"The Marble Industry in New York State"

Mine and Quarry

Vol. 1, No. 4, February 1907, pp. 95-101

The article begins:

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is presented on the Stone Quarries and Beyond web site.
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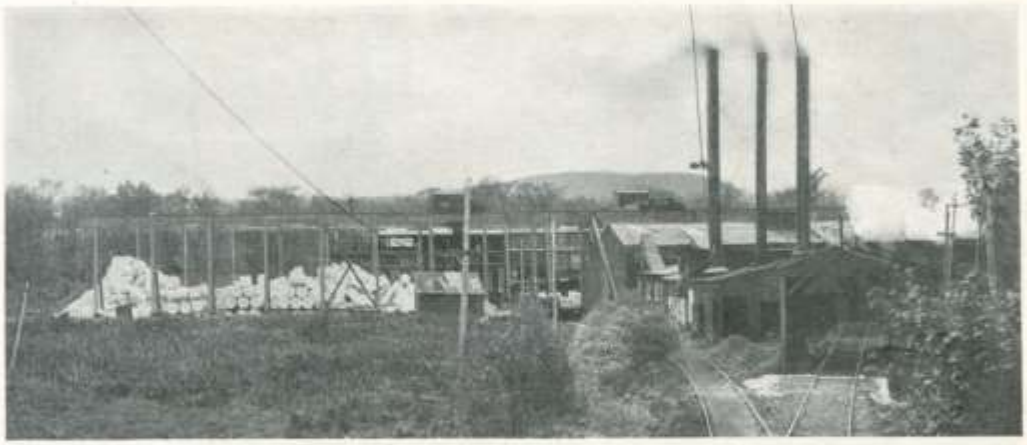
August 2015

THE MARBLE INDUSTRY IN NEW YORK STATE.



Mill and Craneway, South Dover Marble Co., Wingdale, N. Y.

Marble suitable for building and monumental purposes occurs in New York state in two principal localities,—in Dutchess and Westchester Counties in the southeastern portion, and in St. Lawrence county in the northern part of the state.

The South Dover Marble Co., with quarries at South Dover, is the largest single producer in the state, and its methods of operation are typical of the quarries in the southeastern field. South Dover is in Dutchess County, close to the Connecticut line, and 70 miles northeast of New York City. Wingdale, three miles distant, is the railroad station, on the Harlem branch of the New York Central lines. The Company's mills and finishing works are here and are connected with the quarries by a private trolley line.

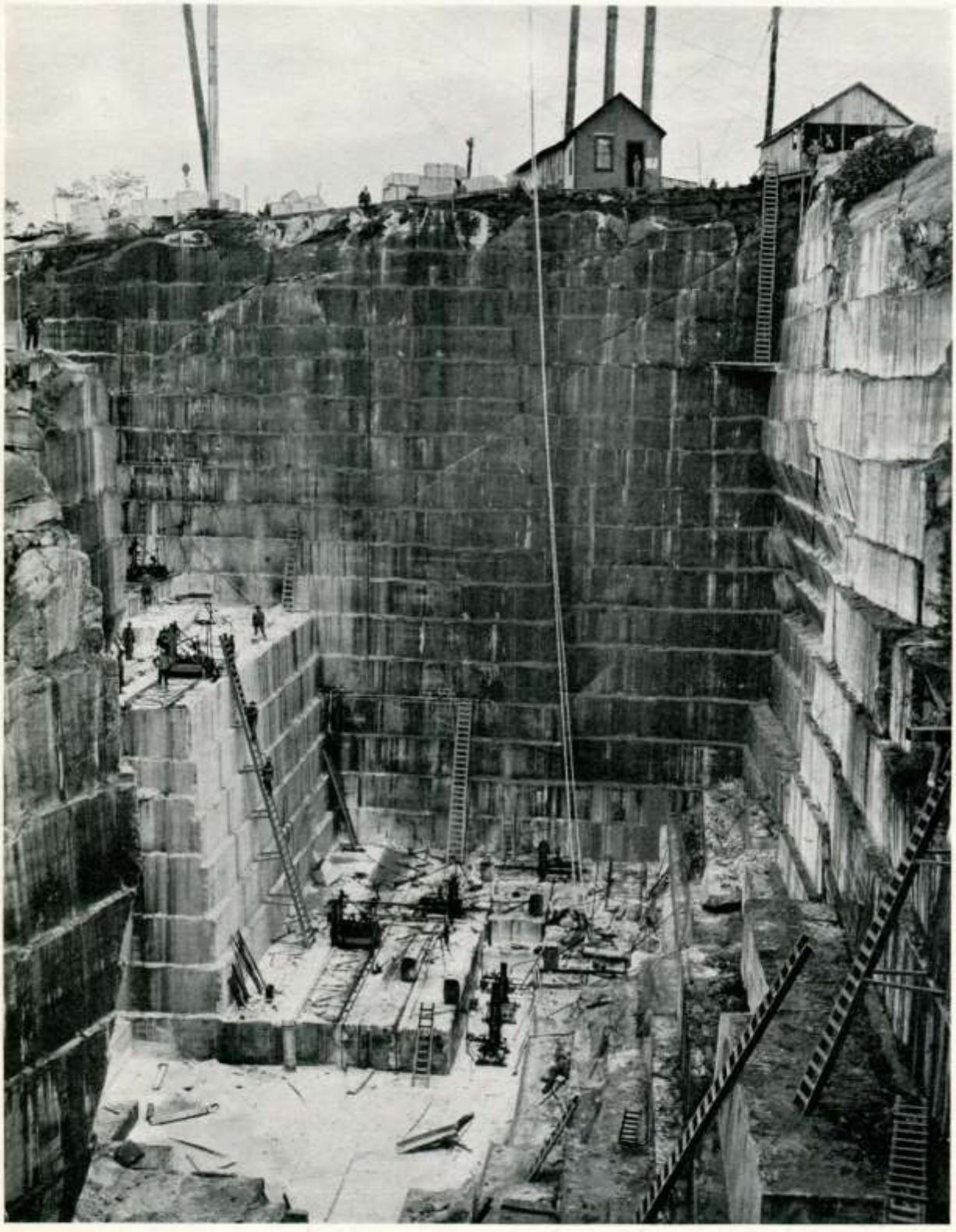
The quarries were opened more than 100 years ago, to work the deposits of dolomite which there occur to great depth. Owing to their inaccessibility, however, they were not fitted and worked with modern machinery until some 12 years since. At this time the electric freight railroad referred to was installed. When first opened the marble was all hauled by teams over the mountains to Poughkeepsie, 25 miles away, and shipped from there by water. The beds slope gently to the east, and are very regular and free from veins, fissures or intrusions of other rocks, a fact which permits solid blocks of pure marble of very large dimensions to be removed for columns and similar purposes. The illustration on page 97 shows a block 29 feet long, weighing 40 tons, being lifted from the quarry. This formed one of 64 monolithic columns, ranging in length from 21 feet to 29 feet ten inches, furnished by this quarry two years ago for the Tiffany Building in New York City.

The quarry opening is about 200 feet long and ranges from 50 to 140 feet in width.

The view on page 96 is from the north side of the quarry, looking south. At this end of the quarry the stone is all of the "White South Dover" variety. In the north end, partly shown on page 98 a popular colored marble is found.

Stone has been excavated to a depth of about 120 feet from the higher side of the hill, and 86 feet from the lower. The marble is excavated by means of Sullivan Class 6½ direct-acting stone channeling machines, of which nine are now in use. One or two other machines

(photo caption) "Mill and craneway, South Dover Marble Co., Wingdale, New York." (pp. 95)



The South Dover Marble Co. General view of quarry, showing Sullivan Channelers and Gadders at work.

(photo caption) "The South Dover Marble Co. General view of quarry, showing Sulliva Channelers and Gadders at work." (pp. 96)

are used in clearing away the less valuable surface stone. The Sullivan machines are of the single cutter type, steam driven, except two, recently installed, which are fitted with the double cutting heads which have been found so satisfactory in the Georgia marble quarries. These machines cut much more rapidly than the regular channelers, and the management is greatly pleased with their performance.

For channeling this rock, the ordinary five-piece gang bit is employed, in which the steels are set with their cutting edges alternately at right angles and diagonally with the cut. The floors, or lifts, are usually six feet in thickness, although seven and eight-foot cuts are sometimes made. Practically all the cuts are vertical, and are made with an offset of about one foot at the end of each lift. The deposits come to the surface for practically their entire width, so that little stripping is necessary, and angle wall cuts or "tunneling" are seldom employed. The photographs show clearly the method of excavating the stone. The blocks are channeled on three sides, and raised by means of gad holes, and plugs and feathers. The channel cuts usually run the length of the quarry floor. When one cut is finished the position of the machine on the track is reversed, and a parallel cut made, giving a width of six feet five inches between centers. The length and thickness of the blocks depend on the work for which they are to be used. The channelers cut from 35 to 50 square feet per day of ten hours, although the double-head machines customarily channel 40 to 50 per cent. more than this.

Channeler runners are paid 25 cents per hour, with a premium of seven cents per foot (five to the runner and two to the helper) for each foot cut over the minimum of 180 feet per week. A foot of wall cutting counts as one and one-half feet; a foot of angle cutting as one and three-fourths feet and a foot of corner or transverse cutting counts as two feet.

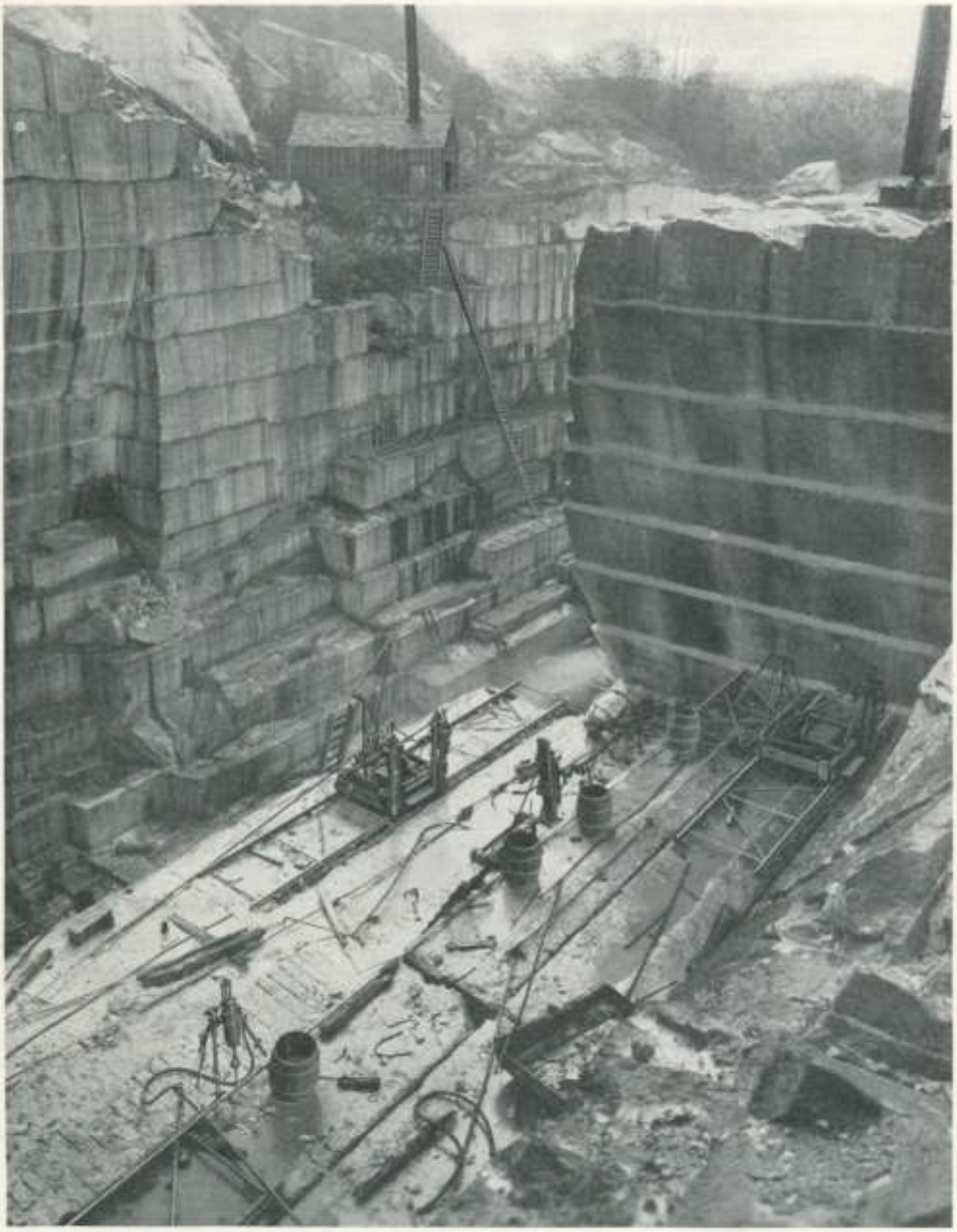
In addition to the channelers, the equipment in the quarries includes a number of Sullivan rock drills, mounted on tripods, gadders and quarry bars.

The blocks of stone are lifted to the surface by four derricks, with a capacity of 10, 20, 30 and 50 tons respectively. Power for the derricks, drills and channelers is supplied by a 400-horse-power boiler at the quarry. The derricks place the stone directly upon cars which transport it over the company's trolley line to the mill. There is also a cableway of 650-foot span, with a lifting power of eight tons. Thus no time and power are wasted in handling the stone.

The views on pages 95 and 100 show the mill buildings, craneway, etc., all of which are thoroughly modern and well equipped. The mill contains six gangs of saws, two rubbing beds, a diamond circular saw and a rotary column-cutting machine with diamond pointed teeth, which cuts columns out of the rough blocks up to three feet 11 inches in diameter. The turning lathes include one for work up to 20 feet in length, and six feet ten inches in diameter, and one

Hoisting a 40-ton block of marble from the South Dover quarry.

(photo caption) "Hoisting a 40-ton block of marble from the South Dover quarry.



The north end of the South Dover quarries. A Sullivan Double Head Channeler is in the center.

(photo caption) "The north end of the South Dover quarries. A Sullivan double head channeler is in the center. (pp. 98)

with a 30-foot bed and a capacity for turning columns 11 feet in diameter. This is the largest marble lathe in the United States.

The cut on page 100 illustrates the 380-foot craneway, with a span of 72 feet, and the electric traveling cranes, of 50 and 30-ton capacity. In the cutting shed there is a six-ton crane with a run of 250 feet. The equipment of hand cranes, hoists, finishing tools, et cetera, is very complete. Power is supplied by two electric generators of 400 horse-power, which are driven by Corliss engines. A third Corliss engine drives the line shaft for the gang saws. There is also an air compressor, which supplies the finishing tools, et cetera. The boiler plant is rated at 650 horse-power.

The company employs about 160 men, and reports a rapidly increasing demand for its various grades of marble.

South Dover stone has been employed for building purposes in all parts of the country, particularly on work requiring large slabs or columns, as mentioned above. It is largely used for interior decoration, but stands weather so well that it has been employed more extensively for outside work. Among the buildings in which this marble has been used during the last few years, are the Tiffany Building, New York, McKim, Mead & White, Architects; the Blair Building, corner of Broad St. and Exchange Place, Carrere and Hastings, Architects; Mutual Life Insurance Building, of Newark, N. J.; New Stock Exchange (interior), Geo. B. Post, Architect, New York City; The House Office Building, and the Municipal Building, in Washington; The Cleveland Trust Co., Cleveland, Ohio; Essex County Court House, Newark, N.J., Cass Gilbert, Architect, and public buildings in large numbers in New York, Brooklyn, New Jersey, and elsewhere.

The main offices of the company are at 5 and 7 East 42nd St., New York. Mr. P. B. Parker is President, Mr. G. N. Williams, vice-president, Mr. B. A. Williams, treasurer, Mr. A. D. Williams, secretary, and Mr. J. B. Gillie, manager. We are indebted to Mr. Parker and Mr. Gillie for the information contained in this description.

At Tuckahoe, in Westchester County, just outside of New York City, the marble deposits are worked by the Waverly Marble Co. This marble is also used principally for building purposes. The company's equipment includes four Sullivan, Class "Z" swivel head single gang channelers.

ST. LAWRENCE COUNTY FIELD.

The other principal marble district in New York State is in the extreme northern part, in St. Lawrence County, centering about the village of Gouverneur. The crystallized limestone is plentiful in this region, lying on gneiss and, in some places, beneath sandstone. The stone is chiefly used for monumental purposes, and only the gray marble, which occurs irregularly, in some places in beds 30 feet thick, in others only in patches, has value for this purpose. When polished, this stone resembles gray granite and resists the weather well. The poorer grades, containing lighter shades and white streaks, are used somewhat for building.

The companies now active are the St. Lawrence Marble Quarries; Gouverneur Marble Co.; White Crystal Marble Co.; Watertown Marble Co.; Northern New York Marble Co.; D. J. Whitney Marble Co.; Rylstone Marble Co.; and Extra Dark Marble Co. These companies all have mills of varying size adjoining their quarries, except the Watertown Co., whose finishing works are at Watertown.

The quarries are all on the outcrop, and range from 20 to 50 feet in depth. The Whitney and Northern New York quarries are over an acre each in extent. They are practically vertical, and employ the same methods of quarrying their stone as the South Dover Marble Co., described in the first part of this article.

In opening up a new quarry, the out-

crop is cleared of broken stone and earth, and a water sump is made at the lowest point of the ground to be worked, with rock drills and dynamite. A crane is set up at the edge of the sump, and the ground is leveled off for channeling. The machines used are the Sullivan Class 6½, with five-piece gang steel and swivel head, capable of cutting at any angle. Steam is supplied by the mill boilers, through pipe, with flexible joints, which permit the channelers to move freely back and forth on their track, usually 30 feet in length. The accompanying cut shows one of these machines. The White Crystal Marble Co. also employs a Sullivan Class Y channeler, with rigid head, which carries its own boiler. These machines have a feed engine, which propels them along the track at a speed adjusted to the hardness of the cutting. The engine reverse lever is attached to a long rod which is close to the rail and parallel with it. When the machine reaches the end of the track, this rod strikes a dog fastened to the rail, thus reversing the channeler automatically. The Class 6½ channelers cut from 30 to 60 square feet per ten-hour day, and work to a depth of six feet. The Gouverneur Marble Co. still employs one or two of the old style Sullivan Diamond Channelers, which preceded the direct acting steel type. The high price of diamonds has caused the general abandonment of this machine, which is otherwise efficient and economical of stone.

In opening a new quarry, after the sump is cut out and the derrick set up, as described above, two parallel channel cuts are made, usually 60 feet apart, and at right angles to the sump, rising from

The craneway and finishing works, South Dover Marble Co.

(photo caption) "The craneway and finishing works, South Dover Marble Co." (pp. 100)

it, so that the cuttings and water will drain into the sump and prevent the formation of a mud cushion under the channeler bits. Cross cuts are now put in 4 feet 8 inches apart, and the key block pulled. This is located under the swing of the derrick if possible. It is channeled on all four sides, and is lifted by means of an eye bolt wedged into a drill hole in the center. The block is freed from the bottom by wedges driven into the channel cut on one side. When this block is removed, the second is taken out by "plugs and feathers." A Sullivan steel gadder is then put to work in the opening, and drills horizontal holes with centers 1½ inches above the floor, if the blocks are to be removed solid (4 ft. 4 in. square x 6 ft. deep) for building purposes; if the stone is to be used for ornamental work, the gadder frame is set at the same angle as the vein of valuable marble, and holes drilled along its edge to separate it from the worthless stone. The view on page 96 shows several of these machines at work. "Plug and feather" wedges placed in the gad holes are used to split the stone.

Acknowledgment is tendered to the *Engineering and Mining Journal* for a portion of the information contained in the above paragraphs.

Sullivan Class 6½ Single Gang Marble Channeler.

(photo caption) Sullivan Class 6 ½ Single Gang Marble Channeler." (pp. 101)