Duplicate

REPORTS OF THE

DEPARTMENT OF

CONSERVATION AND DEVELOPMENT

STATE OF NEW JERSEY

HENRY B. KÜMMEL, State Geologist and Director

BULLETIN 34

Geologic Series

THE MINERAL INDUSTRY OF NEW JERSEY FOR 1928

Compiled by

MEREDITH E. JOHNSON

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INTRODUCTION

This bulletin is a continuation of the series devoted to the mineral industries of the State of New Jersey and published by this Department. The statistics of production presented in the following pages were compiled from data furnished by the mineral producers of this State to the Division of Geology and Topography of the Department of Conservation and Development, and the Bureau of Mines and Bureau of the Census of the United States Department of Commerce. The policy of cooperation adopted by these three organizations has resulted in the elimination of duplicated effort in the collection of mineral statistics and has relieved the producers of the annoyance of receiving two or more sets of similar, printed forms from different organizations. As producers know from long experience, statistics of individual production are never published without the consent of the operator concerned, the rule being to publish only the combined figures of three or more producers.

SUMMARY OF THE MINERAL PRODUCTION IN 1928

Conditions in the mineral industries of New Jersey in 1928 evidently reflected conditions in other parts of the country, for we find that the total value of New Jersey's mineral production declined 3.4 per cent from the total for the previous year, and for the country as a whole there was a loss of 2.34 per cent.[1] In New Jersey the decline was due almost entirely to a drop in the value of the production of the clay and clay products industries. These allied industries account for slightly more than half the total value of all New Jersey's mineral products and therefore any condition which affects their prosperity has a pronounced effect upon the total value of the entire mineral output of the State. All but three of the other mineral industries in New Jersey increased the value of their output, the value of iron shipments, for example, increasing 57.8 per cent, or from $860,393 to $1,357,877. This remarkable increase is the brightest spot in the record for 1928 and is the best record the iron industry in this State has made since 1923. Another notable increase was in the production of sand and gravel. The following table summarizes information about the mineral industries of New Jersey in 1928 and presents comparable statistics for 1927.

1 Katz, Frank J., and Clark, Martha B., Mineral Resources of the United States in 1928 (Preliminary Summary): U. S. Bur. of Mines, p. A5, 1929.

MINERAL PRODUCTION IN NEW JERSEY IN 1928 AND 1927

Products	No of operations [a]	Quantity—Short or long tons 1928	Quantity—Short or long tons 1927	Value—Dollars 1928	Value—Dollars 1927	Per cent increase or decrease Tonage	Per cent increase or decrease Value
Zinc ore	1	648,797 s. t.	629,108 s. t.	(b)	(b)	+ 3.1	+ 1.2
Iron ore (shipped)	5	350,618 l. t.	202,720 l. t.	1,357,877	860,393	+72.9	+57.8
Stone	45	3,210,845 s. t.	2,760,882 s. t.	4,601,895	4,334,526	+16.3	+ 6.2
Sand and gravel	113	6,292,636 s. t.	4,627,159 s. t.	4,261,390	3,602,289	+36.0	+18.3
Clay (sold raw)	40	260,742 s. t.	312,410 s. t.	1,133,848	1,270,572	—16.5	—10.8
Brick and tile	65			18,160,009	20,343,656		—10.7
Pottery	51			21,219,269	22,729,721		— 6.6
Greensand marl	5	12,295 s. t.	11,259 s. t.	209,047	163,048	+ 9.2	+28.2
Feldspar (ground) [c]	4	24,085 s. t.	25,344	459,507	485,446	— 5.0	— 5.3
Other products:				28,843,643	29,281,790		
Lime	2					+16.3	+32.1
Portland cement (shipped)	2					— 0.16	+ 0.27
Quartz sand (ground)	7					+17.2	+13.3
Zinc ore	1					+ 3.1	+ 1.2
Talcose rock (ground)	0					—100.0	—100.0
Graphite (shipped)	1			28,843,643	29,281,790		
Non-clay refractories and refractory cements							—16.4
By-product coke [c]	2					— 0.3	— 4.8
Totals				80,246,485	83,071,441		— 3.4

a. Number of mines, quarries, pits or plants as the case may be.
b. Value included in other products.
c. Raw material from other states.

ILLUSTRATIONS.

CONTENTS

According to figures published by U. S. Bureau of Mines, [1] New Jersey ranked eighteen among all the states in the total value of its mineral production in 1927. In itself that is not a bad record; but the degree to which New Jersey's mineral resources have been developed is more fully brought out if we reduce the mineral production of each state to a valuation per square mile of area. In the following table the states are ranked according to this method.

MINERAL PRODUCTION IN 1927

State	*Total value of mineral production*	*Area in sq. mi.*	*Value per sq. mi.*	*Rank*
Pennsylvania	$936,693,474	45,126	$20,780	1
West Virginia	366,643,205	24,170	15,180	2
New Jersey	73,064,418	8,224	8,884	3
Oklahoma	524,594,732	70,057	7,495	4
Ohio	226,731,200	41,040	5,530	5
Kentucky	152,614,177	40,598	3,765	6
Illinois	180,288,060	56,665	3,180	7
Indiana	107,578,234	36,354	2,960	8
California	459,470,570	158,297	2,905	9
New York	112,106,913	49,204	2,280	10

In the above tabulation it will be noticed that with the single exception of New Jersey, every one of the ten leading states produced at least two of the mineral fuels. Were the value of these fuels subtracted from the total value of the mineral production of the other states listed, thus putting all ten states on a comparable basis, the very great development of New Jersey's mineral resources would be brought out even more sharply.

DETAILS OF THE PRODUCTION IN EACH MINERAL INDUSTRY.

ZINC ORE.

All of the zinc ore produced in this State comes from the famous mines at Franklin Furnace and Ogdensburg which for many years have been operated by the New Jersey Zinc Company. The latter company increased its output slightly more than three per cent in 1928, but due to a lower average price for zinc the estimated value of the output was only one per cent greater than in 1927. So far as known, there were no new developments at the mines during the year.

Many attempts have been made to discover ore-bodies similar to those at Franklin Furnace and Ogdensburg in other parts of the same region, but though zinc minerals have been found in many different localities, no one has as yet succeeded in finding another deposit where the zinc minerals are sufficiently concentrated to warrant the hope of successful exploitation.

[1] Op. cit.: Katz, Frank J., and Clark, Martha B., P A7.

If such deposits exist, they probably are overlain by glacial drift and hence were inaccessible to the prospectors who, armed only with compass and picks, long ago examined every outcrop within a radius of many miles of both Franklin Furnace and Ogdensburg. It is possible, however, that a systematic survey using modern geo-physical methods might succeed where older methods failed; for whereas former surveys were limited to surficial examination and a limited amount of prospecting with drills; modern methods, such as the electrical method so successfully employed in locating buried deposits of iron ore in Sweden, can be employed just as successfully in drift-covered areas as where rock outcrops abound.

IRON ORE.

Not since 1923 has the iron industry of New Jersey enjoyed such prosperity as it did in 1928. The increased demand for iron and iron products felt throughout the country was more marked in New Jersey than elsewhere, for whereas total shipments of iron ore from all mines in the United States increased about 3 per cent in quantity and 2 per cent in value, in New Jersey shipments increased 73 per cent in quantity and 58 per cent in value. The revival of the iron industry in New Jersey is graphically depicted in the following table:

SHIPMENTS OF IRON FROM NEW JERSEY MINES

Year	1928	1927	1926	1925	1924
No. of mines reporting shipments	5	4	3	4	3
Quantity of ore shipped.	350,618 g. t.	202,720 g. t.	212,152 g. t.	164,523 g. t.	101,123 g. t.
Value of ore shipped...	$1,357,877	$860,393	$925,403	$678,021	$420,488

All the iron ore mined in New Jersey in 1928 was magnetite and it came from three mines: the Mount Hope Mine of the Warren Foundry and Pipe Corporation, located at Mount Hope, some three miles northeast of Wharton; the Richard Mine of the Thomas Iron Company, located about a mile and a half to the north of the same town; and the Beach Glen Mine of the Eastern Iron Company, located about two miles northeast of Rockaway. A circle five miles in diameter could be drawn to include all three mines. The average grade of ore shipments ranged from 60 to 62 per cent iron (dried samples). The Cannon and Peters Mines of the Ringwood Company were idle during the year, but all of the stock on hand was shipped and the way cleared for resumption of mining operations in 1929. A small amount of limonite, or brown oxide of iron was shipped from stock at the Ahles Mine of the Basic Iron Ore Company, located near Oxford, N. J.

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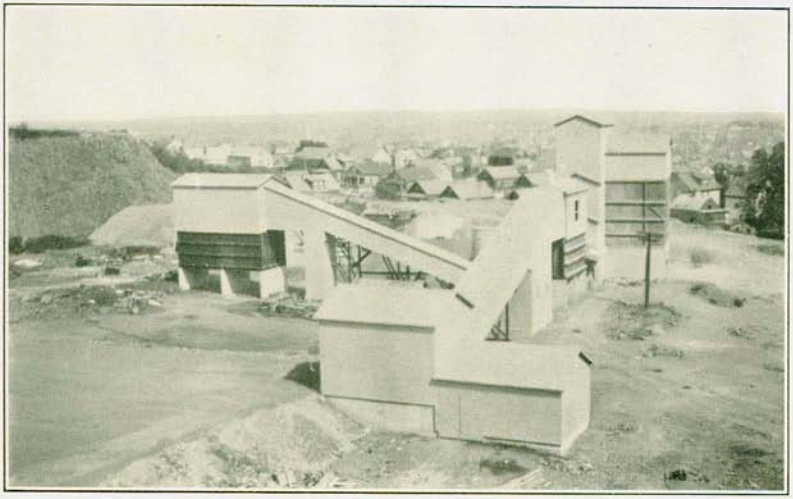
(a) *Plant of the Morris County Crushed Stone Company (trap rock) at Millington, Morris County.*



(b) *New plant of the Sowerbutt Quarries (trap rock) at Prospect Park, Passaic County.*

STONE.

The stone industry as a whole had another prosperous year, although competition for business was somewhat keener and prices were forced down to levels considerably below those prevalent in 1927. The total production of stone in 1928 amounted to 3,210,845 short tons, valued at $4,601,895. Both figures are new high records for the production of stone in New Jersey. The following table illustrates the steady growth of the stone industry in this State in the last decade:

AMOUNT AND VALUE OF STONE PRODUCED IN NEW JERSEY

Year	*Amount*	*Value*
1928	3,210,845 tons	$4,601,895
1927	2,760,882 "	4,334,526
1926	2,315,450 "	3,602,343
1925	2,335,820 "	3,656,943
1924	2,149,270 "	3,326,298
1923	2,038,740 "	3,022,918
1922	1,903,840 "	2,850,557
1921	1,680,940 "	2,634,738
1920	1,679,720 "	2,777,018
1919	1,625,870 "	2,521,860

It will be noticed that even in 1921, a year of severe business depression, there was only a small decline in total value from the total for the "boom" year, 1920,—and production actually increased. The year 1926 was the only one to witness a decline in both the amount and value of production.

In 1928, as in previous years, the credit for the increased production of stone belongs to the trap-rock operators. Production of limestone and "other stone" (see table) decreased considerably.

TOTAL PRODUCTION OF STONE IN 1928 AND 1927

Kind	*No. of quarries* 1928	1927	*Production—short tons* 1928	1927	*Value—dollars* 1928	1927
Trap rock	34	31	2,925,110	2,388,702	4,025,637	3,654,404
Limestone	5	8	187,395	233,550	360,161	388,551
Other stone	6	6	98,340	138,630	216,097	291,571
	45	45	3,210,845	2,760,882	4,601,895	4,334,526

Trap rock. Increasing competition is the urge which caused many operators of trap-rock quarries to renovate their crushing plants—practically all of the trap which is quarried is crushed—and speed up production. There are literally dozens of quarries in the State where such a program of renovation and expansion has been enacted in the last few years. Competition is also the cause for the abandonment of many quarries which for one reason or another were expensive to operate, or which were poorly located with respect to a market. The present tendency in quarry operations is to concentrate production where costs are lowest and where transportation facilities are best.

There is also a tendency towards the standardization of operations. At most of the large quarries in the State it is now common practice to use portable churn drills for drilling the deep blast holes in back of the quarry face; to use steam or electric shovels for loading the broken rock; to load directly into trucks which haul the rock from the quarry face to the crusher; and to use electric power for driving crushers and trommels (revolving screens used to separate the different sizes of broken rock).

In 1928 the production of trap rock was 22.4 per cent greater than in 1927 and its value for the first time exceeded $4,000,000. The great bulk of the trap rock quarried is used as aggregate in concrete work; a considerably smaller amount as railroad ballast. The proportions so used are shown in the table which follows:

PRODUCTION OF TRAP ROCK IN 1928 AND 1927

Use	Quantity — short tons 1928	1927	Value — dollars 1928	1927
Road metal	644,948	2,003,967	916,034	3,144,313
Concrete	1,977,773		2,733,770	
Railroad ballast	297,990	348,250	368,139	455,456
Other uses	4,398	36,485	7,694	54,635
Total	2,925,109	2,388,702	4,025,637	3,654,404

Limestone. With the cessation of operations at the McAfee quarry of the Bethlehem Mines Corporation, one more blow was struck at this rapidly declining industry. In 1928 just four quarries were operated in the State; two in the white limestone area of Sussex County and two in the more dolomitic limestones occuring at Clinton and Peapack. Although it is impossible to say with certainty that such is the case, it is hoped that the economic pruning of limestone quarries in this State has about come to a standstill. Washed gravel and crushed trap-rock have largely supplanted limestone for use in concrete work in New Jersey, but there is still a small local demand for crushed stone and a certain, minimum demand for limestone for use in agricultural work which, together with the demand for limestone to be used for special purposes, such as poultry grit, as filler in various manufactured articles and as raw material in the manufacture of mineral wool, should be enough to keep a few quarries running even if the demand for fluxing stone is entirely eliminated.

PRODUCTION OF LIMESTONE IN 1928 AND 1927

Use	Quantity—short tons 1928	1927	Value—dollars 1928	1927
Road metal and concrete	40,140	34,770	52,259	41,137
Agriculture	23,770	35,700	70,200	104,270
Other uses[a]	123,485	163,080	237,702	243,144
	187,395	233,550	360,161	388,551

a. Incudes fluxing stone for furnaces, finely ground limestone used as a filler, limestone for use in the chemical industries, and in the manufacture of mineral woll.

Other stone. The production of sandstone, granite, argillite, verde antique marble (serpentine), and slate, is grouped under this heading in order to conceal the output of individual operations.

Sandstone was produced from three quarries in 1928; from the large quarry at Raven Rock operated by Charles T. Eastburn, and from smaller quarries at Stockton and Closter operated by John S. Hendricks and James L. Bried, respectively. The latter two operators produced small amounts of rock and dressed stone for use in buildings; whereas practically all of the production from the Raven Rock quarry is in the form of large blocks used as riprap in the building of jetties.

Granite is now quarried at only one point in the State; namely, at the quarry of the Pompton Crushed Stone Company adjacent to the excellent highway between Pompton Lakes and Bloomingdale. A spur from the nearby line of the New York, Susquehanna and Western Railroad enables the company to ship by rail as well as by truck. All of the company's production is crushed and it is used chiefly in concrete work.

Although it is not reported, a considerable tonnage of tailings from the iron mines is also sold for use in road work and concrete. Since the operating iron mines are all in the granite-gneiss of the Highlands District, the tailings from the mines must be classed as crushed granite also.

The use of argillite as a building stone continues in gain in popularity and the quarry operated by C. A. Williamson in Princeton was therefore busy throughout the year. Most of the stone taken out is used as face or rough building stone, but a little is also used in concrete work and for driveways and walks.

There was a slight increase in 1928 in the production of serpentine from the old Lizzie Clay quarry, located north of Phillipsburg. This is one of the oldest of the active quarries in the State, but as the demand for serpentine is rather limited, production has never grown very large. In recent years the quarry has been operated by the Rock Products Company, with offices in Easton.

After a shut-down of several years, work at the old Lafayette slate quarry, located about a mile and a half north of the village of that name in Sussex County, has once more been resumed. For a number of years prior to 1918 this quarry was operated by the Lafayette Slate Company. The decline in building operations during the war period caused a decrease in the demand for slate and brought about a change in ownership, for in 1922 we find the quarry being operated by Louis Hershkowitz under the name of the Lafayette Slate Quarry, Inc. Operations were evidently unprofitable as work was again abandoned

within a short period. The present company, the Lafayette Slate Mining Corporation, is controlled by P. H. Heyel and the same Louis Hershkowitz, and under the active management of Mr. Heyel the old quarry has been cleaned out, new machinery installed and several expert slate-cutters employed. This quarry was described in the "Annual Report of the State Geologist for 1908", pages 106-107, but for the benefit of those to whom that report is not available, a short description is given here.

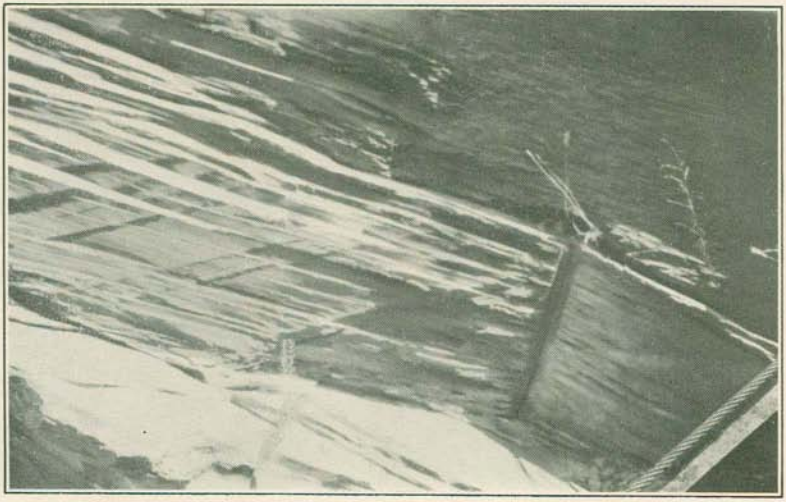
The quarry is located in a belt of "hard" [1] slate which can be traced without difficulty all the way from Lafayette to the Delaware River. In this particular quarry the bedding of the slate dips 18° to the northwest and the cleavage 19° 30′ to the southeast, the intersection of the bedding planes with the cleavage plans forming faint lozenge-shaped designs on the northeast and southwest walls of the quarry (Plate II). The slate is broken by vertical fractures which have a bearing approximately at right angles to the strike of the bedding and cleavage and which constitute the "grain" of the rock and are of great value to the slate producer because they save him the cost of cutting the ends of blocks where they occur. The slate is blue-gray in color and is crossed by bands or "ribbons" of slightly different hue at intervals of 1 to 15 inches. These bands are caused by a slight difference in mineralogical constitution and texture, but since they do not deteriorate in strength or change noticeably in color with long-continued exposure (see Plate II), they do not effect the value of the slate for roofing purposes.

At the present time the quarry is about 150 feet long, 100 feet wide and 80 feet deep. Since the slate below the zone of weathering is of uniform quality, no effort is being made to follow any particular bed; instead, attention is being centered on the development of systematic cuts in the bottom of the quarry and the elimination of waste rock as far as that is possible. As a means towards this end the company has installed a wire saw by means of which cuts of any desired length can be made with a minimum of work and expense.[2] When last visited (August 2, 1929) the company was still using the old steam power plant for hoisting, but work was then under way to replace this equipment with modern electric hoists.

The color hardness and banding of slate from the Lafayette quarry

1. Slate from the Delaware Valley region is usually designated as "hard" or "soft" depending upon its physical characteristics. In general, the slate from the region about the Chapman quarries is harder than from the Pen Argyl and Bangor tracts to the north and is superior for the manufacture of roofing slates.

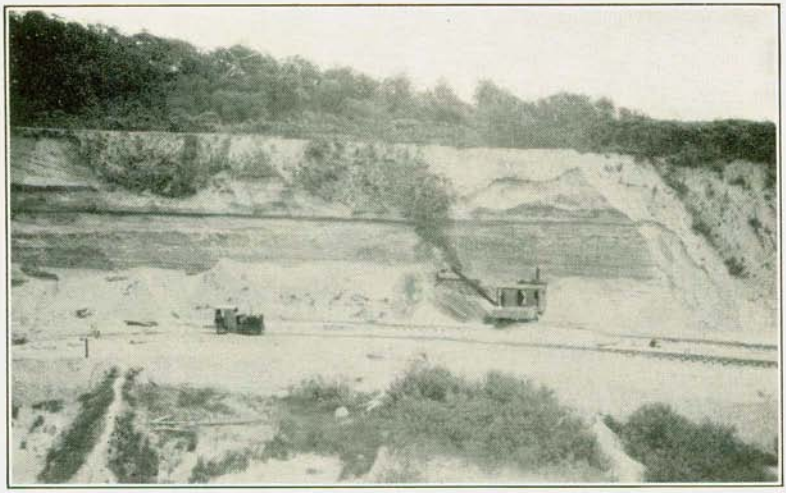
2. For a description of the wire saw and its use the reader is referred to Reports of Investigations, Serial Nos. 2918 and 2918A by Oliver Bowles of the U. S. Bureau of Mines, Washington, D. C.



(a) *A portion of the northeast wall of the Lafayette slate quarry. View taken to show opposite dip of bedding and cleavage.*

(b) *Sixty-year-old house in Lafayette roofed with slate from the Lafayette quarry. The slate is still in perfect condition.*

(a) *Bennet plant of the New Jersey Sand and Gravel Company, located three miles east of Farmingdale, Monmouth County.*



(b) *Sand and gravel pit of the North Jersey Sand and Stone Company, Carpentersville, Warren County.*

have already been described. The strength, porosity, and corrodibility were determined in a series of tests made for the report on building stones given in the "Annual Report of the State Geologist for 1908". As a result of those tests it was shown that "this slate equals in strength many of the best slates in Pennsylvania and Vermont, while in toughness is exceeds all slates that have thus far been tested. It is also very low in porosity and near the average in corrodibility." For further details of the tests made the reader is referred to the report from which these sentences are quoted.

SAND AND GRAVEL.

Sand and gravel are the most widespread of all New Jersey's mineral resources, deposits of these materials occurring in every county in the State. In 1928 the Department of Conservation and Development received reports of the production of 113 pits, located at almost as many different localities, and scattered all the way from the town of Sussex to Cape May Point.

In value, molding sand is the most important of the various kinds of sand and gravel produced in New Jersey. In 1928 its value amounted to almost a millon dollars. Operators in Burlington County alone produced over 200,000 tons of this sand, with a total value of over $300,000. Cumberland County operators produced a slightly greater tonnage (234,245 tons as compared with 218,981 tons), but its value was slightly less than that of the molding sand from Burlington County.

Paving sand ranks next in importance to molding sand with a total value of $774,124. Middlesex County operators led in the production of this sand, their production in 1928 amounting to 443,711 tons—almost as much sand as was produced by all the molding sand operators in the State.

Structural sand, or sand used in building and other construction work, leads in tonnage, the total production in 1928 amounting to more than a million and a half tons.

In value per ton, ($2.90) filter sand leads slightly, but it is closely followed by blast sand with a value of $2.89.

The total production of all kinds of sand and gravel, namely, 6,292,636 tons, is the greatest amount ever produced in one year by operators in this State and very probably will stand as a record for some years to come. That profits were not necessarily large in proportion is indicated by the fact that the total value of this tremendous tonnage is slightly below the record value established in 1923.

PRODUCTION OF SAND AND GRAVEL IN 1928 AND 1927

Type of production	No. of pits	Quantity—short tons 1928	1927	Value—dollars 1928	1927
Glass sand	7	227,642	185,568	307,170	278,588
Molding sand	38	692,081	444,667	937,978	564,826
Structural sand	51	1,340,186	1,512,150	731,551	788,626
Paving sand	39	1,582,954	1,303,523	774,124	704,700
Cutting, grinding and blast sand	7	53,736	70,961	155,178	203,897
Fire or furnace sand	11	44,824	57,428	57,939	84,316
Engine sand	4	34,139	87,529	13,807	36,615
Filter sand	5	30,039	29,208	87,208	82,048
Other sand[a]	6	16,373	29,109	15,773	39,756
Total sand	..	4,021,974	3,720,143	3,080,728	2,783,372
Structural gravel	34	623,938	270,421	608,795	267,212
Paving gravel	24	1,619,789	587,509	553,241	487,111
Other gravel[b]	3	26,935	49,086	18,626	64,594
Total gravel	..	2,270,662	907,016	1,180,662	818,917
Total sand and gravel	..	6,292,636	4,627,159	4,261,390	3,602,289

a. Includes sand for use by golf clubs, "mica sand" and sand for other special purposes.

b. Includes railroad ballast gravel, filter gravel, foundry gravel and gravel for filling.

There have been many changes in the sand and gravel industry since the list of operators was published in Bulletin 31[1] and a revised list is therefore given here.

1. Johnson, Meredith E., The Mineral Industry of New Jersey for 1926; Bulletn 31, Geologic Series, Dept. of Conservation and Development, State of New Jersey, 1928.

LIST OF SAND AND GRAVEL OPERATORS

Operator	*Products*[1]	*Office Address*	*Location of active pits (nearest community)*
			Atlantic County
Brennan Sand Co.	1	Tullytown, Pa.	Richland
Edward Goehler	3, 4, 12, 13	Pleasantville	Port Republic
Wm. G. Moore	1	Philadelphia, Pa.	Corbin City
Paxson-Taggart, Inc.	1, 7	" "	Cedar Lake
Charles E. Pettinos	1	New York City	Folsom and Newtonville
George F. Pettinos	1	Philadelphia, Pa.	Richland
			Bergen County
Bergen Sand & Gravel Co., Inc.	3, 12	East Paterson	Fairlawn
Fairlawn Sand & Gravel Co.	S & G	Fairlawn	"
Glen Rock Sand Co.	3	Glen Rock	"
A. D. McKee, Inc.	3, 12	Hohokus	Hohokus
Progressive Sand & Gravel Co., Inc.	3, 12	Paterson	Fairlawn
Charles Trensch	3	North Hackensack	North Hackensack
Van Decker Sand Co.	3	Paterson	Fairlawn
Wm. Van Kruiningen	3	Wallington	Wallington
O. Weisgerber & Sons, Inc.	3, 12	Paramus	Ridgewood
			Burlington County
Brennan Sand Co.	1	Tullytown, Pa.	Lumberton
Joseph Cugliotta	1, 3	Burlington	Burlington
Henry D. Culin	1	Mount Holly	Hainesport
Delaware River Sand Dredging Co.	3, 12	Bordentown	Fieldsboro
F. A. Hillman	1, 3	South Amboy	Lumberton

1. Products are listed according to the following key:

1—Molding sand	6—Blast sand	11—Other sands	16—Filter gravel
2—Glass sand	7—Fire or furnace sand	12—Building gravel	S—Sand
3—Building sand	8—Engine sand	13—Paving gravel	G—Gravel
4—Paving sand	9—Filter sand	14—Railroad ballast gravel	
5—Cutting and grinding sand	10—Railroad ballast sand	15—Foundry gravel	

Operator	*Products*	*Office Address*	*Location of active pits (nearest community)*
Norcross & Edmonds	S	Philadelphia, Pa.	Birmingham
Paxson-Taggart, Inc.	1	"	Masonville and Lumberton
Charles E. Pettinos	1	New York City	Ewansville
George F. Pettinos	1, 4	Philadelphia, Pa.	Mt. Holly and Hainesport
Harold R. Sherman	3	Burlington	Burlington
Whitehead Bros. Co.	1	New York City	Mt. Holly, Masonville, Smithville and Ewansville.
			Camden County
Associated Sand & Gravel Co.	S	Morrisville, Pa.	Williamstown Jct.
Bridgeton Sand Co.	1, 2	Bridgeton	" "
Robert R. Erato	1, 3, 7, 12	Ventnor	Morris Sta.
Irish Hill Supply Co.	3, 12, 13	Runnemede	Runnemede
Cyrus D. Marter	3, 12	Camden	Bellemaur
Mt. Ephraim Sand Co.	3, 12	Mt. Ephraim	Runnemede
Natural Products Co., Inc.	1	Reading	Blenheim
Paxson-Taggart, Inc.	1	Philadelphia, Pa.	Hayville
George F. Pettinos	4, 13	"	Albion
R. Pieri & Sons	3	Atco	Atco
Reading Sand Co.	1	Bridgeton	Penbryn
Silicate Products Corp.	3, 6	Berlin	Tansboro
Clarence Ward	3	Maple Shade	Pensauken
			Cape May County
Cape May Sand Co.	1, 3, 6, 8, 9, 11, 12, 13, 16	Cape May	Cape May Point
George Chambers	13	Cape May Court House	Cape May Court House
Champion Sand & Gravel Co.	S & G	Ocean City	Palermo
Mt. Pleasant Silicia Sand Co., Inc.	1, 3, 6, 9, 12	Cape May	Woodbine
Sea Isle Junction Sand Co.	3, 6, 7, 11	Philadelphia (?)	Sea Isle Junction
Young Sand & Gravel Co.	3, 4, 12, 13	Ocean City	Dennisville
Whitehead Bros Co.	1	New York City	Belle Plain and Muskee
			Cumberland County
Ed. R. Bonhamn	S & G	Bridgeton	Bridgeton
Crystal Sand Co.	1, 2	"	Cedarville and South Vineland

Operator	Products	Office Address	Location of active pits (nearest community)
J. B. Drinker & Co.	1, 3, 5, 11	Philadelphia, Pa.	South Vineland
Daniel Goff Co.	1, 15	" "	Clayville
W. J. Golder	1	Millville	Millville
Menantico Sand & Gravel Co.	1, 3, 6, 8, 9, 11, 16	"	Clark's Mill
Jesse S. Morie	4	Vineland	Vineland
New Jersey Silica Sand Co.	1, 2, 7	Millville	Manamuskin
Paxson-Taggart, Inc.	1	Philadelphia, Pa.	Millville
Charles E. Pettinos	1	New York City	Dorchester, Dividing Creek & Belle Plain
George F. Pettinos	1	Philadelphia, Pa.	Cedarville
South Jersey Sand Co.	2	Newport Sta.	Dividing Creek
Tavern Rock Sand Co.	1, 2, 3, 11	Alton, Ill.	Millville
Whitall-Tatum Co.	2	Millville	South Vineland
Whitehead Bros. Co.	1	New York City	Clayville, Dividing Creek & Dorchester
			Essex County
Cedar Grove Sand & Gravel Co.	3, 4, 12, 13	Paterson	Cedar Grove
Little Falls Sand & Gravel Co.	3, 4, 12, 13	Little Falls	" "
Lvingston Sand & Gravel Co.	3, 4, 12, 13	Livingston	Livingston
A. C. Million	3, 11	Cedar Grove	Cedar Grove
			Gloucester County
S. W. Downer	1, 3, 7, 11, 13	Downer	Downer
Edward Gahrs, Jr.	3,12	Swedesboro	Swedesboro
Walter N. Leslie	3	Woodbury	Mount Royal
Henry E. Strathmann	3, 12	Philadelphia, Pa.	Paulsboro
Wenonah Cement Products Co.	3, 4, 11, 12, 13	Wenonah	Wenonah
			Mercer County
John R. Hendrickson	1, 3, 4	Yardville	Crosswicks
			Middlesex County
Bloomfield Clay Co.	7, 11, 13	Metuchen	Bonhampton
Crossman Co.	1, 3, 4, 7, 8, 11	South Amboy	Sayreville
Dallenbach Sand Co., Inc.	3, 4, 11, 12, 13	Milltown	Milltown

CLAY.

This heading includes only the clay which was sold as raw clay by operators of clay pits. It does not include the large amount of clay used by some of the same operators in the manufacture of clay products. Inasmuch as some of this clay is sold to other manufacturers of clay products in New Jersey, the value of whose products is listed elsewhere, it is obvious that there is an unavoidable duplication of figures to that extent.

Sales of raw clay in 1928 declined appreciably in both tonnage and value from that in the previous year. This decline was probably due in large part to a decline of similar proportions in the clay-products industries; but it is also true that there has been a continued decline in the production of raw clay each year since 1923; whereas the clay-products industries had a banner year in 1926. It would appear therefore that several factors are contributing to this steady decline. One such factor, and an important one, is the development of high-grade clays in other states which now compete with New Jersey clays. Another factor is the tendency on the part of manufacturers of clay products to develop their own sources of raw materials, thus diminishing the demand for raw clay from outside sources. Whatever the cause, however, the tendency towards decreased production of raw clay in New Jersey is unmistakable. The following table illustrates the growth of the clay industry in the whole United States as compared with production in New Jersey.

SALES OF RAW CLAY

	I. In the United States[a]		*II. In New Jersey*	
Year	*Production short tons*	*Value dollars*	*Production short tons*	*Value dollars*
1928	3,975,000	13,696,000	260,742	1,133,848
1927	3,849,176	13,697,159	312,410	1,270,572
1926	3,967,198	14,105,589	342,586	1,463,288
1925	4,030,420	12,736,632	343,202	1,418,979
1924	3,691,119	11,507,536	352,734	1,486,032
1923	3,434,660	11,188,913	376,854	1,650,900

a. Reprinted from "Mineral Resources of the United States in 1928 (Preliminary Summary)", U. S. Bureau of Mines, 1929.

A detailed tabulation of raw clay sold by New Jersey producers in 1928 shows that the bulk of the clay sold is plastic fire-clay. This is used in the manufacture of white ware, tile, fire-brick, terra cotta, saggers, wads and many other products. It is obtained largely from the Woodbridge member of Raritan formation in pits scattered along the outcrop of that formation near Woodbridge, Perth Amboy, Sayreville, South River and Milltown. Most of the production of ball clay and stoneware clay also comes from the Raritan formation, but a little clay is produced from each of several younger formations in various, scattered localities.

RAW CLAY SOLD IN 1928 AND 1927

Kind of clay	No. of pits	Production—short tons 1928	1927	Value—dollars 1928	1927
Ball clay	5	11,377	5,901	74,073	33,083
Fire clay	35	212,514	251,205	963,609	1,134,143
Stoneware clay	6	13,082	12,406	61,390	55,298
Miscellaneous clay ..	7	23,769	42,898	34,776	48,048
Total	40	260,742	312,410	1,133,848	1,270,572

There were several changes during the year in the list of clay pit operators. The pit at Woodbridge formerly operated by R. N. & H. Valentine Company was reported as abandoned and the company in the hands of the receiver. The Philadelphia and Camden Fire Brick Company, Inc., of Camden, was also reported to be out of business. The Sayre and Fisher Land Company has apparently become a non-operating unit through the sale of its property to the Sayre and Fisher Brick Company of Sayreville. So far as known, no new pits were opened during the year.

BRICK AND TILE.

The brick and tile industry is closely related to the building industry and normally is prosperous in the same years. In spite of this fact the productions of brick and tile in New Jersey in 1928 showed a decline of 10.7 per cent in value as compared with the previous year, whereas construction activities were at their highest peak. In the brick industry, prices remained low, although they were somewhat more stable than in the previous year. Common red brick sold in New York at $12.00 to $13.00 per thousand. At that price only those operators who are advantageously situated with respect to their market and to transportation facilities could compete in the metropolitan district. Fortunately the market for bricks is a broad one and local demand is sufficient to absorb the output of many small plants. With competition from European producers still severe, there is little prospect of any real increase in prices unless Congress sees fit to place a heavy duty on the imported product. Meanwhile there is sure to be a "weeding out" of inefficient plants with a consequent reduction in local competition.

The reduction in sales of hollow building tile is believed to reflect a decreasing demand for new office buildings—particularly in the metropolitan district. The shortage in office space brought about by the enforced cessation of building activities in war times has not only been relieved, but there are indications that a surplus of office space now exists and that further building will only bring a reduction in office rents and the abandonment of older buildings, still in good condition, for newer ones with more modern facilities. So long as the public will pay the higher rents required for offices in new buildings,

new construction will continue, but there is good evidence pointing to the fact that the small portion of the public which can offord to pay top rents for new office space has already moved its quarters. In order to persuade additional elements of the public to move, office rents will have to be lowered and the income available for maintenance, interest on the investment, and profit, will be reduced proportionally until it is no longer profitable to build. Lest the picture just painted appear too dark, it should be added that in any large city the depreciation of old buildings will always provide a demand for some new buildings; and improvements in lighting, service facilities and office arrangement will augment that steady demand. The point we wish to make is that during the past years construction has exceeded this steady demand to such an extent that the balance between supply and demand has become top-heavy on the supply side. Until that balance is restored there is sure to be a slackening in the construction of new office buildings.

BRICK AND TILE PRODUCED IN 1928 AND 1927

Products	Plants operating in 1928	Quantity produced 1928	Quantity produced 1927	Value in dollars 1928	Value in dollars 1927	Quantity of stocks on hand Dec. 31. 1928	Quantity of stocks on hand Dec. 31. 1927
Common brick	22	340,154 M	356,860 M	3,681,065	4,125,754	63,279 M	54,889 M
Face brick and enameled Brick [a]	5	22,379 M	32,195 M	1,089,814	1,341,321	15,314 M	16,906 M
Fire clay products: (a) brick, etc. [b]	11	17,556 M	17,162 M	956,114	1,000,497	5,250 M	5,256 M
Fire clay products: (b) special shapes	4	5,475 M	4,879 M	239,627	231,243	1,526 M	1,340 M
Hollow building tile [c]	14	369,959 n. t.	412,025 n. t.	3,072,326	3,485,616	102,538 n. t.	69,950 n. t.
Floor tile	8	5,174,361 sq. ft.	5,180,725 sq. ft.	1,095,643	1,199,496	870,592 sq. ft.	1,268,823 sq. ft.
Ceramic mosiac	6	3,658,428 sq. ft.	4,068,485 sq. ft.	641,842	957,507	1,260,072 sq. ft.	1,463,361 sq. ft.
Enameled tile	3	1,121,926 sq. ft.	621,354 sq. ft.	620,385	404,720	357,039 sq. ft.	320,200 sq. ft.
Wall tile	7	7,695,327 sq. ft.	7,978,758 sq. ft.	2,319,620	2,653,158	975,351 sq. ft.	1,690,561 sq. ft.
Drain tile	3	1,004 n. t.		15,360		125 n. t.	
Miscellaneous	11			[d] 4,428,213	[e] 4,944,344		
Totals				18,160,009	20,343,656		

M—Thousands.
n. t.—Net ton of 2000 pounds.
[a]—Includes 3 plants which manufacture face brick and 2 which manufacture enameled brick.
[b]—Includes brick block or tile for locomotive and other fire-box lining, etc. (9 inch equivalent).
[c]—Includes 9 plants which manufacture partition, load bearing, furring, and book tile; and which manufacture floor-arch, silo, and Cornerib tile; conduits; radial chimney blocks; and fire-proofing tile.
[d]—Includes the value of terra cotta (6 plants); faience tile; (3 plants); glass-house tank blocks, melting pots, stoppers, floaters, and rings (1 plant); and other brick and tile products (1 plant).
[e]—Includes the value of terra cotta (6 plants); drain tile (2 plants); sewer pipe (1 plant); flue lining (1 plant); wall coping (1 plant); glass-house tank blocks, etc. (1 plant); chimney pipe and tops (1 plant); and other brick and tile products (2 plants).

POTTERY.

There was a time when New Jersey not only was a center for the manufacture of ceramic products, but it almost monopolized the picture east of Pittsburg. It still is a leading producer of sanitary ware and electrical porcelain and doubtless will so continue, but as new plants are built in other sections of the East, each will tend to restrict still further the market formerly dominated by New Jersey's pottery manufacturers. Competition, here too, is bound to cause the elimination of poorly-managed, inefficient plants, and the future is apt to see—not greatly increased production—but a steady lowering in the cost of operation of these plants which do survive, and the probable merger of small, weak units into corporations big enough to obtain the economies of large-scale production.

In 1928 the value of pottery produced in New Jersey declined 6.6 per cent from that in 1927, and the number of active plants decreased from 60 to 51.

POTTERY PRODUCED IN 1928 AND 1927

Products	Plants operating in 1928	Quantity—pieces 1928	Quantity—pieces 1927	Value in dollars 1928	Value in dollars 1927
Hotel china	6			1,564,001	1,770,213
Vitreous china plumbing fixtures:					
(a) Bathroom and toilet fixtures					
Closet bowls—Siphon jets	15	148,295	145,528	1,375,332	1,437,061
Washdowns	16	436,966	494,762	1,860,232	2,104,645
Reverse traps	13	71,272	87,230	420,543	424,444
Flush tanks—Lowdown (large and small)	15	384,028	393,124	2,183,975	2,201,885
All other	4	6,110		49,354	
Lavatories	8	161,639	182,949	2,154,080	2,468,886
Other bathroom and toilet fixtures including tubs	9			905,838	809,181
(b) All other fixtures including laundry tubs & Kitchen sinks.	6			375,219	376,492
Semi-vitreous or porcelain fixtures	14			3,996,547	4,793,569
Porcelain electrical supplies	16			3,893,711	3,838,772
Saggers	24			277,216	261,818
Red earthenware (flower pots, etc), stoneware, chemical stoneware and chemical porcelain	5			473,121	467,628
White ware and porcelain china [a]	6			972,622	1,076,481
Other pottery products [b]	9			717,478	689,646
Totals				21,219,269	22,729,721

a. Includes cream-color, white granite, semi-porcelain, and semi-vitreous porcelain ware; also porcelain china, bone china, delft and belleek ware.

b. Includes art pottery, gas and electric logs, and other pottery products.

GREENSAND MARL.

The productions of greensand marl increased about as much in 1928 as it had decreased in 1927. Sales amounted to 12,295 short tons, valued at $209,047. As in all recent years, most of the marl mined was treated and sold for use in water-softening apparatus, and a relatively small amount was sold in the crude state for use as fertilizer. There were no changes in the list of operators, the same pits being operated as in 1927 and 1926.

FELDSPAR (ground)

There is no production of crude feldspar in New Jersey, but several grinding mills have been located at Trenton in order to be near the large market provided by many potteries in and near the city. In 1928 these mills ground 24,085 tons of feldspar, valued at $459,507. The average value of the ground product—including imported feldspar—was therefore $19.08 per ton. Crude feldspar was produced in 12 states in 1928 but most of the domestic production came from North Carolina, New Hampshire and Maine. It sold at the quarries at an average price of $6.73 a ton.[1]

OTHER PRODUCTS.

Lime. Of the many lime plants formerly active in northern New Jersey, only two, that of the Peapack Limestone Products Company of Peapack, and that of the Hamburg Ridge Lime Company of Sparta, were operated in 1928. Each of these plants increased its production by several hundred tons, the net increase in the total for the State amounting to 16.3 per cent. All of the lime produced was sold for use on farms.

Portland Cement. Both the amount and the value of total shipments of Portland cement from plants in New Jersey were almost exactly the same as in 1927. Shipments decreased about one-sixth of one per cent., and the value of shipments increased by about one-quarter of one per cent.

The low price at which cement is now selling has forced the operating staff at every plant to seek ways of reducing the cost of production and of increasing revenue. As a means towards the latter end, the Vulcanite Portland Cement Company has developed a special cement called "Vulcanite Super Cement" which sells at a higher price than ordinary cement and sales of which have shown a promising increase since production began in October, 1927.

1. Production of feldspar in 1928; U. S. Dept. of Commerce press bulletin dated June 22, 1929.

The Edison Portland Cement Company has taken steps to cut the cost of production by modernizing some of its equipment. As one step in this program it has replaced the old steam hoist at its large limestone quarry near Oxford with a modern, electric hoist. This quarry is somewhat off the beaten track and probably few people realize that it has a larger production than any other limestone quarry in the State. The quarry itself is also large, its floor being several acres in extent. Quarry practice is somewhat similar to that at most of the large trap-rock quarries in this State. The face of the quarry is kept as nearly vertical as possible, and from 100 to 160 feet high. Deep blast holes are drilled in back of the face by portable churn drills and enough rock is broken in one "shot" to keep the loading shovels busy until another section of the quarry face has been blasted down. The quarry face is long enough so that blasting in one section does not seriously interfere with work in the rest of the quarry. The broken rock is loaded by several power shovels into skips on the quarry floor. A crane with a long boom then hoists the skips vertically, swings around and deposits them on railroad flat-cars ready for shipment.

The quarry is located in a triangular belt of Franklin limestone which extends from a point half a mile southeast of Oxford Church (Hazen, P. O.) to a point half a mile east of Butzville, the long side of the triangle joining the points mentioned, and the shorter sides curving around to the southeast. The Edison Company uses only that part of the limestone which is relatively pure; consequently a considerable amount of waste rock is dumped daily on the hill slope east of the quarry. This dump is one of the best places in the State to search for minerals, a brief search at the time of a recent visit yielding the following species: calcite, serpentine, quartz, tremolite, pyrite, chalcopyrite, sphalerite, graphite, hornblende, biotite, dolomite and possibly ankerite. This same limestone can be seen just a quarter of a mile south of Butzville where it underlies the glacial drift in a road cut made for the State Highway which joins Butzville and Oxford. The contact between the limestone(of Pre-Cambrian age) and the over-lying basal Paleozoic rocks is also well exposed in this cut. The so-called Hardyston quartzite (basal Paleozoic sediment) is here an arkosic sandstone and rests on the limestone along a depositional contact. sandstone and rests on the limestone along a depositional contact. However, the sandstone beds, which were approximately horizontal when originally deposited, now dip to the northwest at an angle of 29 degrees. The underlying limestone was of course tilted or folded in the same manner as the sandstone, but metamorphism and consequent crystallization of the limestone previous to the deposition of the quartzite, have obscured the original bedding to such an extent that the attitude of the beds, both in relation to the sandstone when originally deposited, and at the present time, cannot be determined.

Quartz Sand. In 1928, six firms reported a production of ground sand, part or all of which same from New Jersey. Three of these firms used sand from their own pits which is not included in the tabulated statistics of sand and gravel and the amount and value of which is therefore included under this heading.

There seems to be a steady demand for pulverized sand of good quality. Most of the New Jersey sand being used is white as snow after crushing and practically all of it will analyze 98 per cent silica (SiO_2), or better. It is used chiefly as a filler in such products as scouring soaps, talcum powders, asphalt and roofing products, paints and metal polish. In 1928 the total production of ground sand from the mills located in New Jersey amounted to 84,786 tons, and its value was $403,813.

The Pennsylvania Pulverizing Company has recently built a new grinding plant at Toms River to replace the one at Williamstown Junction which was destroyed by fire on November 21, 1928. The new plant is of fire-proof construction throughout and is located beside the Toms River Branch of the Pennsylvania Railroad and the new sand plant built by the Walter C. Smith Mineral Products Company of 320 Broadway, New York City.

The method of preparing and storing the sand is typical of all modern sand-pulverizing plants. Washed sand from the new sand plant is carried by a long belt conveyor to four circular concrete bins which are 40 feet high and greatly resemble silos. Other belt conveyors take the damp sand from a pit at the bottom of each bin to a drying shed where it passes down through closely-spaced, steam-heated pipes and the moisture is evaporated. It then falls on another belt conveyor, and is lifted by a bucket elevator to the top of two circular concrete bins provided for dry storage. These bins are 60 feet high. From the dry bins the sand is drawn as needed to an adjacent fire-proof building where it is ground to a fineness of 75 to 300 mesh in large ball mills. The estimated capacity of the pulverizing plant is 16 tons of ground sand a day. All conveyors and machines are driven by electric motors.

Before any building was done—in fact, before the property on which the buildings now stand was purchased—the tonnage of clean, white sand available at this site was determined by sinking numerous test bore-holes. From a study of the information gained in that way, it was estimated that there are at least 2,500,000 tons of white sand underlying the 370 acres of land which were eventually purchased. The maximum thickness of white sand found was in test bore-hole No. 46. The log of that hole follows:

Dirty white sand	2 ft.
Yellow sand and gravel	6
Yellow sand	1
White sand	40

A more typical section is that at the point near the cleaning plant where a big hole was dug to make a pond for the company's dredge. At this point the section is:

White sand with roots	2 ft.
Gravel	1
White and yellow cross-bedded sand	12
(Water level)	
White sand (full thickness determined by borehole)	15
Gravel	4

A few feet of clay was encountered in some of the bore-holes, but not enough to be of any value. The records of the bore-holes also show that only a few feet of cover will have to be stripped in order to expose the white sand.

Washed sand of a grade suitable for glass-making or pulverizing is prepared as follows.[1] Sand from the pit is sucked from below water level by a dredge and pumped to the cleaning house where it is screened and delivered to two sets of quadruple-screw washers. Each of the latter consists of four helical screws revolving in inclined troughs and arranged in series so that each screw feeds to the next. All sand therefore goes through four single-screw washers before it is delivered to the belt conveyor which carries it to the damp bins.

In the latter part of May, 1929, the writer was informed that still another pulverizing plant was being built by the Standard Silica Company at Dennisville, Cape May County.

Talcose rock. Ordinarily a small amount of talc is produced each year from the Lizzie Clay quarry of the Rock Products Company, the talc being associated with the serpentine which that company also quarries. In 1928, however, only the latter rock was produced—hence the decline of 100 per cent in the production of talc as shown in the table on page. . . .

Graphite. For the first time in a good many years, we can include in this State's mineral production the value of graphite produced from a New Jersey mine and sold in the open market in competition with graphite from other sources. In a previous report[2] the operations of the Annandale Graphite Corporation were briefly described. In 1928 no additional ore was mined by this company, but many thousands of pounds of graphite obtained from work in previous years was sold. Experimental work was continued by the resident staff at Annandale in an effort to discover the most economical and efficient method of milling the ore.

1. This plant has been enlarged since it was first visited and important changes have been made in the method of preparing the sand for shipment.

2. Johnson, Meredith E., The Mineral Industry of New Jersey for 1927: Bulletin 32, Geological Series, Dept. of Conservation and Development, State of New Jersey, pp. 17 and 18, 1929.

Non-clay refractories and refactory cements. Many of the refractory products used for furnace, open hearth and reverberatory linings, etc., and made in New Jersey, contain little or no clay. These substances—such as alumina, silicon-carbide and magnesia refractories—and also refractory cements made of clay or other material, being neither brick (clay), tile nor pottery, are grouped together under this heading. Most of the output of such substances is used in the metallurgical and ceramic industries and we would therefore expect production to fluctuate with the tide of business in those industries. We have already noted that the ceramic industries in 1928 had a smaller output than in the preceding year, but on the other hand the metallurigical industries had a banner year. The decline of 16.4 per cent in the value of these refractory materials must therefore be due in part to causes unassociated with market supply and demand.

By-product Coke. The outstanding event in this division of the mineral industry in 1928 was the construction of a new by-product coke plant at Piscataway, on Raritan River just below New Brunswick.[1] The plant was built by the International Combustion Engineering Corporation and is the first one in this country designed to produce coke by the low-temperature distillation of coal. The object in reducing the temperature at which coking takes place is to produce a greater proportion of the valuable coal tar products. Coke and gas are produced just as in other plants. The coke is said to be greatly superior (for domestic use) to that produced by the high-temperature distillation of coal because it contains a small percentage of hydrocarbons and will therefore burn much more readily. Also, it is said to be practically smokeless and the ash content is said to be lower than in anthracite. Because of these advantages it is believed the coke can readily be sold to domestic consumers in competition with other house-heating fuels. The gas which is produced is sold to the Public Service Corporation of New Jersey.

The plant has been designed to use about 600 tons daily of bituminous coal. Because of its location on a navigable part of the Raritan River, this coal can be unloaded directly from boats receiving their cargoes at tidewater shipping points, thus minimizing freight charges. Water shipments of coke will be similarly benefited by low freight rates. The estimated daily yield of the plant is 300 to 400 tons of domestic coke, 4,000,000 cubic feet of gas, 15,000 gallons of coal tar, and 1,800 gallons of light oil.

Both the amount and value of the combined production of coke from the plants of the Camden Coke Company and the Seaboard By-Products Coke Company declined slightly from similar totals for

1. These notes are taken from an article by William Wight in the February, 1929, issue of the Journal of Industry and Finance, published in Somerville, N. J. For further information about this plant the reader is referred to that article.

1927. Production declined 0.3 per cent and total value 4.8 per cent, the inference being that prices had to be lowered in order to secure about the same volume of business as in 1927.

PROSPECTING FOR OIL.

In spite of repeated warnings of the absence of favorable indications of oil in New Jersey, the perennial search goes on. The Department has learned that in 1927 a "wildcat" was drilled in West Orange, but that the backer of the project became faint-hearted after the well had been drilled some 200 feet and the well was therefore abandoned at that depth.

In the latter part of June, 1929, the New York Herald-Tribune published a story to the effect that a garageman had discovered oil while excavating for the installation of a gasoline tank in Kenvil. According to this journalistic account, he was so convinced that he had discovered a genuine oil seep that he was preparing to sink a well to tap the golden stream. Subsequently inquiry revealed that either the story was somewhat misleading, or else the garageman changed his mind subsequent to the appearance of the story, for nothing further was done about the discovery.

Work on the well of W and K Oil Company at Jackson Mills has continued with few interruptions. This well is the deepest in the State and an accurate log of the formations passed through would be of inestimable value in throwing light on the sub-surface geology of the coastal plain. Recently it was reported that the company had succeeded in clearing the hole of the collapsed casing which for many months blocked all progress, but before drilling can be continued it will be necessary to remove the tools which were lost in the bottom of the hole previous to the collapse of the casing. Since the hole is said to be over 5,000 feet deep and since it is extremely difficult to work with fishing tools at such great depths, progress will doubtless be slow.

Recently several deep wells drilled in Philadelphia and not listed in Bulletin 32 of this same series have been called to the attention of the writer. One of these was drilled for the Philadelphia Rapid Transit Company at Thirteenth and Mt. Vernon Streets to a depth of 2,043 feet. Another at Ritner and Swanson Streets was sunk to a depth of over 1,800 feet. Both yielded large quantities of water when pumped, but neither well found any trace of oil.

NEW DEVELOPMENTS.

Fuller's earth. In the latter part of 1928 the writer visited a peat deposit owned by J. G. Marcrum of Netcong and located about one mile north of Lake Musconetcong. The interesting feature of this deposit is that it is underlain by a lacustrine deposit of very fine-

grained, silicious material which exhibits the characteristic property of fuller's earth—namely, the ability to de-colorize mineral and vegetable oils. Tests made by Mr. Marcrum show that the material has a very good bleaching action, but that filtration takes longer than with some of the standard earths now in general use.

Sand flint. Numerous inquiries have been received during the past year relative to deposits of "silica sand"—sand suitable for the manufacture of glass, or for pulverizing. These inquiries reflect a growing production of sand for use in manufacturing processes. Recently the Tavern Rock Sand Company, a subsidiary of the Owens-Illinois Glass Company built a large, new, sand-cleaning mill at Menantico, Cumberland County. The feature of the mill is a number of viberating riffle tables, by means of which sand is produced which will analyze better than 99.5 per cent silica. [1] Since the mill is capable of supplying a much larger tonnage of washed and concentrated quartz sand than is needed at the parent company's glass plant in Millville, an arrangment was made whereby the Eureka Flint and Spar Company of Trenton was given the exclusive right to sell this sand to the ceramic trade, and in return the latter company built a new pulverizing mill adjacent to the plant of the Tavern Rock Sand Company. In the past, most of the flint used in the manufacture of pottery in New Jersey has come from France or from consolidated beds of sandstone and quartzite in West Virginia and Pennsylvania; but it is reported that many car-loads of this pulverized sand—known as sand flint in the industry— have already been sold in competition with these older products and that results fully justified the claims made for it.

Clay. The clay beds of New Jersey have been the subject of many studies and the location, thickness and real extent of all important deposits is now well known. Numerous reports, both State,[2] and private, have dealt with them exhaustively, and their chemical composition and many of their physicial characteristics have been determined and the results published. Yet there is still opportunity for further useful, and profitable study. What do we know of the colloidal properties of our clays? How can they be separated or prepared, mechanically or chemically, so as to give us new substances with different qualities, suitable for different industrial uses?

In recent months the request of the New Jersey manufacturer of clay-coated products for information relative to domestic supplies of high-grade clay suitable for paper coating, brought out the fact that all such clay, used in New Jersey, is imported from other states or from

1. New Jersey Sand Flint Wins Recognition in Ceramics; The Ceramic Age, Vol. 14, No. 3, pp. 115-116, Sept., 1929.

2. Clay Deposits, Geol. Survey New Jersey, 1878, and The Clays and Clay Industry of New Jersey, Vol. VI of the Final Reports, Geol. Survey New Jersey, 1904.

foreign countries. In 1927 the value of foreign imports of high-grade clay alone amounted to nearly $3,000,000. Surely the opportunity of capturing an annual business of that amount is worthy of thought and research.

Miscellaneous. The continued growth of New Jersey's population and industries is warrant enough for the belief that there will be further development of its mineral resources; but if additional evidence for such a belief were needed we might cite some of the many inquiries received by this Department. Each year we are asked to answer dozens of letters asking about the location, extent or quality of various mineral substances. Most numerous during the past year, perhaps, were inquiries as to the location of sand deposits of a quality suitable for use as "silica sand". Many other inquiries related to gravel deposits, and perhaps as many to greensand marl. Two or three requests were received for information about the quality and amount of feldspar occurring in New Jersey, and whether it could be found in sufficient concentration to warrant an attempt to mine it. Other inquiries referred to clay deposits, zinc, mica, bog iron ore, manganese, barite, talc, slate, limestone, trap rock and petroleum. Many of these letters undoubtedly were written only to satisfy an academic curiosity concerning some specific question; but just as surely others represented the preliminary step in the development of heretofore untouched mineral deposits.