

“Cutting Columns From Solid Rock”

(at Charleroi, Belgium, circa 1906)

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This article begins: “A special electric drill or cylindrical cutter for sinking shafts in rock by taking out solid columns of stone is now built by the Société de Constructions Electriques at Cherleroi, Belgium. The essential part of this machine, as described by L. Ramakers in *The Scientific American* (New York, March 31), is an iron-plate cylinder 140 inches in height and 36 ½ in diameter, at the base which is mounted a cylindrical knife 12 inches in height, bearing alternate teeth upon concentric circumferences....”

This article, which begins on the next page,
is presented on the Stone Quarries and Beyond web site.

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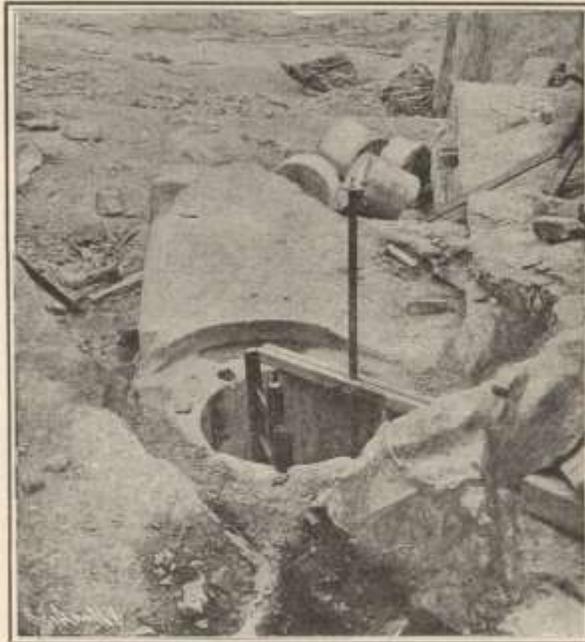
skates. Solid rubber tires are employed to impart comfort to the skater and facilitate the wheels in passing over rough ground. Beneath and back of the foot-plate of each skate is carried a small gasoline-engine enclosed in a metal box and connected with a carburetor placed inside the forward part of the skate, which is inclined downwardly and backwardly. The gasoline supply is contained in a two-quart receptacle made to conform to the waist where it is belted to the wearer. From this tank the gasoline is fed to the engines by small rubber tubes, and ignition is accomplished by a flexible cable that also connects with the belt so that it will always be under the control of the operator. The inventor claims that a speed of twenty miles per hour can be attained upon these skates on smooth surface and they may be built at an approximate cost of \$75 per pair. Some doubt exists as to the practical use of the auto-skates, for the reason that considerable difficulty would be had in maintaining a uniform speed in both skates; otherwise one foot would run away from the other and thus result in liability to falls and accidents."

CUTTING COLUMNS FROM SOLID ROCK.

A SPECIAL electric drill or cylindrical cutter for sinking shafts in rock by taking out solid columns of stone is now built by the Société de Constructions Electriques at Charleroi, Belgium. The essential part of this machine, as described by L. Ramakers in *The Scientific American* (New York, March 31), is an iron-plate cylinder 140 inches in height and 36½ in diameter, at the base of which is mounted a cylindrical knife 12 inches in height, bearing alternate teeth upon concentric circumferences. Says the writer:

"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



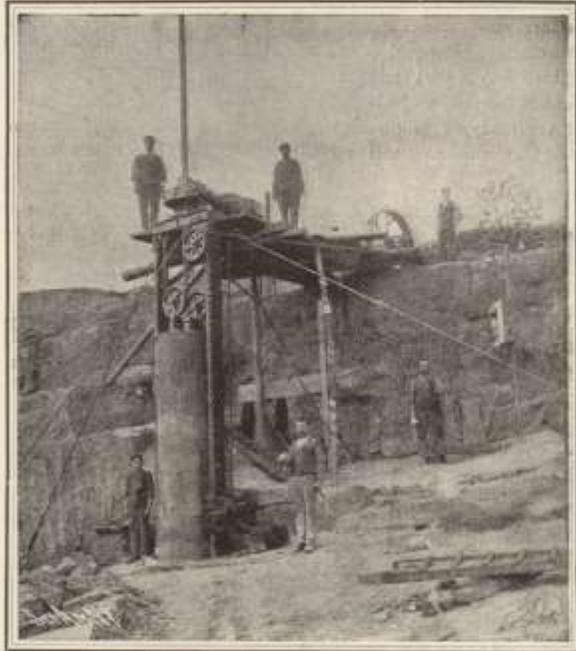
Courtesy of "The Scientific American."

PITS DUG BY THE CIRCULAR CUTTER.

upper end of which is keyed a helicoidal wheel, which engages with an endless screw upon the shaft of the electric motor. . . . 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 . . .

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. . . .

"When the operation of boring is finished and it is a question



Courtesy of "The Scientific American."

THE CIRCULAR CUTTER AT WORK.

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 book 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 bluestone is extracted, the above-named establishment has installed a type of drill capable of driving a 13-foot shaft in ten hours."

Defective Hearing among Railroad Men.—Rail-

way companies have been taking precautions against color-blindness ever since the discovery that it was more common than had been supposed; but it now appears that they have been overlooking a more insidious danger, namely, impairment of hearing, to which railroad employees have been found to be specially subject, and against which no single preliminary examination can guard, since it may come on at any time. A writer in *Cosmos* (Paris, March 10), describing recent investigations on the subject, says:

"Railroad engineers have the deplorable habit of abusing the whistle, literally splitting the ears of dwellers along the track. We must apparently excuse them for the reason that they often do not hear very well themselves. In fact, Dr. Lichtemberg, of Budapest, has examined the ears of 250 railroad employees; in 92 of these he found troubles of hearing.

"In 14 cases there was chronic catarrh of the middle ear; in 1 case, otorrhea; in 3, an affection of the labyrinth; in 4, anomalies of tension in the membrane of the drum; in 36, accumulations of wax; in 5, infiltration; in 5, cicatrices of the tympanum; in 3, a loss of substance in the tympanum without secretion.

"Lichtemberg attributes this frequency of affections of the ear

(photo captions) "Pits dug by the circular cutter" & "The circular cutter at work," Both "Courtesy of *The Scientific American*."

in railway employees to the extreme variations of temperature to which they are exposed. In his opinion the troubles of hearing are more dangerous than color-blindness. This latter is congenital and may be recognized in a test, while lesions of the ear are acquired and tend continually to increase.

"The conclusion is that every applicant for employment on a railway should be examined by an aurist before he is pronounced fit for service, and it is recommended that the examination should be repeated every two years."—*Translation made for THE LITERARY DIGEST.*

INJURIOUS GERMS IN YEAST.

THAT most of the yeast of commerce contains injurious bacteria, and that our methods of breadmaking are calculated to encourage the development of these and of their poisonous products, is asserted by Dr. E. Paller, of New York, in *The Dietetic and Hygienic Gazette* (New York, March). He says:

"Several specimens of yeast sold on the market were examined and found to be contaminated, but the greatest contamination was found in the yeast of one manufacturer, which is being retailed in small packages, and which yeast for some unaccountable reason has the reputation of being the best on the market. So it may be, as far as appearance is concerned, but under the microscope it is the worst as regards bacterial contamination."

From one fresh package no less than four different kinds of microbes were isolated, including one that is commonly associated with putrefaction. To resume the quotation:

"In short, what is being sold on the market as yeast contains in addition to the yeast-cells numerous bacteria, the most frequent being the bacillus coli communis or one of its congeners. Of course, any pathogenic microbe may find its way into the yeast and may find there an excellent culture-medium.

"Now, what is being done with the yeast? It is put into water and flour and the whole is left in a warm place and allowed to ferment. That means that we encourage the . . . bacteria to develop fully in the dough and we encourage their toxins to fully develop and to saturate it.

"On examining microscopically after twelve hours the dough which has fermented by the addition of such yeast, I found it to contain the very microbes which were present in the yeast. The flour in itself, of course, is not sterile; but the evil is aggravated by the addition of a substance laden with bacteria.

"It will not be amiss to refer here to the claim made by some that yeast is an antiseptic and, consequently, hinders the growth of bacteria.

"I shall briefly state that I have found by experiments that

yeast hinders the development of some putrefactive germs in albuminous substances, but it does it to a very slight extent. Its antiseptic power on the whole is insignificant. . . .

"The baking of the dough does not seem to destroy all the microbes, the heat probably not being strong enough or not continued long enough. As said before, I found bacteria in the pulp of fresh, warm bread just brought from the baker's. If that is the case with non-sporulent microbes, the sporulent ones are surely not destroyed.

"Even if the heat should destroy all the microbes it might not destroy the toxins that they have generated, nor does it correct the chemical changes that have occurred owing to the excessive bacterial development. The boiling of sour milk does not render it fit for consumption. The cooking of decomposed eggs, fish, or meat does not make them safe for ingestion.

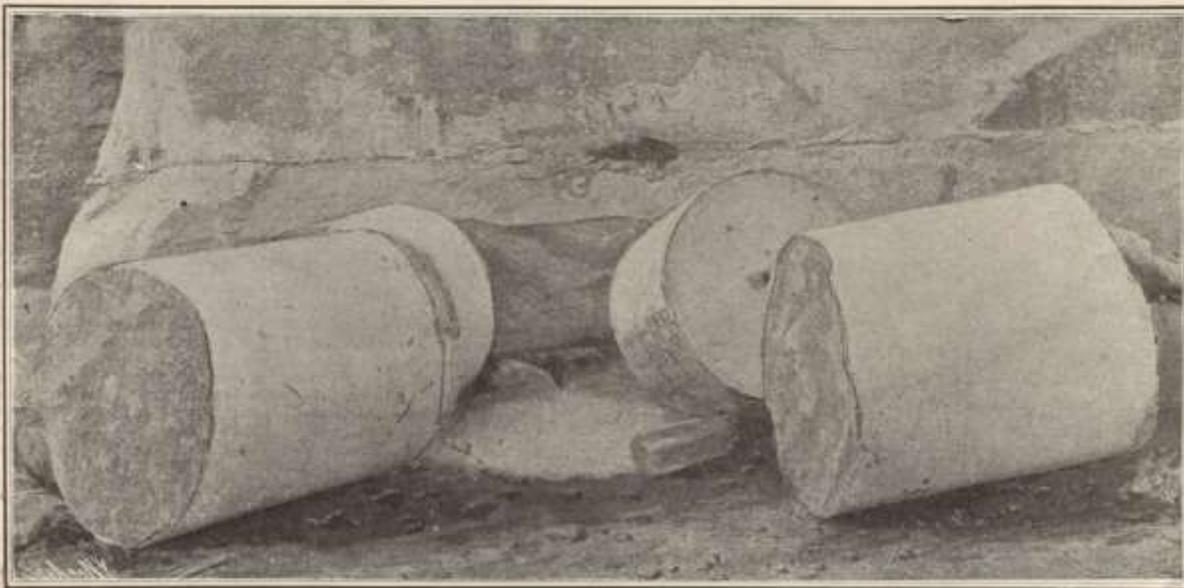
"We have a rigid inspection of milk and other articles of diet; but our bread, the staple article, especially of the poor, has been entirely neglected. The bread looks to be such an innocent, harmless article that it has been left alone.

"The fact is that in the presence of the numerous microbes the dough undergoes putrefaction as well as fermentation. . . . The proteid elements of the flour practically undergo a process of putrefaction in the presence of the many putrefactive bacteria. The development of lactic acid and other acids due to the presence of carbohydrates in the flour in the end hinders the excessive development of the putrefactive germs and also the process of putrefaction, and that is the reason why the very offensive fecal odor is absent from the dough. But undoubtedly there has been some putrefaction. Sour milk does not emit a putrescent odor, but undoubtedly chemical changes have taken place in the proteid elements. . . .

"I have no doubt that the many forms of the so-called fermentative dyspepsias and catarrhal conditions of the small intestines, characterized by extreme flatulence, are in numerous instances caused by the consumption of contaminated bread. In people with normal gastric juice the injurious microbes are as a rule destroyed in the stomach. But even in them it is doubtful whether the toxins generated by microbes are neutralized by the gastric juice. Those who suffer from hypochlorhydria [insufficiency of chlorhydric acid in the digestive fluids] have very little defense against the injurious bacteria and still less so against their toxins. Even in those whose stomachs are normal the injurious germs, or their toxins, will find opportunities to do harm, because a human stomach, even the best, frequently is not adequate to the performing of the heavy tasks that are imposed on it.

"The yeast can be manufactured so as to be free of injurious bacteria, and it is the duty of the boards of health to see that it is done."

The author states in conclusion that he has been experimenting



Courtesy of "The Scientific American,"

PORTIONS OF A GRANITE CORE EXTRACTED BY CIRCULAR CUTTING.

(photo caption) "Portions of a granite core extracted by circular cutting. Courtesy of *The Scientific American*."