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SCIENTIFIC AMERICAN SUPPLEMENT

No. 560.

For the Week Ending September 25, 1886.

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THE NEW YORK WATER SUPPLY.

In a recent issue we spoke of the fear that might be reasonably entertained that the new aqueduct, as dependent upon the Quaker Bridge reservoir for its supply, would not fulfill the popular anticipations. We gave grounds for the belief that it might prove detrimental in many respects, and a failure as regards purity, pressure, and sufficiency of the water to be delivered by it. An exhaustive paper on the subject was given in the SUPPLEMENT of the same week, by Mr. R. D. A. Parrott. On this our article was in great measure based. In the New York *Times* of the 17th inst., we find a discussion of Mr. Parrott's paper. The *Times* finds that the points in it are well taken, and while hesitating to pass judgment on his suggestions for a new watershed in the Catskill Mountains as a question within the scope only of an engineer, seems fully to appreciate the benefits to be derived from the appropriation of so thinly settled and mountainous a region for a watershed.

The exactness of Mr. Parrott's figures are fully appreciated by our contemporary. The subject in general is one that will bear ample discussion. It is a subject of congratulation that it has been begun while there is yet time to adopt the new aqueduct as a connection between the city and a new region of water supply.

ARRANGEMENT OF WIRES IN CITIES.

At the recent convention of the National Electric Light Association, no little time was occupied in a discussion of the expediency of burying the wires. The sense of the convention was decidedly opposed to the project at the present time. The speakers, for the most part experienced electricians and practical men, urged many cogent reasons for delay; and it seems only fair, since what is known as the public's side of this question has found such full and frequent expression in the popular press, that the other should receive something like the attention and consideration it deserves. Since the bill fixing the time for the compulsory burial of the wires passed the New York Legislature, the electrical companies have been threatened with similar exactions in other parts of the country, and affairs have now assumed what, under the circumstances, must be considered a grave aspect. It was believed by many, the electrical companies included, that by the time the New York law went into effect, a practical means would have been found to operate the wires underground. Unhappily, this has not been the case, if we are to believe the best authorities. Continued experiment and study, while they have done much to remove the obstacles in the way of success, have not yet resulted in finding a solution of the problem in hand.

None of the speakers at the recent convention claimed that the project was impossible nor even impracticable, but that experimentation had not yet shown the time for burying the wires to have arrived. That is all. If the service is to be a popular one, economy is as important a factor as efficiency, and it is, therefore, as necessary to keep down the expense of the service as it is to check induction, leakage, and retardation. When we consider the fact that air is the best insulation and the ground the worst, it is scarcely reasonable to look for an expeditious and easy conquest in the struggle for a similar service underground as the public has become accustomed to receive over the aerial lines. To put all the wires in the metropolis underground is a great and costly undertaking; and to proceed with it without the most conclusive evidence of the practicability of the means employed would be hazardous, to say the least.

As a striking illustration of this, we have the experience in Washington. Two years ago the wires in that city were taken down and buried in plaster, and for a time so much success was had that it was used as a principal and, it must be said, a powerful argument in support of the assertion that an efficient means of burying the wires had been found. It seems, however, that the system has proved defective and troublesome, good service has been the exception, and recently it was found necessary to take them out on F Street and suspend them on poles in the old way. On Pennsylvania Avenue, too, there has been much trouble of late with the underground wires, and, according to one of the speakers before the recent convention, the electrical generators—we speak now of lighting apparatus—have frequently been found to be running dead on account of difficulties, the nature and location of which it has not always been easy to discover.

Cost is an important factor in the sinking of the wires. The Philadelphia authorities are so well aware of the expense of underground construction that, though ordering all private companies to bury their lines, they make an exception in the case of the lines belonging to the city, because of the large sum required.

Again, that description of arc light wire which is used for aerial lines costs only 1½ cents a foot, whereas, so says an authority, that for use underground costs 6 cents. The conduit now being laid in the New York streets, which is a series of ducts, ten to a prism, is in most of its essentials purely experimental. Proof of this is shown by the reports and contracts that have been made, and which leave some of the most important problems in the way of efficient and cheap service to be solved during the progress of the work; problems, it may be said, which skillful and experienced electricians have been unsuccessfully struggling with for many a day.

This is one way of burying the wires; and while it may satisfy the requirements of the statute books, it may not, when completed, give a like content to the general public, in whose interest the law may be presumed to have been made.

Progress of the Daft Electric Railway Motor.

A new and more powerful electric locomotive for the experimental section of the Ninth Avenue elevated railway, in this city, is now nearly ready for operation. The intermediate conducting rail, which is now of iron, is to be replaced by a bronze rail, as the rusting of the iron rail interfered with the conductivity. When these improvements are completed, the motor, it is believed, will prove to be a great success.

The Daft motor has been used for over a year in Baltimore on the Hampden Street Railway, which is two miles in length, and is one of the most difficult roads in the country to operate. There is one grade of 353 feet to the mile on an 89 degree curve; another of 319 feet to the mile on a 75 degree curve; and a third of 275 feet to the mile on a 40 degree curve. With horses and mules, they were able to make only four miles an hour. With the electric motor, eight are made. The cost of operating with horses and mules during eight months and twenty days was between $4,700 and $4,800. With the Daft motor during a like period, 32,907 more passengers were carried, and the cost was only $3,160. The motors that do that work each weigh 5,000 pounds, draw nine tons, and cost $2,500.

Crater Lake, Oregon.

A party sent out under the command of Captain Clarence E. Dutton, of the army, has succeeded in making a complete survey of Crater Lake, in Oregon, a body of water whose shores, with the possible exception of one point on the south, have never before been touched by the feet of white men. The party's boats were hauled 100 miles by mule teams, dragged by a detail of soldiers up the snow-clad sides of the ridge which surrounds the lake, and lowered by ropes from the crest to the water, 900 feet below. One hundred and sixty soundings were made, the result of which gave the general character of the lake bottom. Two large submerged cinder cones were found, respectively 800 and 1,200 feet high, the rest of the bottom being flat. Captain Dutton believes this to be the deepest body of fresh water on the continent. The greatest depth attained by the sounding line was 2,005 feet. He writes to Director Powell, of the Geological Survey:

"As regards the origin of the basin, I now have a decided opinion. It has, I think, been formed in much the same way as the great *calderas* of the Hawaiian Islands, by the melting of the foundations of the original mountains, the blowing out of the molten material in the form of light pumice and fine tufa. It cannot have been formed by an explosion, like Krakatoa and Tomboro, for there is no trace of the fragments anywhere in the country round about. But the pumice and tufa which surely emanated from this crater are seen in vast quantities anywhere within a radius of twenty to sixty miles, and in quantities ample to fill the whole vast crater twice over. The age of the crater is wholly post-glacial. I have found at the extreme crest of the wall on the western side splendid examples of glacial striation, while the old moraines are half a mile to a mile below. That the age of the *caldera* cannot be great is evident from the fact that though the walls are crumbling at a very rapid rate, the talus has not only not reached the water surface anywhere, but the sounding discloses little of it at the bottom."

Photometry.

In a note to the French Academy of Sciences, M. Charpentier points out a curious defect of the human eye, which is of great consequence in photometry. Take two sources of light, red and green; let them form on the photometer screen two disks of apparently equal brightness. Now approach the screen so that the disks appear to the eye to be larger; the green appears the brighter of the two. If the disks appear smaller, the red gains in brightness.

A new photometer has been introduced by Messrs. Yeates & Son, of Dublin. It consists of two prisms of solid paraffine connected together on one side, but with a layer of silver foil between them. This foil acts as a reflector for each, while, at the same time, it prevents light rays traveling from one prism to the other. When two illuminants are to be compared, they are placed on either side of the double prism until the illumination of each paraffine surface is equal. The distances of the two lights can then be measured, and the result recorded in the usual way.