

tory, but as an auxiliary plant. If the storage battery should be employed in this manner by the Cataract Power Company and be found satisfactory, it will undoubtedly result in other companies following in their footsteps, and will give encouragement to the storage battery industry in Canada.

Extension of Canadian Telegraph System.

THE Dominion government is about to undertake the construction of two quite important extensions to its telegraph system, both of which will involve rather uncommon engineering features. One of these is a line from Lake Bennett to Dawson city, in the Yukon district, for which three hundred and thirty thousand pounds, or one hundred and sixty-five tons, of iron wire will be required. The second is the extension of the Gulf of St. Lawrence telegraph system from Big Roumaine, Quebec, to Chateau Bay, Labrador, opposite Belle Isle, a distance of 315 miles, and which has been frequently asked for by the shipping interests. In connection with the latter extension, it is not improbable that wireless telegraphy will be employed to communicate between Chateau Bay, on the Labrador coast, and Belle Isle. It is said that the experts are as yet undecided as to how the connection will be made. The laying of a cable would be the most simple method, but it is feared that it might be broken by the grounding of icebergs in this narrow strait. About the only alternative, therefore, seems to be the adoption of a system of wireless telegraphy, and this course is understood to be under consideration. The demonstrations that have been made of this system would seem to place its practicability beyond question, and its adoption in Canada to a greater or less extent may be expected to follow in the near future.

Pumping Water by Electricity.

THE Cataract Power Company have made another proposition to the city council of Hamilton to pump the water supply of the city by means of electricity, instead of steam, now employed. The revised offer is said to be more favorable than the previous one, and there is a probability that eventually satisfactory terms for performing the service will be reached. The Cataract Power Company contends that by the introduction of electric power a considerable saving in cost of operation can be effected. The pumping of water by electricity, not a new idea, opens up another field for the central station manager to exploit in his search for a market for the output of his station. Where the water supply is pumped by electricity, it may be found expedient by some cities and towns to adopt a system of water purification by means of the electric current. We observe that in St. Louis such a method has been adopted with satisfactory results. The system consists in admitting the water to be purified into a tank divided into small compartments. In each of the latter a pair of electrodes are located, the positive being attached to the bottom of the compartment, while the negative floats upon the surface of the liquid. As these receptacles are presumably non-conductors of electricity, when the current is turned on it naturally passes through the water from the positive to the negative electrode, and by decomposing it liberates hydrogen, which escapes to the surface, carrying with it all foreign matter and impurities. In Paris, France, the Tindal system is in use. This consists in forcing air that has been subjected to the action of a high tension electric

current, and thereby ozonized, into the water to be purified. The cost is given as .028 of a cent to sterilize one cubic yard of water, which certainly seems very reasonable.

The Record of Acetylene.

THE Canadian Manufacturer, apparently with the object of securing the favor and incidentally the advertisements of the manufacturers of acetylene gas machines, charged this journal with having misrepresented the extent of the development of acetylene lighting by publishing statistics compiled by the Canadian Electrical Association. Our answer showed clearly that no responsibility attached to us for the correctness or otherwise of these statistics, which were published as a part of the proceedings of the Canadian Electrical Association convention. The Manufacturer, evading entirely this, the main point, in our reply, returns to the attack in this manner: "Our esteemed contemporary gives itself away, for in the very letter that it alludes to from a manufacturer of acetylene gas machinery, data is given that disproves the assertion that there are only 155 machines in use in Canada. If the Electrical News desires to verify its unverified statement, we will have pleasure in giving it the names of a few Canadian concerns whose annual output each is in excess of the gross number mentioned in the statement alluded to." As to the correctness or otherwise of the statistics published, the editor of The Manufacturer should have addressed himself to the Canadian Electrical Association, under whose direction the figures were compiled and given to the public. Incidentally it might be mentioned that the editor of The Manufacturer "gives himself away" when he alludes to data given in the letter of a manufacturer of acetylene apparatus, mentioned in our previous reply, which letter, through an oversight, was not published in our September number.

LIQUID AIR.

PRIOR to 1887, says the Engineer, air was thought to be a permanent or incondensable gas, but it was liquefied simultaneously by Messrs. Pictet and Caillete at that time, though at an enormous expense. About 200 years ago the lowest temperature thought to be obtainable was produced by a mixture of snow and ice, and was used by Fahrenheit in establishing a zero for his thermometric scale. Since that time scientists have reached a temperature some 400 degrees below the lowest point ever reached by Fahrenheit. Of the three known methods for producing cold, the first, i.e., by the rapid solution of a solid was used entirely up to 1820 and yielded a temperature of 50 degrees below zero centigrade. The other two methods are the rapid evaporation of a volatile liquid and the rapid expansion of a cooled and compressed gas. By a combination of pressure and refrigeration, Faraday in 1823 liquefied all except six of the existing gases, but it was not until 1869 that it was discovered that these gases must first be cooled to a critical temperature. By subjecting hydrogen to an enormous pressure and at the same time lowering its temperature it was found possible to liquefy it. Hydrogen has a critical temperature only 33 degrees C. above the absolute zero of temperature. From the experiments performed, the conclusion was drawn that solids, liquids, and gases were but different forms of matter through which any substance could be made to pass by the addition or withdrawal of heat and pressure.