

WE feel under a debt of gratitude to our contemporaries for their generous references to THE CANADIAN ENGINEER. It is not often that a new paper has been so kindly and warmly received, and we hope to deserve the good opinions our *confreres* have been so kind as to express. The many new subscribers we are receiving are equally warm in their expressions towards this paper, and our earnest endeavor will be to deserve the confidence which has been so quickly and so unstintingly placed in us. The paper will be found not to be without faults, and we shall take it as a favor from any reader who will point out a defect or make a suggestion for future improvement.

It is very much to be regretted that with all the suspicious circumstances surrounding the Government canal works in Montreal, the Government should lay themselves open to the charge of cruel neglect in the pay of the men. The families of many of their workmen are said to be bordering on a state of starvation, caused by not having received their pay for the last three months. The fact of the suspension of Mr. Kennedy is no excuse whatever for keeping these workmen out of their well-earned pay.

THE work on the Chignecto, N.S., marine railway has been stopped for some time owing to the depletion of funds necessary for construction work. The company hoped to raise by the 1st July the extra £300,000 necessary to finish the work, but great difficulties are in the way owing to the condition of the money market at home. Another difficulty is the pronounced opinion of many captains and vessel-owners that the strain upon a heavily laden vessel when lifted out of the water on these immense trucks will be greater than can be safely borne. Friends of the undertaking are confident that as soon as money becomes easier, the work will be successfully carried out.

THE fact is now becoming more recognized that the rapidity with which the electrical energy of the Hertz Resonator is dissipated is increased by the magnetism and resistance of the conducting wire. The dissipation may take place either by transformation into heat in the conducting wire, or by radiation across the dielectric medium. The transformation into heat, which perhaps is more probably the cause, takes place in the thin superficial layer along which the electric currents flow. To ascertain the thickness of this layer, V. Bjerknes covered the iron wire with thicker and thicker electrolytic layers of copper, and found that the deflections of the electrometer increased as the value of the deflections which took place in the case of the solid copper wire; when the layer had a thickness of 0.01 mm., the difference between the wires disappeared. He next covered the copper wire with electrolytic layers of iron, and even a layer 0.0002 mm. thick had an appreciable effect. The value which the deflections had in the case of the solid iron wire was very soon approached, and when the layer exceeded 0.003 mm. in thickness, the difference totally disappeared. Mr. Bjerknes concluded, therefore, that the currents penetrate less deeply into the magnetic than into the non-magnetic metals. The part taken by magnetism in the dissipation of electric energy is thus explained. The currents are confined to a thin layer and encounter greater resistance; consequently, there is a greater generation of heat.

TEMPERING STEEL BY ELECTRICITY.

When a strong current of electricity is passed through an electrolyte, the negative electrode being a fine wire, and the positive electrode a conductor of considerable surface, a luminous sheath is formed around the negative electrode, and, at the same time, the heat developed is very great. By its means a very intense heat may be applied to any particular point, while, on account of the rapid disengagement of this heat, the surrounding parts remain cold. This principle has been applied to a process of tempering and hardening steel. The outside of a bar of steel has been heated by this means to a bright red heat, and then, the current having been stopped, the cold electrolyte was allowed to come in contact with the hot steel. The outside of the steel can thus be hardened to any degree, while the inside, not having been heated very greatly, remains soft and tough.

STEAM ENGINE JACKETS.

The Research Committee appointed by the Institution of Mechanical Engineers of England, for the purpose of deciding upon the value of steam jackets, have just presented the second part of their report. From this it appears that the expenditure of a quantity of steam in a very large jacket causes the saving of a greater quantity in the cylinder. An important factor in such an investigation as this is the exact ratio between the two quantities. One experiment showed that for every 1.13 pounds of steam expended in the jackets there are 5.82 pounds less feed water passed through the cylinder, the nett saving thus being 4.69 pounds. The smaller the cylinder, the greater is the usual gain from the use of a jacket; for a smaller cylinder presents a larger surface of jacket for a given weight of steam passing through it than a large cylinder does. In the test of a triple expansion condensing vertical inverted engine having cylinders 5, 8, and 12 inches in diameter, and 10, 12 and 15-inch stroke, the engine being on three uncoupled cranks, it was shown that without the jacket 16.42 pounds of feed water were recorded for each horse power per hour; while, with the jacket, only 13.56 pounds were recorded. In this case, 64.7 per cent. of the internal surface of a high pressure cylinder was jacketed, 67.1 per cent. of that of the intermediate, and 75.2 per cent. of that of the low pressure cylinder. The committee found that engineers were practically unanimous as to the advantage and economy of using a steam jacket, but were divided in opinion as to how far the principle ought to be carried. One speaker mentioned that he had known instances in which the required power had not been developed until the pistons had been arranged to take steam inside. The piston rods should also be jacketed, he said, as, by passing from the cylinder to the outside air, they must necessarily carry off and waste a considerable amount of heat. The speaker also stated that he knew of an engine the power of which had been increased from 41½ horse power to 49½ horse power in five minutes by putting the steam jacket into use.

TESLA holds the opinion that the earth is a great insulated globe filled with electricity, or the capability of electrical vibration. The only problem is to awaken this electricity, to shake the earth so that this immense force may be set working. For instance, there is enough latent power in Niagara Falls to do this easily. How to utilise it, how available to store it when obtained, is the question.