to be found at French Lick Mineral Springs, between 2 and 3 miles from West Baden, in French Lick township, and in Northwest township, about 8 miles from the French Lick quarries. Both these varieties of whetstone are in some places found in the same quarry, but occur in different ledges. The rock is decidedly stratified and splits with great readiness into large sheets.

At times the whole ledge, from 10 to 20 inches in thickness, is raised by means of steel bars and wedges. More frequently sheets from 5 to 6 inches in thickness are cleared off. These sheets are again split to the desired thickness. Some pieces of rock can readily be severed into layers not having a thickness of over $\frac{1}{4}$ inch. After the stone has been brought to the proper thickness it is marked off into pieces of the requisite length and width by means of a straight edge and scribing awl. The stone is so soft that the awl will penetrate it sufficiently for it to be readily broken. The stone is now worth one-half of its price when finished. Finishing on iron wheels with sand, and boxing complete the cost of manufacture. Between the ledges of good stone is generally found from 6 to 10 inches of soft shale. The whetstone varies in hardness. That at the surface is usually much softer than the rock underneath. The harder variety makes the best stone for use. At fissures in the rock is found what the quarrymen call ironstone. This contains, as its name indicates, a large quantity of iron, sometimes in the form of limonite, but more frequently as brown hematite. The presence of the iron ore prevents the rock from crumbling as readily as it does in the ordinary Hindostan and Orange stones, and hence makes a very fair finishing stone. It is, however, apt to become glazed after some use.

In French Lick township, about 7 miles south of the Hindostan and Orange quarries, are found sandstones which are quarried for dry whetstones. These stones are sold principally to shoemakers.

During the year 1886 about 400,000 pounds of Hindostan and Orange stones were quarried. The prices for the Hindostan stones, according to J. A. Chaillaux, of Orangeville, and William F. Osborn and T. N. Braxton & Sons, of Paoli, Indiana, are as follows :

Prices for Hindostan oil and water stones.

	Per pound.
No. 1, Washita finish, 8 by 2 by 1½ inches.....	\$0.03½
Axe, small, 3 by 2 by 1 inches.....	.04
Slips:	
Plain.....	.04½
Beveled.....	.06

About the same amount (400,000 pounds) of the sandstones as of the Hindostan and Orange was placed on the market during 1886. Nearly one-quarter of this quantity went to Europe. As the cost of the preparation is not great, this stone can be sold for 4 cents a pound.

Exports.—It is exceedingly difficult to obtain any accurate information as to the total amount of whetstones exported annually from this country, as official data are combined with those of marble and other stone.

The chocolate whetstone (finished) is shipped in small quantities to Canada and England. Of the Indian Pond stone in 1886 about 500,000 pounds went to Germany. A large quantity was also shipped to England, Canada, and Australia. But little of the White Mountain stone passes out of this country. About 40,000 pounds of the Lamoille rock were exported during the past year. It is estimated that 100,000 pounds of the Hindostan and Orange stones find a market in Europe each year. Nearly the same amount of the sandstone from French Lick township is annually taken out of this country. The Arkansas and Washita stones also find quite a market abroad.

Imports.—The value of hones and whetstones imported into the United States during the year 1886 was \$18,160.72. This includes both the entries for immediate consumption and withdrawals from the warehouse. The value of the imports by custom districts were :

Value of imported whetstones, by customs districts, during the fiscal year ending June 30, 1886.

Customs districts.	Value.
Boston and Charlestown, Massachusetts.....	\$483.00
Chicago, Illinois.....	839.00
New Orleans, Louisiana.....	1.00
New York, New York.....	14,434.00
Philadelphia, Pennsylvania.....	621.00
San Francisco, California.....	150.00
Saint Louis, Missouri.....	215.00
All other customs districts and ports.....	6.00
Total.....	16,749.00

The difference between the amount imported for immediate consumption, including the withdrawals from warehouse (\$18,160.72), and the value of imports by customs districts (\$16,749) is due to the fact that whetstones to the value of \$1,411.72, which were already in stock from the previous year, were withdrawn for consumption.

The value of imports by way of New York for the separate countries was as follows:

Value of imports of whetstones into New York during the fiscal year ending June 30, 1886.

Whence imported.	Value.
Germany	\$4,608
Belgium	3,915
Scotland	3,648
England	2,630
Italy	348
Chili	178
Australia	175
Japan	134
Mexico	19
Netherlands	12
Total	15,663

The above figures give the value of whetstones removed for consumption rather than the mere import for the year. Quite a large amount of foreign stone is shipped to this country in the rough and prepared for market by our own manufacturers. As it is brought over as ballast the expense of transportation becomes very light. During last year about 100,000 pounds of Turkey oil stone was finished for market in this country. German and Belgian hones found quite a ready market at the following prices:

Prices of German razor hones.

	Per dozen.
With rubber stone:	
6-inch	\$2.00
7-inch	3.00
8-inch	4.00
9-inch	5.00
10-inch	6.00

Prices of Belgian razor hones.

	Per dozen.
5-inch, common	\$1.25
5-inch, fine	1.50
6-inch, superfine	4.00
8-inch, superfine	10.00

Stones imported from Scotland bearing the name Scotch Water of Ayr are also sold in this country. These stones are not only used as whetstones but for burnishing purposes and as lithographic stones. A few of the so-called Norway Rugg, from Norway, and a few Welsh stones, find a market in the United States. Probably \$100 will cover the value of the annual import of the two stones last mentioned.