"Boring Blast Holes with a Diamond Drill"

By W. R. Austin, Hutton Building, Spokane, Washington

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Excerpts from the article:

> "It is seldom, nowadays, that diamond core drills are employed for any but their legitimate purposes, namely mineral prospecting and test drilling, in which the core recovered is all-important. Occasionally they are used for special purposes, such as that of tapping bodies of water under pressure in mines. Thirty years ago diamond drill gadders and channelers were considered the most satisfactory means of quarrying marble, but the increase in cost of black diamonds since that time has precluded any regular use that does not utilize the core records.
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BORING BLAST HOLES WITH A DIAMOND DRILL

By W. R. Austin*

Sullivan Diamond Drill at Tenino

It is seldom, nowadays, that diamond core drills are employed for any but their legitimate purposes, namely, mineral prospecting and test drilling, in which the core recovered is all-important. Occasionally they are used for special purposes, such as that of tapping bodies of water under pressure in mines. Thirty years ago diamond drill gadders and channelers were considered the most satisfactory means of quarrying marble, but the increase in cost of black diamonds since that time has precluded any regular use that does not utilize the core records.

The drilling of deep blast holes in a quarry by this means, therefore, sounds incongruous and extravagant to those familiar with excavation methods and costs. But that is just the work for which the Hercules Sandstone Company is using a diamond drill at Tenino, Washington. This company has a contract to supply stone for a United States government jetty, under construction at Gray's Harbor, which is between Tacoma, Washington, and Portland, Oregon. Rock fragments or boulders of large size are required for this work. The quarry face is about 70 feet high. The method at first used consisted in drilling "coyote" holes horizontally at the base of the cliff. This resulted in shattering the rock badly and breaking much of it too small for use, thus causing a high operating cost.

During the fall of 1913 the company installed a Sullivan class "C" diamond core drill, with "A" fittings, boring a hole $1\frac{13}{16}$ inch in diameter and normally removing a $1\frac{1}{8}$ inch core. With this drill holes are bored to an average depth of 63 feet, 30 feet back from the face, and nine feet apart. After boring the hole, a special tool is run down, cutting a groove on each side, in line with the line of holes. These grooves aid in splitting the rock, which has a favorable grain, from one hole to the other. The holes are sprung with dynamite and then loaded with black powder to about ten feet from the top. When shot, the whole face is thrown over into the quarry and breaks into very large pieces.

The average progress by the diamond drill has been about 53 feet of hole per day, which indicates the favorable character of the stone. The cost of drilling and grooving together is given as 28 cents per foot. The wear on the diamonds is practically nothing.

A blast of sixteen holes, made soon after the drill was installed, threw about 40,000 tons of rock. Others, made later, produced an even larger amount of stone. The first

Hercules Quarry after a blast

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(photo captions) "Sullivan Diamond Drill at Tenino" (Washington) & "Hercules Quarry after a blast."

figure gives a drilling cost of $7.00 per thousand tons of rock excavated, or 2½ cents per cubic yard.

The photographs on page 810 show the drill, which was operated by compressed air, and the rock after blasting, showing the large size of the fragments. At the left may be seen the quarry face, with the lines of some of the drill holes. The drill is mounted on skids on which it is pulled from one hole to another by a cable and hoist.

The Hercules Sandstone Company owns several channeling machines, including a Sullivan class "6½," for quarrying dimension stone.