"The Lifting Process of Granite Quarrying"

(At the Mt. Airy quarries in North Carolina)

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Excerpts from the article:

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This article, which begins on the next page,
is presented on the Stone Quarries and Beyond web site.
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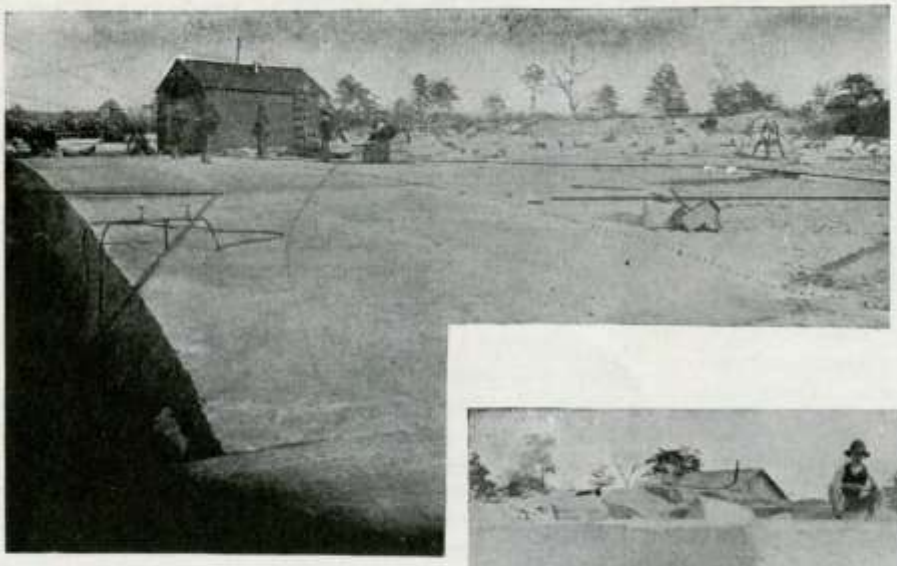
THE LIFTING PROCESS OF GRANITE QUARRYING

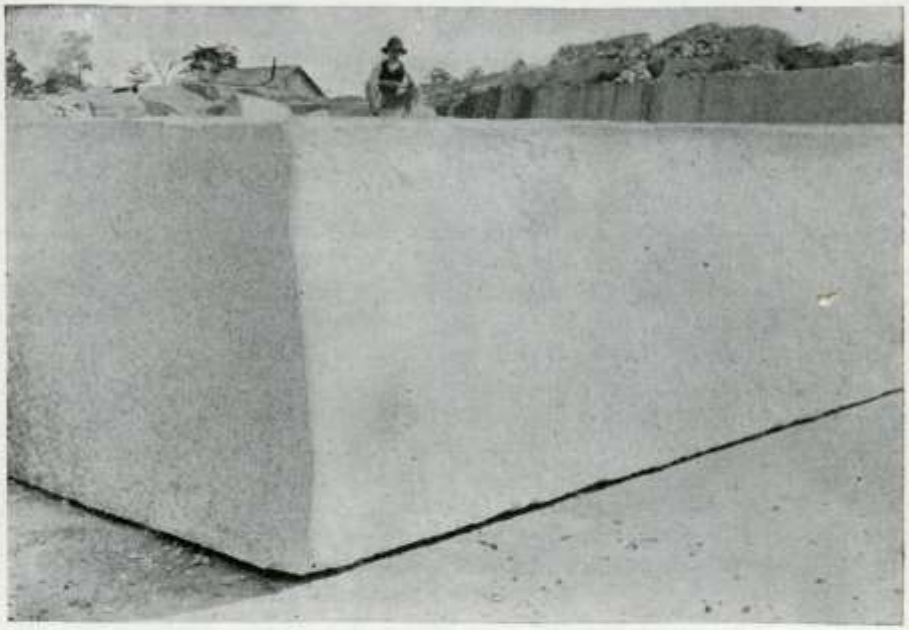


ORDINARY LEDGES OF VARYING THICKNESS, IN MT. AIRY QUARRIES.

The quarrying problems where the granite deposits lie in mountains of almost solid rock is different from the ordinary quarrying and interesting in many ways. L. B. Ward, in a recent number of the Scientific American tells of the lifting practiced in North Carolina, where great rock masses are found in many places.

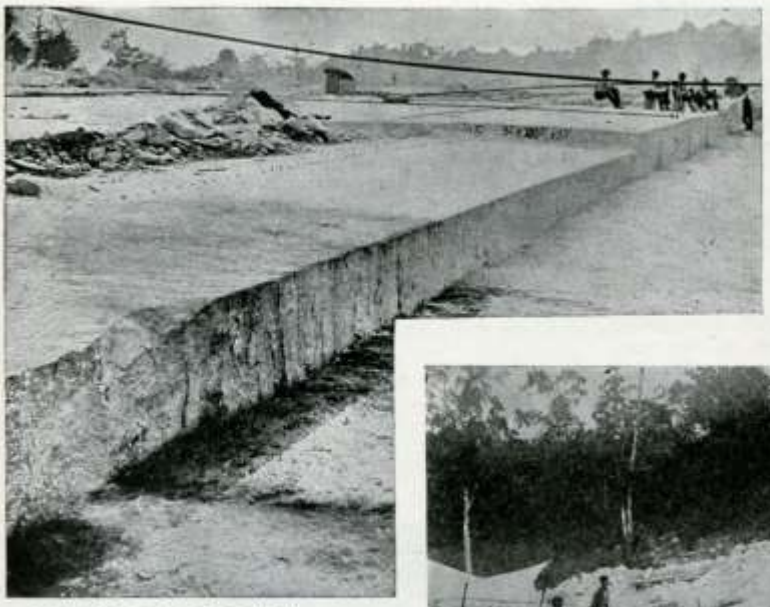
The section of the country at and around the vicinity of Mt. Airy is composed almost entirely of these rock masses. The Mt. Airy quarries are situated on a hill many acres in area, very gradual in slope and practically bare of vegetation, composed of a solid, uniform mass of moderately hard granite, which shows no ledges or bed planes whatever. Near these quarries is Stone Mountain, about 1,000 feet high and four or five miles in circumference, a huge mass of granite similar to the Mt. Airy quarry lands, with the same scant vegetation.

This great bare mountain of stone is a remarkable sight to those who are familiar only with the regular granite outcrops as seen elsewhere. The fact that these masses of stone show no ledges or bed-planes, whatever, split readily, and in straight lines in any direction is taken advan-



VIEW OF BIG LEDGE, SHOWING SEAM AT BOTTOM.

(phoro captions) "Ordinary ledges of varying thickness, in Mt. Airy quarries." & "View of big ledge showing seam at bottom."



A COMMON FORM OF LEDGE.

tage of to create artificial beds to work on. Large sheets of granite are separated from the mass at a single "lifting" operation, by successive use of powder and compressed air.

The "lifting process" is applicable to quarries of large horizontal areas and in solid masses, and such conditions being almost ideal at the Mt. Airy quarries, this process is altogether used. The tremendous advantage afforded by "lifting" can be readily understood, as by means of a "lift" granite of any desired area and of definite thickness can be made available for surface work and drilling.

The largest stone required for any possible construction could be produced thus; the weight of the larger stones now produced has to be reduced to the capacity of the largest equipment furnished by the railroads, by coring.

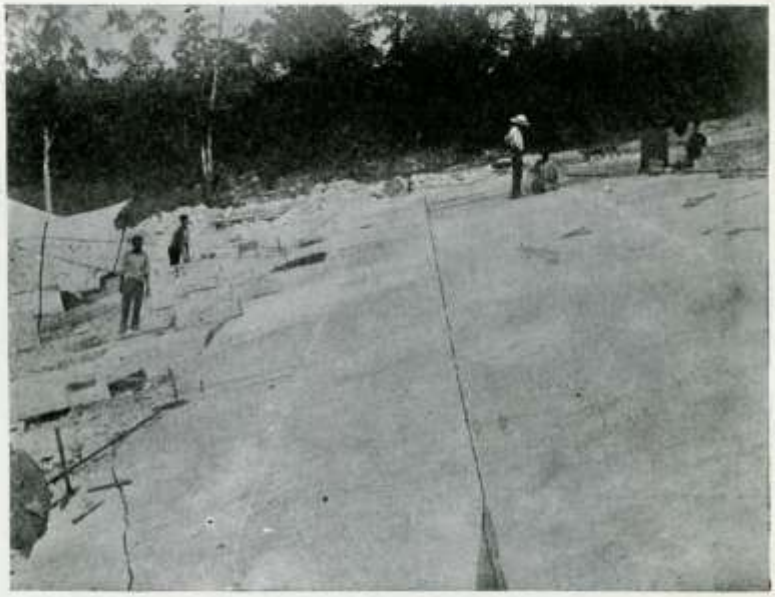
At the central power station in the quarries are two huge water-tube boilers, each of 210 horse-power. These supply steam to the air compressor, which has a capacity of 2,000 cubic feet of free air per minute. This air is conducted by six-inch pipe lines running the entire length of the quarries. Lead lines distributing it to all parts of the quarries, make it available at all points for "lifting," as well as for use with pneumatic tools.

In the center of the area to be lifted, a drill hole two or three inches in diameter is sunk six or eight feet in depth (according to the required thickness of the stone). The bottom of the drill hole is enlarged into a pocket by exploding a half stick of dynamite; a handful of powder is then exploded in the pocket thus formed. This starts a horizontal crack or cleavage across the greater diameter. The charges of powder are now increased in size, and are exploded in the cavity, the drill hole being plugged at every blast to confine the gases and cause constant force upon the stone, until the crack has extended 75 or 100 feet in all directions from the lift hole. A pipe is then cemented into the hole, and connected with the air pipe line of the air compressor by means of a globe valve, and is used gradually to admit compressed air at between 70 and 80 pounds pressure until the crack or cleavage extends until it becomes visible in a thin edge out on the hillside.

Sheets of several acres and of any required thickness can be so "lifted," thus affording a bed plane to which quarrymen can work, drilling and splitting the stone into proper sizes for the purposes required.

It can readily be seen that a great deal of time, labor, and expense are saved by this unique, successful and interesting process.

The Mt. Airy quarries are owned by the North Carolina Granite Corporation, and quarrying on an extensive scale has been conducted for many years. The stone is a light gray biotite granite, containing no visible injurious minerals. Crushing tests of this granite reported by the North Carolina Geological Survey showed an average of over 20,000 pounds to the square inch, the tests being made on two-inch cubes.



A "LIFT" BEING SPLIT AND DRILLED INTO REQUIRED WIDTHS AND LENGTHS.

The Stone Mountain exposures referred to above are in Wilkes and Alleghany counties, about twenty miles from Wilkesboro. The north, south and west slopes of Stone Mountain proper are bare of vegetation and the top is practically so. The stone is a light gray, slightly coarser than the Mt. Airy granite, which it closely resembles. Like the Mt. Airy granite, it is nearly free from joint planes, and is quite uniform throughout the whole area.

In the pink granite deposit of the Balfour Quarry Co., at Salisbury, vertical jointing is quite strongly developed in several directions in the various openings, with the planes spaced at such intervals as to allow the quarrying of stone of any practicable and desirable size.

(phoro captions) "A common form of ledge." & "A 'lift' being split and drilled into required widths and lengths."