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NEW YORK, SATURDAY, AUGUST 7, 1880.

Contents.

(Illustrated articles are marked with an asterisk.)

TABLE OF CONTENTS OF
THE SCIENTIFIC AMERICAN SUPPLEMENT
No. 240,

For the Week ending August 7, 1880.

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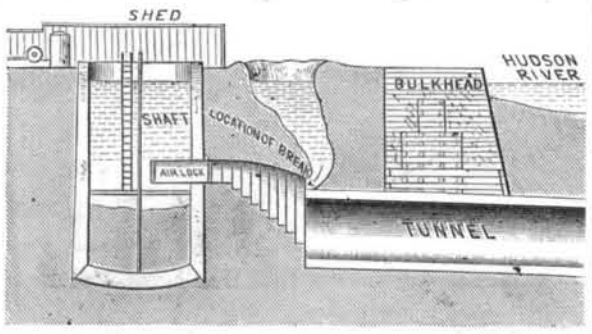
SERIOUS ACCIDENT IN THE HUDSON RIVER TUNNEL.

An accident of a serious nature, consisting in the fall of a portion of the roof of the temporary entrance to the great tunnel now being built under the Hudson river between New York and Jersey City, took place early on the morning of July 21.

It appears that the workmen were engaged in excavating for the enlarged or permanent entrance to the tunnel, on the New Jersey side of the river, near the working shaft, when, suddenly, it was found that the compressed air had broken through the loose filling of earth at the junction of the brick wall of the tunnel proper and the roof plates of the temporary entrance to the tunnel, and that the leakage was so great that it could not be stopped.



Our diagram shows the place of the accident. The workmen, twenty-eight in number, ran for the air lock chamber, and all would have been saved could they have got in; eight of them had succeeded in entering the lock, when down came the iron roof plates, earth, mud, and water, closing the entrance door to the lock chamber and cutting off the escape of the remaining twenty men, who were quickly suffocated, to help them being impossible.

Among the lost was Peter Woodland, assistant engineer in charge of the tunnel, 35 years of age, a man of superior ability in carrying on the practical operations of such a work as this. The coolness and presence of mind which he displayed up to the last moment are quite remarkable, and distinguish him as a real hero. When he saw that there was no chance to stop the leak he instantly ordered the men to fly to the air lock, himself staying back to urge and help them, deliberately sacrificing his own life in his efforts to save others.

After the occurrence of such an accident as this nothing is more easy than to find fault, and nothing more common than senseless denunciations of the managers of the works. Scores of prophets, who never handled a tool, parade their wisdom in the papers, summing up in such expressions as "reckless carelessness;" "stupid blundering;" "didn't do this;" "ought to have done that;" "might have known better;" "I told you so," etc.

So far as we can gather from the published particulars and the testimony of survivors, the accident was not due to any defect in the system of working or any neglect of the engineers or directors. On the contrary, every protection against accident and every provision for safety which intelligent prudence could point out had been adopted by them, and this is greatly to their credit. They had gained practical knowledge in successfully tunneling through the unusually treacherous soil at the very spot where this break took place; they had successfully worked their compressed air system, both in the entrance and in the main tunnel, for months; had become thoroughly familiar with its operation; had established the best and most effective rules and methods to insure safety; and in the task of enlarging for the permanent entrance, they were using, at the time of the catastrophe, every precaution which skill and experience could suggest.

But in all works of this character there are contingent dangers which none can foresee. In this case the air lock, specially provided as a place of safety, stood with its open door. Who could have foreseen that the falling earth, instead of blocking and holding it open, as might be expected, would close the door? Had it remained open all would have escaped. The great Thames River Tunnel, engineered by the eminent Brunel and guarded by his wonderful shield, caved in more than once, and many lives were lost. The Hoosac Tunnel and the St. Gothard Tunnel, cut through solid rock by the ablest engineers, had their shocking disasters. Even the builders of the elevated railways in this city, working in open daylight on the surface of the ground, could not prevent accidents, and many lives were sacrificed.

Except for the deplorable loss of life the accident in the Hudson River Tunnel would be comparatively unimportant. The temporary entrance which has caved in (shown by the step rings in our diagram) is only thirty feet in length. The tunnel proper, built of iron plates and solid brick work, two feet thick, is probably not injured. As soon as the *débris* of the fallen part can be removed, which is to be done, we learn, by means of a coffer dam, the work of tunneling under the river will proceed rapidly, as heretofore, in both headings.

Our readers will find a full illustrated description of the tunnel and the system of its construction given in the SCIENTIFIC AMERICAN and in our SUPPLEMENT, both of May 8, 1880.

HOW TREES ARE STRUCK BY LIGHTNING.

M. Colladon says: "The lightning always, or almost always, strikes the upper branches, especially those that are most elevated and most exposed to the rain storm. From thence it descends through almost the entire mass of branches to the main branches, and from these to the trunk. These large branches, and especially the trunk, being in general much poorer conductors than the young branches, the passage of the electricity produces therein heat and repellent effects which lacerate the sap wood or the bark, and sometimes scatter the *débris* to some distance (150 feet and beyond). This is a law that I have ascertained by very numerous observations. The tree recently struck in Rue des Glacis de Rive presents an interesting case, in that it confirms this law.

"It is not a very common thing in France to see trees struck by lightning in May, when their as yet young leaves have little consistency. The tree under consideration was struck essentially on its chief branch—the highest one by some inches, and situated on the southwest side. The young leaves of this summit and those of the branches immediately beneath were neither dried nor withered, but they were gashed in part and broken into small fragments and strewn over the surrounding earth. In fact, they had suffered from the effect of a violent concussion of the air, like the window panes which had been broken in two neighboring houses, and were reduced to fragments, just as they would have been had a dynamite cartridge been exploded near them. Even before seeing the tree I had made up my mind that there must have been a well or stream of water near there in contact with the roots of the poplar; for the vicinity of a spring or a subterranean stratum of water is very often the determining cause to attract the lightning to the summit of a tree standing near it. Here, again, this influence is rendered evident by two interesting facts. At about 18 feet from the tree, *on the north side*, there is a lead conduit which leads water to a laundry, and a drain which carries the waste water off under the street. At the base of the trunk the wounds *swerved toward the north*, and, midway between the tree and the lead conduit, a board placed as a border on the earth was pierced with a round hole about 4 inches in diameter, showing that the electric fluid, concentrated in a powerful jet (if that expression is allowable), shot directly from the foot of the tree toward the lead conduit by the shortest route."

ARRIVAL OF THE EGYPTIAN OBELISK AT NEW YORK.

The steamer Dessoug, bearing the Egyptian obelisk, arrived at this port July 20, thirty-seven days from Alexandria. The Dessoug left Alexandria June 12, and arrived at Gibraltar June 22. Leaving Gibraltar on the 25th, everything went well until July 6, when the after-crank shaft broke, causing a delay of several days, during which a spare shaft was fitted, the vessel proceeding slowly under sail. The obelisk had been so well stowed that during the voyage it did not move in the slightest degree from its position in the hold. Lieutenant Commander Gorringe, who has not only had the entire charge and responsibility of the removal of the obelisk, but has borne the entire cost of the enterprise thus far, reports that the stone is in perfect condition. It is 70 feet long, 8 feet square at the base, and 5 feet 3 inches at the top. It weighs 200 tons, the pedestal 43 tons, the steps, or foundation, without the pedestal, 74 tons. The machinery for lowering it weighs 60 tons. The site selected for the obelisk in Central Park has been reconsidered and abandoned by the Park Commissioners. No other site has as yet been fixed upon.

The Resonator.

Under the above name Signor Alberto B. Bach has recently devised and introduced in London a very simple and apparently very effective appliance for increasing the volume and power of the human voice when singing, and a lecture on the subject was lately delivered at the Royal Academy of Music, the use of the resonator being illustrated by Signor Bach himself during a concert which followed the lecture. In the course of his lecture Signor Bach described the mechanism of the vocal organs, and explained the modes in which their power could best be developed, and among other points he directed attention to the office performed by the hard portion of the palate, this acting as a kind of sounding board when the mouth is open for singing. It is for the purpose of increasing the efficiency of the palate in this respect that the "resonator" has been designed.

The instrument consists of a gold plate fitted to the roof of the mouth, close above the upper teeth—much in the same way as the gold palate of a set of artificial teeth—the plate having attached to it another gold plate which is convex downwards in both directions. A hollow sounding board—if we may call it so—is thus formed, which has a remarkable effect on the volume of sound producible by the person wearing the instrument. The resonator appears to have no prejudicial effect upon the distinctness of articulation, and Signor Bach states that it can be used without the slightest inconvenience after a moderate amount of practice. Of course, as Signor Bach remarks, the resonator will not give a good voice to any one who does not already possess one, nor will it eradicate any faults in singing, but properly used it is reported to have a remarkable effect in increasing the power of the sound which a singer can produce, and this without deteriorating its quality or increasing the effort required.

The *Statesman*, of Walla Walla, Washington Territory, says, in its issue of July 3, that there are indications of volcanic activity at the summit of Mount Hood. On Tuesday, June 29, a bright light burned all night steadily from the summit, at times so bright that the flames themselves could be seen as they shot out from their crater prison, and all the time throwing a bright, lurid glare upon the clouds that hung like a pall over the far-away Cascade Mountains.