

often embodies impurities and incipient cracks which may radiate to the surface after long use and cause disaster. The same idea of hollowing out is carried through the entire system, even the crank pins being bored. The rule is now for 8 to 10 horse power to each ton of machinery, including boilers and all appurtenances.

THE dates of the coming convention of stationary engineers, to be held in Montreal, have been fixed so as to enable the visiting delegates to take in the Montreal Exposition. The exhibition begins on the 4th September, lasting till the 9th, and the convention of engineers will be held on the 7th, 8th and 9th. A number of delegates will come from Chicago and the west, and will be joined by a contingent coming on by way of Niagara Falls. Seventy-five to one hundred are expected from the United States, and a number of interesting papers are to be read. We understand it is proposed to have a display of models of inventions, and that the exhibits of machinery will fill all the space available for that department in the present buildings. These features might be made very interesting if the management give the matter their attention.

AN inquest was held on the body of Joseph Lanthier, who was killed in the machinery of the Royal Electric Company's works, Montreal, when a verdict of accidental death was rendered. The jury added the recommendation that "in future proper safeguards be placed around all shafting." This is rather a reflection on the administration of the factory act of Quebec, and at the same time an index of popular ignorance on the same subject. While one cannot say that the factory inspectors are chiefly to blame, it must be confessed that in some respects the factory act of Quebec is so far a dead letter. In Ontario the factory act is fairly well administered, and, as a consequence, accidents are far less numerous, considering the larger industrial population, than in any other part of Canada. None of the provinces of Canada except the two named have laws regulating factory work, and for the sake of uniformity in the law, as well as uniformity in the administration of it, it is a great pity that this had not been made a subject for federal, instead of provincial legislation.

IRON and lead pipes rapidly oxidize, and consequently contaminate more or less the water which passes through them; but for want of a better means of conveyance we use them for our water supply. Some Belgian engineers have been experimenting with glass pipes, which they make capable of resisting great interior and exterior pressures in the following way: They place glass tubes in metal tubes of slightly larger diameter, and fill the space between the two with a special kind of cement which perfectly unites the two tubes. It is found that these compound pipes will bear a very great internal strain without damage to the glass, while they present to the external strains rather more resistance than the metal pipe would alone. The method of manufacturing is applied not only to straight pipes, but to every form and shape of conduit. The ends of the pipes can be fitted with flanges so that they can easily be hermetically joined by means of gutta percha washers. These pipes would also appear to be suitable for running electric cables in, as they would not require further insulation.

THE necessity for such an improvement in the waterworks system of Montreal as will prevent a calamity in case of the breakdown of the present ma-

chinery has long been felt, but has of late been urged so strongly that two engineers, Mr. Keefer and Mr. Vanier, have been appointed to make a report on the subject. Each engineer will make a separate report, but both will recommend some essential improvements. About twenty years ago Mr. Lesage proposed a large aqueduct to tap the river above the Lachine Rapids, at a cost then estimated at \$2,000,000. Such a scheme would mean a larger expenditure of money now owing to the increased value of the land, but it would be far cheaper now than ten or fifteen years hence, and now that the electric light can be so economically produced by water-power, the city might make the aqueduct a source of actual revenue by supplying the citizens with electric light. Such a system could easily be inaugurated by the time the present expensive lighting contract expires ten years hence. If the engineers were to make such a recommendation, we are sure it would be heartily endorsed by the citizens of Montreal.

E. S. FERRY, in the *Electrical World*, comes to the conclusion that electrical oscillations and light are identical. The principal points in which they agree are in velocity, reflection, rectilinear propagation, interference, refraction, absorption by material substances and polarization. Practically, the only difference appears to be in the wave lengths. The oscillations of light measure about the hundred thousandth part of an inch, while it is difficult to produce continuous electrical oscillations of less than a foot. The question is, how to produce directly very short wave lengths. So far, only half-way and very meagre solutions of this problem have been offered; but the outlook, on the whole, is by no means discouraging. Hertz, by means of an induction coil and condenser, has set molecules in a rarified atmosphere into such rapid vibration as to produce light, and Tesla has done the same thing with the aid of a special multipolar dynamo. This question is of great importance when wireless telegraphy is under consideration. Much has already been done in this direction, and much more will undoubtedly be done by the aid of electrical oscillations of high power and frequency. The Edison method of telegraphing from moving trains is probably the best known practical application of electrical oscillations in air to commercial practice. Betts' method of telegraphing between ships at sea is another well known application, and depends upon the transmissibility of electrical oscillations through water. Although these methods are far from perfect, the end seems not distant, and we can confidently expect that in the near future we will be able to telegraph on land and sea without wires with great ease by means of electrical oscillations of high power and frequency.

#### THE IRON SITUATION.

Everyone who has studied the subject realizes that the present iron tariff of Canada is neither fish, flesh, nor fowl. The Government have arrived at an uncomfortable half-way house, and must either turn back or go on. In taking either course, they are confronted by an unusual tide of changes in both the United States and Great Britain—the two countries above all others which exert a vital influence on our own markets. In Great Britain, the year 1892 was, in the words of the President of the British Iron and Steel Institute, "one of the worst years ever known in the iron and steel industries, and these industries are still greatly depressed. The production of pig-iron fell off 600,000 tons, and steel rails are in a worse condition. The