BORING OUT COLUMNS IN SOLID ROCK.

BY L. RAMAKERS.

The method of extracting stones by means of wedges driven into them at intervals, or by explosives, is beginning to be discarded in quarries in favor of new processes. The system of sawing by helicoidal cable is becoming more and more widely employed. Utilized at first for forming an entrance to the lower part of strata in working shafts where there existed no entrance with natural slope, it is employed at present for cutting out stone at the adit end of quarries and forming it into blocks. For guiding and carrying the cable, use is made of a tubular support provided with two channeled pulleys, one of them mounted upon a fixed support at the upper part, and the other upon a movable one sliding along the entire length of the tube. The displacement of the movable support is effected by a long screw parallel with the tube and which gives the wire the pressure necessary for the sawing of the stone. For the sawing of a detached block, the mounting of these tubes on both sides of the block is done very easily. But the case is entirely different when it is desired to saw in a stratum in which no break occurs. In such an event shafts about thirty-six inches in diameter designed for the reception of the tubes are formed at the extremity of the length that it is desired to saw. In hard stone (such as bluestone) the shafts are driven at distances varying from 35 to 50 feet, while if it is a question of soft stone they may be driven at a distance of 120 feet from each other.

The Société de Constructions Electriques de Charleroi (Belgium) is constructing for the sinking of shafts a special drill actuated by an electric motor. The essential part of this machine consists of an iron plate cylinder 140 inches in height and 36½ in diameter, at the base of which is mounted a knife 12 inches in height. The knife also is cylindrical and upon its lower part are formed alternate teeth upon concentric circumferences. This arrangement of teeth in two rows permits the knife to attack the stone better, and to widen the space in which the cylinder moves. After the shaft is driven, the cylinder and the internal core of stone may be removed.

The cylinder and knife system receives a circular motion of 50 or 60 revolutions through the intermedium of a square rod to the upper end of which is keyed a helicoidal wheel, which engages with an endless screw upon the shaft of the electric motor.

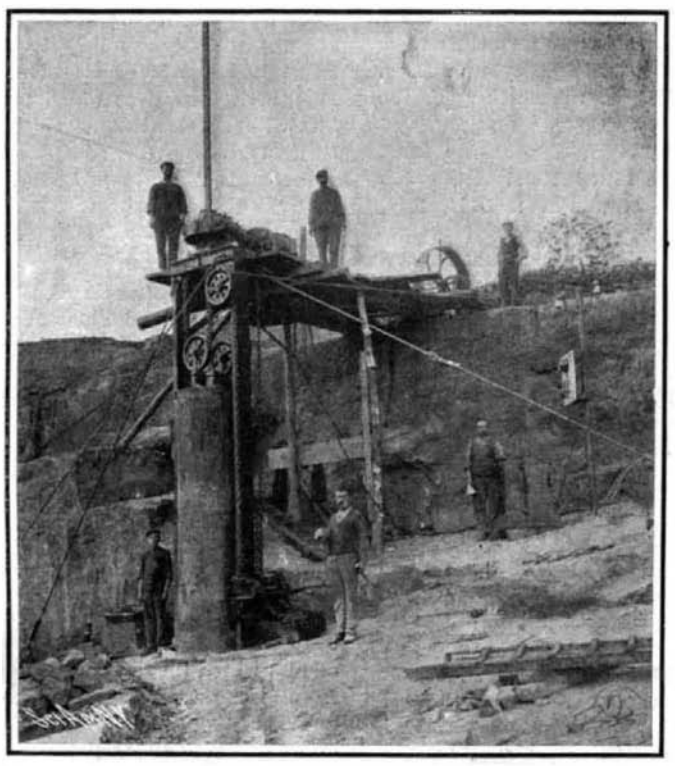
The knife-carrying cylinder was formerly actuated by the helicoidal cable that saws the stone, or by any sort of electro-dynamic drive; but all such transmissions had certain faults, and their efficiency, moreover, was unsatisfactory. The endless screw is much more certain in its action, its operation noiseless, and its efficiency very high. Its axial reaction is produced upon accurately calibered steel balls. The square rod, through a sleeve, carries along the cylinder, and permits it to descend in measure as the work advances. The weight of the iron plate alone causes the descent of the knife. The sleeve is held in the axis by a movable guide sliding in three uprights of U-iron, forming the frame of the apparatus. In order to facilitate the boring of the stone, some fine granules of tempered steel and some water are thrown from time to time into the groove of the drill.

As the entire apparatus has to be often shifted, the motor is in no wise sheltered, and so it is of the hermetic type. It is from 20 to 25 horse-power.

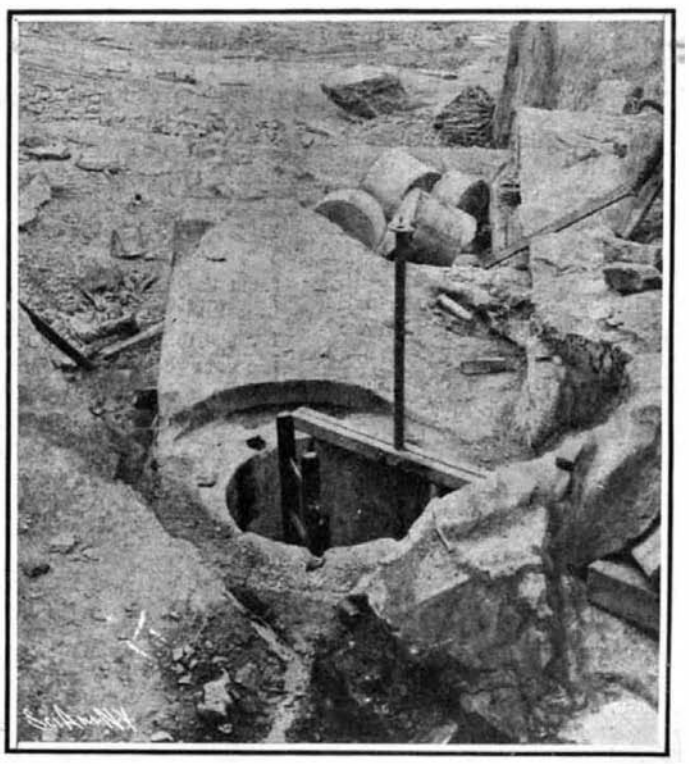
When the operation of boring is finished and it is a question of removing the cylinder and the internal core, a hand windlass fixed to one of the uprights of the frame is employed. This windlass takes the cylinder by the upper part, while as for the core, a hook is first inserted therein, after which it is broken by driving wedges into the groove formed in the drill.

When it is desired to bore deep holes, a second cylinder of 140 inches diameter may be superposed; and sometimes even a third and fourth are added. In this way shafts of 50 feet in depth have been sunk. As a general thing, however, the boring is not done to a depth of more than 25 or 35 feet.

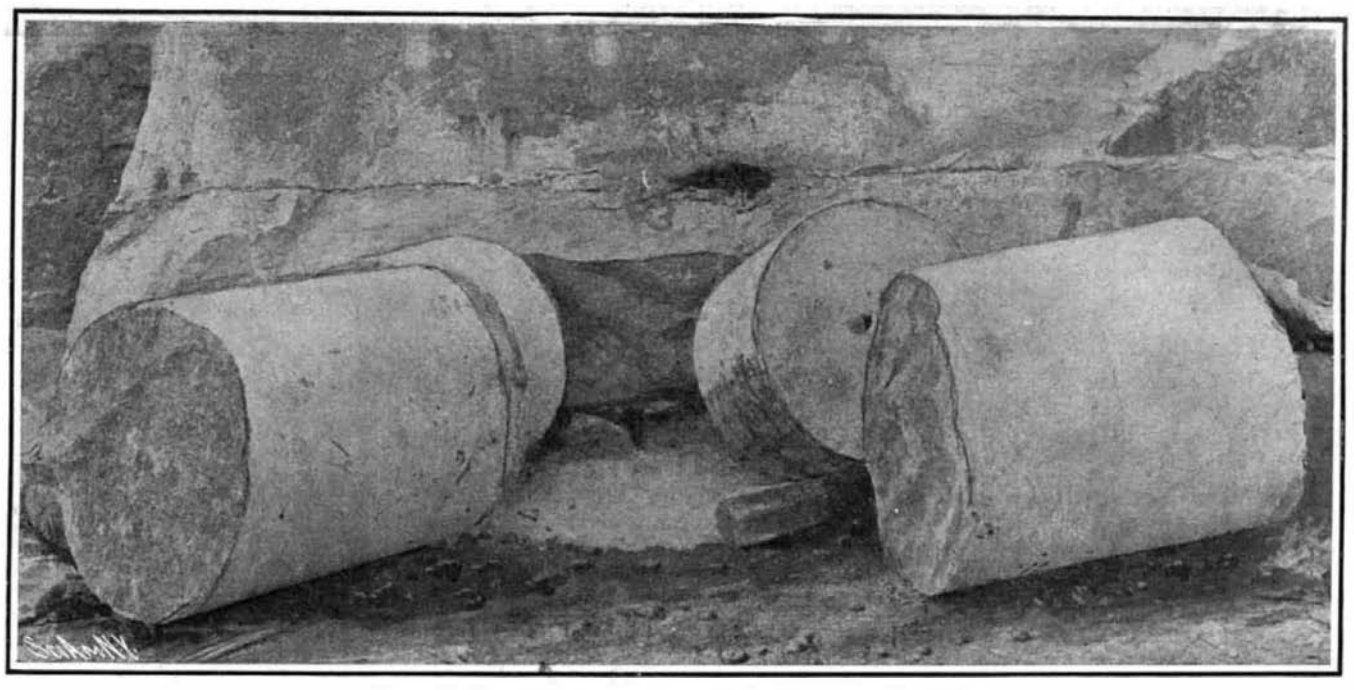
The advance of the work varies greatly with the hardness of the stone. At the Hainaut quarries (Belgium) where blue-stone is extracted, the above-named establishment has installed a type of drill capable of driving a 13-foot shaft in ten hours.



The Circular Cutter at Work.



Pits Dug by the Circular Cutter.



Portions of a Granite Core Extracted by Circular Cutting.

A Seven-Ton Pump as Evidence of Patentability.

Sometimes the rigors of Patent Office procedure are not without their humorous side. A New York attorney filed an application for improvements in a centrifugal pump. The Patent Office declared the invention inoperative and demanded a working model. The Patent Office was requested to send an examiner to Trenton to inspect the machine in actual operation. But this the Patent Office refused to do. The attorney, therefore, politely sent a seven-ton pump to the Patent Office—sent it, moreover, from Trenton to satisfy a skeptical examiner. Twenty-one men were required to get it into the examiner's office.

ARTISTIC FRENCH TAXIDERMY.

BY JACQUES BOYER.

Time was when museums of natural history were filled with stuffed animals, mounted in stiff, unnatural attitudes, veritable caricatures of the creatures which they professed to represent. It was deemed sufficient to rub skins with arsenical soap and stuff them with hay or tow, and Agassiz was justified in writing: "Stuffing a skin is equivalent to destroying it."

The taxidermist of to-day, on the contrary, takes great care to preserve the appearance of life and to mount single animals and groups with all possible realism.

Artistic taxidermy had its beginning some twenty years ago when Jules Vernaux mounted a group of lions attacking an Arab courier, which created a great sensation. Soon afterward, Mr. William T. Hornaday, who had been sent by a great London firm to the East Indies to study the orang-outang in its native forests and to collect skins and skeletons, determined to reproduce some of the curious scenes that his pencil had caught. On his return he composed a masterpiece which was purchased by the American Museum of Natural History in New York. It represents two male orangs fighting for the possession of a young female that is shown fleeing from her nest in a treetop, with her baby clasped to her breast. One of the rivals has overpowered the other and is biting his hand. The face of the vanquished combatant is distorted with rage and pain. Several simian spectators awakened by the fray, are viewing the scene from their arboreal homes. The group is a sculptural monument worthy of Barge or Frémiet.

French taxidermists soon followed the example of Vernaux and his successors, notably Hornaday, Ward, and Dyche.

The old absurdities were abandoned and the art has now reached a high degree of perfection in France.

The tools of the taxidermist are simple. They comprise sharp scalpels, dissecting pincers, mallets, saws, files, scissors, awls or large needles for sewing, steel punches for perforating bones and claws, bristle brushes for applying antiseptics, badger brushes for arranging fur and feathers, and iron wires of various sizes for supporting the specimens and attaching them to their pedestals.

In preparing a large animal, like a tiger, for mounting, the flesh is carefully dissected away and the bones are cleaned. Next, the skin is freed from adhering fat by scraping with a thin-bladed knife and rubbing with plaster. It is then soaked in an antiseptic bath (usually a solution of alum and common salt) which prevents the falling of the hair and the development of injurious insects.

Skins of small animals, such as rats and squirrels, are coated inside with arsenical soap—a mixture of white soap with arsenic, camphor, and potassium bitartrate, which was invented by the pharmacist Becœur.

These manipulations, which vary somewhat according to the nature of the subject (mammal, bird, fish, or reptile) constitute, so to speak, the manual and me