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THE BROADWAY AND SEVENTH AVENUE CABLE ROAD.

The operations for converting the Broadway and Seventh Avenue street railroad of this city into a cable traction road are now under way. As this is the representative of a number of roads under the same administration, and as the work marks the first application of the cable system to railroads in the downtown business districts of the city, the operations have a definite meaning. It marks the first step in making this a city of cable roads. The Third Avenue railroad company is committed to a cable system which may be in operation as soon as the Broadway and Seventh Avenue company complete their change. It is said that the Sixth Avenue railroad also propose making the same change. Then, by bringing associated lines under the system, the street car horse may, within a few years, be almost banished from our streets.

As yet the operations of installing the cable system are in a very early stage. Our illustrations show the work in progress and the difficulties that have to be contended with. Up to the present time the work has not reached the stage of actual construction. The contractors are only clearing the way for the introduction of the cable duct.

The first step in the work was executed by the railroad company, and was in the nature of reconnaissance or exploration. The road starts at the southern extremity of the city, and runs up Whitehall Street to Broadway. Thence following the line of Broadway, which is not a perfectly straight one, it goes obliquely through the city to Seventh Avenue, near 44th Street. Near this point Broadway and Seventh Avenue cross each other at an acute angle. Diverging slightly to the right, the road follows Seventh Avenue and continues to 59th Street, terminating at one of the en-

trances to Central Park. The entire length of the road is about five miles. To ascertain what work was necessary to clear the ground of obstructions, this entire line was examined. At every intersection of a cross street, one or two cross sections, showing the pipes, electrical conduits, etc., underlying the street, were prepared. Some of the data for these cross sections were obtained from any records that were found available. Such records were far from complete. The work done on the electric subway vaults or manholes furnished another source of information, but much of the data were determined only by actual digging.

In this way a great number of cross sections were determined. To illustrate the nature of the work, we reproduce one of such sections and show in the other cut what appearance the ground in the vicinity of the same cross section presented when excavated. The

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THE BROADWAY AND SEVENTH AVENUE RAILROAD—CLEARING OBSTRUCTIONS FROM THE LINES OF THE CONDUITS.

THE BROADWAY AND SEVENTH AVENUE CABLE ROAD.

(Continued from first page.)

locality was at the intersection of Fulton Street with Broadway. Although this is but half a mile from the southern terminus of the road, twenty-one such cross sections were plotted at intermediate points between the line of this section and the end of Whitehall Street. This fact gives a good idea of the extent of work required to determine what had to be done in the way of clearing the ground. The illustrations also show how many are the obstacles in the way of prosecuting the work.

The next step in the work is the clearing of the ground. This is now in progress. For this purpose, wherever necessary, the tracks are temporarily shifted to one side, and the ground is excavated on the line of the conduits. The pipes are moved and shifted as required, so as to leave everything clear. At the present time this work is being prosecuted at many points upon the line of the road, so that no delay shall be experienced in putting the conduits in place, once the operation begins.

A careful recapitulation of the obstacles in and upon the ground at the point illustrated gives no less than twenty-five classes of incumbrances or occupants of the street, either on the surface or below it. In the category are included gas and water mains, valves for gas and water, sewers, with their manholes, basins and connections, Edison electric conduits and manholes, electric subways with their vaults, service boxes, and air pipes, commercial cable conduits and vaults, pneumatic tubes, steam pipes, with expansion joints, return pipes, valves, and valve stems, cellar vaults, and finally the horse railroad tracks. A perspective view of the incumbrances, pipe lines, etc., completely exposed as if by an excavation, produces the effect of a perfect labyrinth of cross connections and parallel lines at various depths. What the outcome of it all will be in the future it is hard to say.

The lesson taught is obvious. To lay pipes and conduits in the earth as has been done in this city is opposed to every principle of municipal engineering. The growing complication is bringing about a condition of things which may yet lead to serious results. There is but one way to escape from the difficulty. It is to construct an adequate subway to contain the entire mass of pipe lines and possibly the sewers also. The complication is increased in many cases by the use of two or more pipes to do the work of one. If a proper subway were provided, the operations of substituting a single large duct for two or more small ones, and in general any operations tending to simplify the underground distribution of light, heat, and power, could be readily effected. The present time is most favorable for such an operation, as Broadway will soon receive a new and expensive pavement, which it would be poor policy to lay until there is no danger of disturbing it.

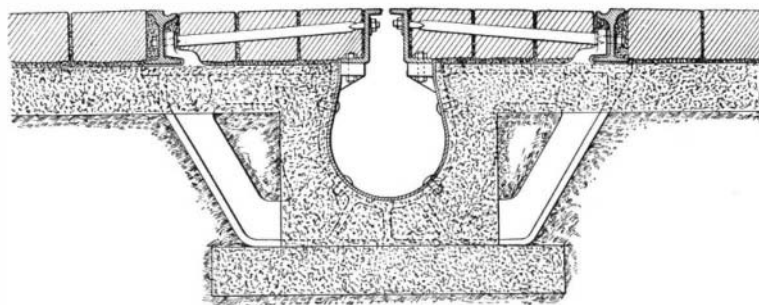
The original plans for the cable road contemplated

Seventh Avenue Railroad Company is Mr. Geo. W. McNulty. The work is being executed by the contractors, John D. Crimmins & Bro., of this city.

The public will be benefited by this improvement, not only by the removal of so many horses from the street and by the improved service certain to be afforded, but the new rails will lie flush with the pavement and will have so small a groove as not to interfere with carriage or truck wheels. The question of different speeds on the upper and lower portions of the road is also a matter for consideration in the near future.

Electricity for Domestic Purposes.

The *Pall Mall Budget* says one of the latest adapta-



CROSS SECTION OF THE CABLE ROADWAY AND CONDUIT.

tions of electricity to domestic purposes, in London, is the establishment of telephonic communication between the servants' hall and the other rooms in the house. There is very little expense in the installation. The common ordinary wires of the ringing bells are used without any alteration. A telephonic mouthpiece is provided at each end, and if you wish to summon the servant, you ring the bell as usual, and then speak your message to him over the telephone. The advantage to the servant is plain. It saves him or her one journey up and down stairs. Suppose you make up your mind, half an hour before your usual dinner time, to dine out, and suppose you wish to communicate this piece of intelligence to the servants. Under the present system it is impossible. You may ring, and they will jump to the conclusion that you want your dinner quickly. Give two peals, and they will only think you are in an extra hurry. You must wait till the soup is brought up, before you have a chance of putting in a single word, whereas in future you will merely have to ring the bell and then telephone, "I shall dine out. Get me a cab."

Damages for Non-Delivery of Telegram.

A distilling company sent a message to boiler-makers in a neighboring city notifying them that a boiler was out of repair and asking them to "send man at once." By reason of the failure of the telegraph company to transmit or deliver the message, the distilling company was compelled to suspend operations for twenty-four

sent, he could not have done the work. Rich Grain Distillery Company vs. Western Union Telegraph Company.

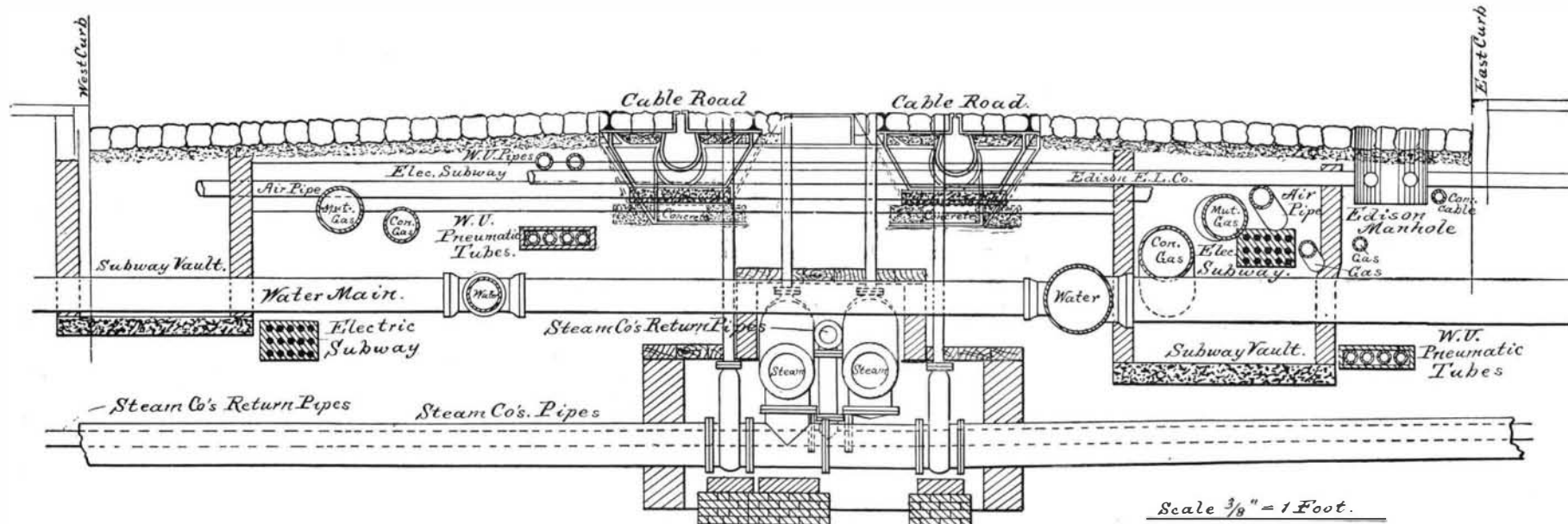
The Tallow Tree in China.

Mr. Hosie, the British consul at Wenchow, in his last report describes a curious vegetable product which is cultivated in his district. This is the tallow tree (*Stillingia sebifera*, Roxb.), the fruit of which produces oil as well as tallow. The berries, which resemble coffee beans in appearance and size, are first steamed and then pounded in an ordinary rice trough. By pounding, the soft mealy mesocarp is partially separated from the kernels. The whole is then placed in a bamboo sieve, the meshes of which are just large enough to allow the mealy matter to be scrubbed through, and small enough to keep back the kernels, which are hard, black, and about the size of peas. From the mealy matter the tallow is expressed in primitive wooden presses. To obtain oil, the kernels are dried and passed between two millstones held at such a distance apart, by means of a bamboo pivot, as to crush the hard shells of the kernels without injuring the white interiors. The whole is then passed through a winnow, which separates the broken shells from the solid matter. The latter is then placed in a deep iron pan, and roasted until it begins to assume a brownish color, the process being accompanied by continual stirring to prevent burning. The crushed shells make an excellent fuel for the purpose. It is then ground by a huge stone roller in a circular stone well, steamed, made into circular cakes with bamboo and straw casings, and passed through the wooden press. A good lighting oil of a brownish yellow color is thus obtained. The tallow is called "p' i yu"—that is, skin or external oil.

Mysteries of Malaria.

Walter Coote, author of "Wanderings, South and East," who has been at the Fiji Islands, has the following notes upon the vagaries of what is called malaria, the strange ways of which, *The Christian at Work* adds, are often past finding out:

"I have seen Englishmen living in Fiji, on the borders of almost stagnant estuaries, with the densest and most rank vegetation around them on all sides, with mosquitoes and a hundred such insects infesting the district like a plague; in dry seasons their houses will stand in the very center of great plains of reeking ooze, in times of flood the muddy river will rise to their very verandas, and yet these people are robust and healthy. I have gone from there, and a few weeks later visited islands in the Solomon group, or New Hebrides, where I have found a dry coral soil and high land, upon which the pure trade wind blows freshly month after month, steep land, too, from which the rain water is quickly borne downward to the sea, and all this but a few hundred miles from the Fiji group, and in the same latitude, and blown upon by the same trade wind, and yet in these places it is almost death for a white man to spend more than a few months in



CROSS SECTION OF THE STREET AT BROADWAY AND FULTON STREET.

an excavation of the width of the entire roadway. But it was found that this complicated operations, as the prism to be cleared was of too large section. Accordingly it has been determined to put each conduit in separately. The general construction is shown in the cuts. The slot is firmly tied, so as not to close. Improved rails are used, which will not interfere with traffic. Two power stations will probably be used, one at Houston Street and other at 51st Street. The conduit will be 24 inches deep and 15 inches wide. At intervals drainage pipes will be inserted connecting with the sewer, to carry off any water that may find its way through the slot. The engineer for the Broadway &

hours longer than it would have done had the message been transmitted and delivered in the regular course of business. The Superior Court of Kentucky held in an action against the telegraph company that the sender of the message was entitled to recover for the additional expense incurred in feeding cattle, and the additional amount paid to hands, by reason of the delay caused by defendant's failure to transmit the message. The court said that as it was the business of the firm to which the message was sent to send men to repair boilers, it must be presumed that they would have followed their usual course of business, and it was not reasonable to presume that had the man been

the year on shore, and practically no one who lives ashore at all can hope to escape frequent and severe attacks of fever. In fact, it is only by being thoroughly acclimated, through a long period of time, that he can hope to live there at all."

AMONG the useful institutions of Chicago is the Watchmaker's Institute, Athenæum Building, Van Buren Street. Here, for \$25 a month, pupils receive both theoretical and practical instruction in all branches of the art. The most improved tools are used, and the utmost pains taken to instruct the learners thoroughly.