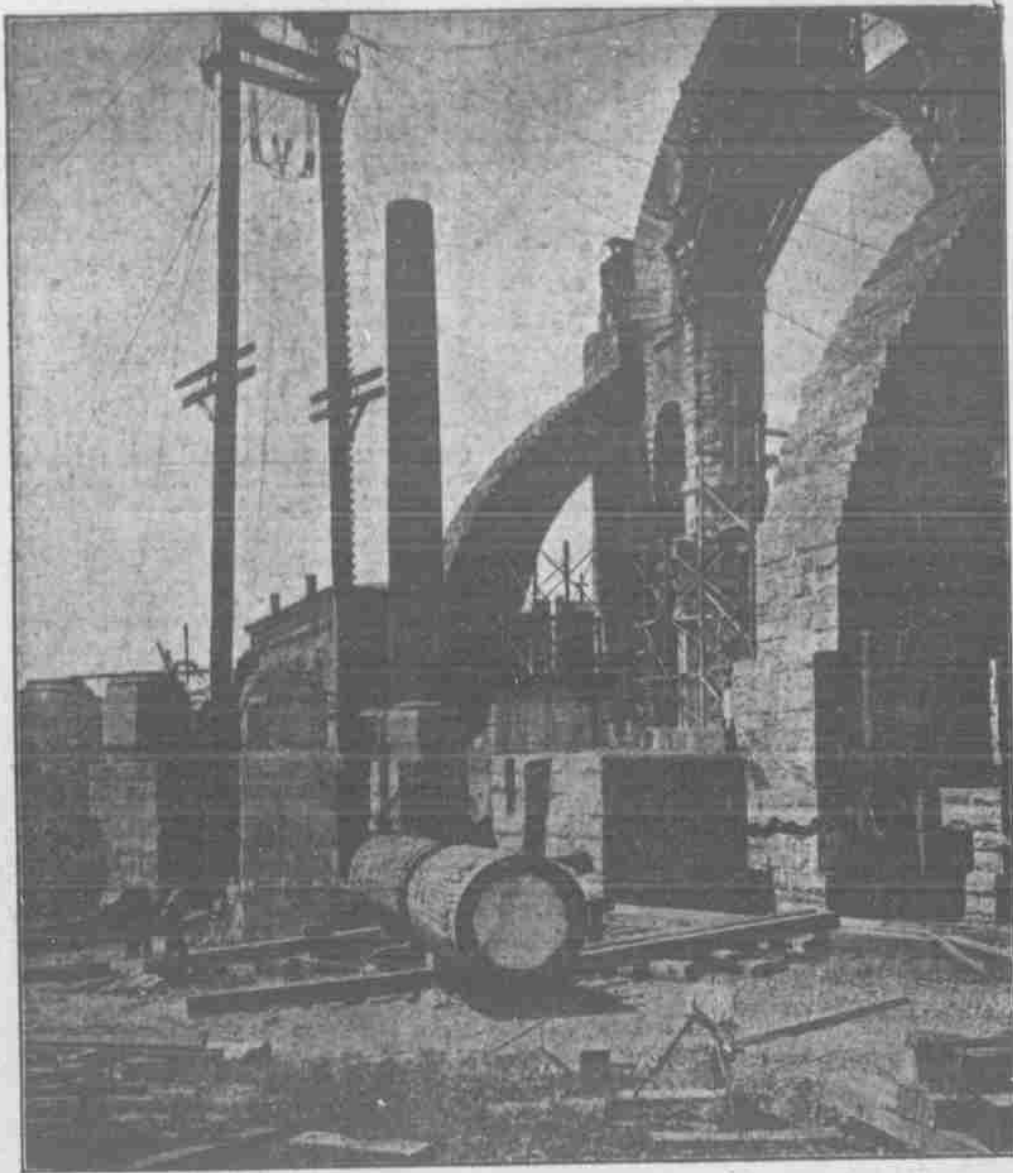


Setting America's Largest Columns



A COLUMN SET AND THE BIG HALF OF ANOTHER IN POSITION FOR HOISTING—NOTICE HOW THE COLUMN IS DWARFED BY ITS SURROUNDINGS.

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NO END of trouble has been caused to all concerned by the eight largest columns in America, which are destined to form the choir of the Cathedral of St. John the Divine, New York, the largest religious edifice to be started since the middle ages, when thousands of zealots worked their lives away rearing Europe's famous cathedrals.

The period of trouble and anxiety stretches over six years, from the time these enormous blocks began to be quarried down Maine way to the present day, when they are being set on foundations in every way worthy of them. These foundations of granite are eight feet square, stand twenty-six feet above the surface and go down seventy feet to a rock ledge. It may be truthfully said of these columns that they have the eternal rock itself for foundation.

Anything short of such a foundation would scarcely do. The lower half of each column, placed in front of the average three-story suburban house, would overtop it; it is thirty-eight feet long and its weight is the staggering one of 130,000 pounds, or ninety tons. In addition six of them are capped by an extension sixteen feet long, with a weight of forty tons, while two support stones two feet longer and weighing four tons more. These caps, which are extremely "hefty" in themselves, were quarried as parts of the bases, for it was the original intention to have monoliths instead of columns. But it was found impossible to turn so big a block in the great lathes, which was especially constructed for the work of polishing the monoliths and represents the last step in such machinery. Three of the monoliths while in the lathe broke from the twisting strain due to turning, despite all that human agency could do. Then the contractors and the cathedral authorities, surrendering to the inevitable and sinking their disappointment, cut all the monoliths in two where the three had broken off while being turned. Of course, the monoliths could have been saved had they been polished by hand, but that would have taken years, and the cost would have been something enormous. So the monoliths were out of the question.

This was just one of the troubles incident to the securing of the great columns, each of which weighs 130 tons, or 260,000 pounds. Placed side by side along the curb of a New York street they would completely hide from view two four-story and basement brown stone front houses, for each column is fifty-four feet long and six feet in diameter.

Yet these mammoth columns are being set with an ease that is astounding to the layman. The big half of the first column to be set was lowered into position in an hour and forty minutes, while the cap was raised and set in a few minutes, and only six men, under W. F. Howland, the veteran stone setter, who is known all over the country by men similarly engaged,

are employed on the work.

The setting of these stones and the preparatory work are by no means the least interesting features in the history of the columns.

Straddling a foundation is a derrick of the trunks of two Oregon firs, each ninety-six feet long and twenty inches through at the top. Mr. Howland spent two weeks selecting these logs and in choosing them he gave no other test than that of sight.

"How did you know merely by looking at them that they would support such a great weight?" he was asked.

"Well," he replied, "I've been setting stone a good many years and I've learned to size up a piece of timber by what weight it will stand."

After the derrick is placed and the cables properly strung—a matter of a week's steady work—cribbing is laid to one of the big stones and a track of equally heavy timber to the base of the foundation. This track is heavily soaped and then the stone is rolled upon the cribbing and over it on to the track by means of what riggers term par buckling, its butt resting on a shoe that has a tenon fitting into a groove in the track, so that there will be no danger of the shoe leaving the track.

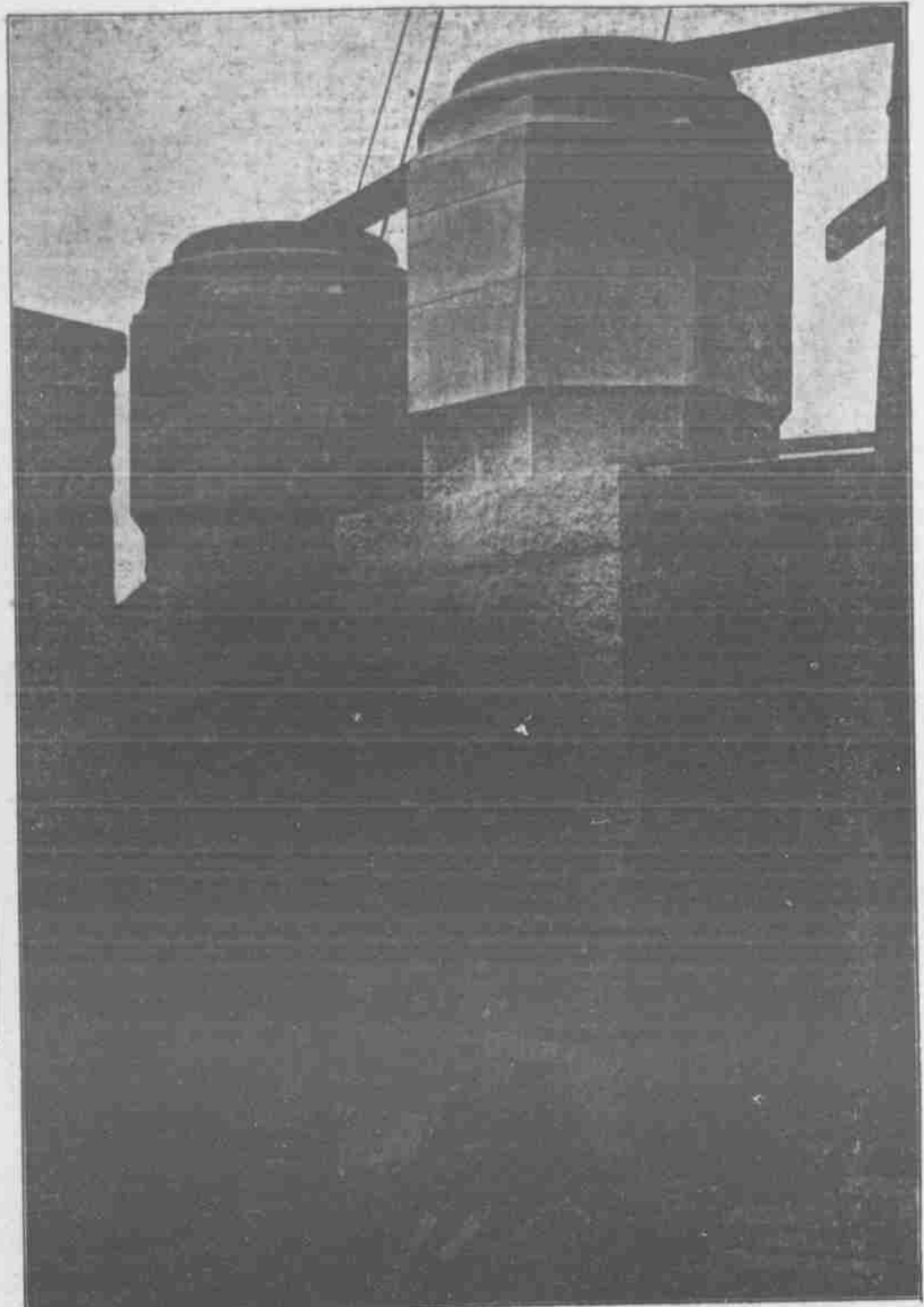
On the end of each of these big stones is a projection of several inches, on which great wooden clamps are set. This gives a shoulder to lift against, for the cables are fastened around the clamp and the shoe put under the butt so that nothing will touch the polished surface, which would be marred by the slightest contact with a cable.

When the stone is in this position its wooden casing is stripped off—15,000 feet of lumber were required to encase the sixteen stones—and it is slid upward along the soaped track to the base of the foundation. Then it is all ready to be lifted.

Two engines are used in this task, and their combined horse-power is increased in effect to 300 by doubling the cables attached to the stone. While the end is hoisted up the butt is kept steady by means of a winch, holes being drilled in the butt for the insertion of hooks on which to fasten cables. Then as the stone swings upward the winch gives and takes, as necessity requires, until the stone is poised about two feet directly above the foundation. It took just ten minutes to get the first monolith into this position.

While the stone is thus poised in mid air the base is given a thick coat of cement and sheet lead, about twenty-five pounds of the latter being used to even the joint. Last thing of all it is eased into position by lowering off on the winch, a matter of a few minutes work.

The small stones are set in practically the same method, except that they have no projection at the end, and so what are known as Lewis irons, instead of the wooden clamp, are used in lifting them. These irons fit into a hole that is larger at the bottom than at the opening. They consist of three pieces of the width of the hole's bottom. The outside pieces are



MAMMOTH BASES FOR THE BIG COLUMNS.

put in the hole first, then the middle one, and the greater the pull the more secure the irons in the hole.

But while very little time is consumed in the actual work of setting a column, the preparatory work seemingly stretches out interminably. Six weeks were spent in preparation for hoisting the first column to be set, and the men worked steadily every work day. In view of this circumstance, Mr. Howland thinks he will be lucky if he finishes the job before cold weather sets in.

So far no untoward event has interfered with the setting, but when Mr. Howland hauled the columns to the cathedral grounds he had trouble enough.

They brought them from the quarries to within two miles of their destination by water; no railroad could have carried them. As Mr. Howland naively puts it, "they'd have demoralized the roadbed." The machinery was ripped out of a ferry boat, two of the small stones were placed in the hold for ballast, two large ones were rolled from the water front on to the deck and shored up, and so they were towed to New York.

Here they were rolled out upon the pier, which had been strengthened, and then Mr. Howland undertook to transport them to their destination upon a wagon specially built for the purpose. It weighs 135 tons. Its hind and front axles are eight and six inches in diameter, respectively. The steel tires are twenty inches wide and are of two thicknesses. The wheels are of blocks of wood with the end grain on the axle, to get the greatest strength. The length is forty feet, and four months and about \$3,000 were required to build it.

But while the wagon eventually got the stones to the cathedral grounds, a 180 horse-power engine hauling it by means of purchase blocks, there were times when it looked as if they would prove too much for their conveyance.

Once one wheel was sunk by the great weight two feet below the street level, and a half day was spent in jacking it up. The steel tires were frayed and torn as if they had been pieces of cardboard, and several thousand feet of three-inch planking, laid in the cathedral grounds for a roadway, were reduced to kindling wood by one stone passing over it, a new roadway being necessary for each block.

As for the two miles of street over which the stones were hauled, they were put in a highly disreputable condition. Stone crossings were ground to powder. Belgian blocks suffered the same experience and smooth asphalt streets were made to look



W. F. HOWLAND, THE VETERAN STONE SETTER, STANDING BY THE BASE OF ONE OF THE BIG COLUMNS.

like a strip of a relief map of some highly mountainous country.

The City of New York has been so unfortunate as to have to pay the cost of repairing. When permission for hauling the columns through the thoroughfares was asked of the authorities they readily granted it, confidently adding that their streets could sustain any weight, no matter how great, put upon them. They know better now, and Mr. Howland thinks they should also be grateful to him for his attempts to crease out the ridges made by the asphalt and asphalt blocks bulging up on either side of the wheels. Whenever a ridge made by a previous passage was reached Mr. Howland would run the wagon over it and thus materially lessen its height. These ridges were often eight and ten inches in height.

Five days were spent on an average in moving each stone. The task, however, stretched out over six months, owing to the fact that it was begun in the fall and could not be pursued in winter, when the streets were in bad shape on account of snow and ice.

When the columns are finally erected they will represent an expenditure of \$200,000, or \$25,000 for each column. As they lay on the ground awaiting setting they look as if they cost at least that much; but those already set are so dwarfed by the great arch and its flying buttresses now erected which

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