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Contents.

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TABLE OF CONTENTS OF
THE SCIENTIFIC AMERICAN SUPPLEMENT
No. 367,
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PERILS FROM SUSPENDED ELECTRIC WIRES.

The promoters of electric lighting confidently promised at first that the new illuminant would insure complete immunity from the peculiar fire risks and dangers to life and health incident to the use of gas.

The promise has been fulfilled; but unexpectedly, the use of electricity for public lighting has developed a variety of public perils as numerous and serious as any due to illuminating gas, and far more subtle. Scarcely a day passes without some new and surprising development of this character; and though the discovered perils may not always be essential to and inseparable from the use of electric lights, the majority of them certainly are inevitable consequences of the present mode of distributing the electric current by means of wires suspended in the air.

The enormous extension of telegraphic and telephonic communication in this and other American cities has filled the air with electric wires, with connections in almost every house. The wires, and the instruments used with them, are designed for service with currents of small quantity and high tension. Until the introduction of suspended conductors for the larger currents employed in electric lighting, the multitudinous telegraph and telephone wires were no more than harmless offenders against æsthetic propriety. Crossed by electric light conductors they at once become the means of ever impending fire hazard, for the current diverted by the slightest contact with an electric light conductor suffices to heat the coils of telephones and telegraphic instruments to such a degree as to destroy them and at the same time set fire to any combustible matter near at hand.

But this is not the only peril incident to such contacts. An officer of the Fire Department of this city reports that during a recent fire the assistant foreman of a fire company received a severe shock when he went to release the key of a fire alarm box near the scene of the fire.

The inference was that the fire telegraph wire had been accidentally crossed by an electric light wire, and that, had the pavement been damp on which the fireman stood, so as to make good "ground," the current passing through his body might have killed him on the spot.

Only a few days before, an accidental contact of an electric light wire with a fire service telegraph wire resulted in the destruction of the electro-magnets in a dozen fire alarm boxes in Nassau, Liberty, Fulton, Beekman, Greenwich, and Hudson streets.

By spoiling the means of instant communication with the fire service, in case a fire should break out, an accident of this nature is obviously a very serious affair. And quite as undesirable as the interruption of the fire alarm service is the development of a feeling among firemen and citizens generally that the legitimate use of an alarm box involves a peril that may be as sudden and deadly as a stroke of lightning. Telegraphic switch boards and telephonic instruments are similarly made more or less hazardous to use by the same misdirection of electric light currents.

Still more recently, at a fire in Fourteenth street, some broken telegraph wires in front of the burning building fell across an electric light wire, and became entangled with the firemen's hose. It is probable that the heated telegraph wires burnt through the insulating cover of the electric light wire, so as to establish contact. At any rate, when a fireman went to free the hose from the wires he received a severe shock. Enough of the current of the electric light wire had been diverted through the broken telegraph wires to the ground to make it unpleasant if not dangerous to handle them.

It is submitted that, so long as the present system of suspending electric light wires on poles is maintained, one or more members of each fire company should be instructed in the art of manipulating electric conductors, so as to be able to cut and secure any electric light wires that the firemen might encounter or with which broken telephone or telegraph wires might be dangerously fouled. The fire authorities suggest that the engine houses be telephonically connected with the electric light stations, so that an electrician may be called when needed for such service. But that method would be too slow and uncertain; the cutting and securing of electric light wires is a simple matter, and the man to do it should be always at hand.

To facilitate such work, or rather, to make it unnecessary, it would be easy for the electric lighting companies to provide at suitable intervals, for the use of firemen, properly guarded switches or other means for cutting out from any fire threatened block any electric currents which might be liable to trouble or imperil the firemen.

Better still would be a law requiring all electric light conductors to be securely boxed or buried, so as to be out of the way of possible contact with telegraph or telephone wires. The street mains might be placed against or under the curbstones or beneath the sidewalk, and under the pavement at street crossings. This at one stroke would eliminate the graver perils incident to the present method of running the lines through the air.

With the rapid extension of electric lighting by means of arc lights, the hazard of life and property arising from misdirected currents has suddenly become one of the most serious as well as alarming of city evils. And it is certain that were the community to fully realize the subtlety, pervasiveness, and indeterminableness of the perils arising from vagrant electricity, as it would if each diversion of an electric light current were accompanied, as the not more dangerous lightning stroke is, by a peal of thunder, there would arise a speedy and positive demand for the adoption of safer modes of distributing this useful but treacherous agent. One thing is evident: the present mode of suspending electric light wires will not answer. And the sooner the electric lighting companies adopt a better method the better it will be for them, as well as for the public at large, for every day's extension of the present system increases the cost of displacing it; and its ultimate displacement is inevitable.

TESTING AND IMPROVING CAST IRON.

It is well known that ordinary cast iron, such as is used in the production of the stationary and moving parts of machinery, is of a granulated texture, the grains being so much separated as to present a mottled or honeycomb appearance, even to the naked eye, and when cut by the planer, chisel, or the lathe tool showing a dark gray surface. When this surface is filed, so as to reduce its irregularities, the color is brighter and the apparent dark interstices between the grains are reduced. But these reductions are only apparent; for if the finish of the surface is carried farther, so as to give a nearly uniformly bright color, and then lightly treated with an acid, as sulphuric or nitric, or a mixture of both, the granular form will be manifested more strongly than when the iron was simply planed or turned. Indeed, the softer portions, which fill the pores between the real iron grains, will be eaten out by the acid, leaving plainly observed protuberances, which consist of the granules of the iron. So distinct is the difference, not only between the iron granules and their envelope, but also between the size of the granules, that a very slight magnifying power will show it.

Under the glass the surface of a smoothed and acid washed piece of cast iron represents very nearly that of an emery wheel, the particles of emery (iron) being more or less embedded in the surrounding material, some showing more and some less of their bulk.

If the spaces between the iron granules could be reduced, it is evident that the entire mass would be stronger; for they are usually filled with material that is of no value except as a means of cohering the particles of iron. And not only would the mass be stronger, but it could be worked with more economy of time and tools; for flint and sand are deadly enemies to a tempered steel edge. And not only would the mass be stronger and be worked at less expense, but it would present a far more attractive appearance when finished, whether that finish was for ornament only, for use and wear, or for painting.

From these remarks it appears that a method that could remove a part of the extraneous material that usually envelopes the grains of iron in a casting would improve the character of the iron; for in an iron casting it is the iron we seek, and not non-metallic and foreign material. In the foundry the prevention and removal of extraneous matter is partially provided for by careful skimming of the surface of the melted iron in the ladles, and by a rise gate in the flask, the latter giving an opportunity for a partial removal of the scum that escapes the skimmer.

But there should be a far more radical means of improving the quality of cast iron; and experiments are now being made in one of the most prominent establishments in the country, to produce a satisfactory result in this direction. The experiments consist mainly of trials of mixtures of different iron, in varying proportions in the cupola. And the first step in this direction is the procurement of pig from different ores, and subjecting it to a series of tests by surface polishing, etching, and examination under the glass, and also by examining the fracture of a breakage. The different grades of iron are then selected and tested in the cupola, and again by examination of finished surface. So far successful have these experiments been that mixtures of irons have been determined upon for different products, and it is expected that the trials will ultimately result in the production of an iron that shall work much easier than that now in use, shall be stronger, shall present a much finer surface, and shall require less fuel and time in melting in the cupola.

The establishment to which reference has been made has already adopted some of the suggestions indicated by the results of these experiments, and if the cost of their castings has not been reduced as they come from the foundry, the expense of preparing them for use by means of planer, lathe, drill, and other tools has been considerably lessened, while the ultimate product is vastly better than formerly. A single statement will convey an idea of the decreased cost of working a casting of this selected iron.

The same planer cutter used under exactly the same circumstances dressed an area fourteen times greater, without the necessity of being reground, than it did of the best ordinarily used iron. More definite information will be given when the experiments now in progress have been completed.

Cheese in Central New York.

The principal markets of the dairy region of New York are Utica and Little Falls. At the last meeting of the Utica Dairymen's Board of Trade for the season just closed, the Secretary, Mr. B. D. Gilbert, presented a report of the year's work. The season lasted from May to December. The cheese sold at Utica was 13,230,120 pounds; at Little Falls, 12,790,500. The average price was 11½ cents a pound.

The cheese industry, as represented by these two, the principal markets of the dairy region of New York, brought its patrons in seven months of 1882, $2,992,430.25. The total receipts in these two markets last year were $3,268,950; in 1880, $3,800,436. The falling off this year is attributed to the late opening, the cold spring, and dry summer.