

THE ELECTRIC LIGHT.

MR. E. B. EDDY'S NEW ENTERPRISE—AN EVENT
LONG TO BE REMEMBERED IN HULL.

On the 14th inst., the public of Ottawa and Hull had for the first time a full practical test of the value of the electric light. Much as has been written and said upon this subject, vivid as may have been the description of it, clever as may have been the theories advanced about it, nothing could have brought its beauties and utility so lucidly home to the minds of the public at large as the grand exhibition of its powers as shown in the extensive works of the most enterprising and shrewdest business man of the Ottawa Valley, Mr. E. B. Eddy, of Hull. Mr. Eddy, in its adoption, has, of course, been actuated by a desire to have what was best at the cheapest rate. No false economy. In all his transactions he fully realizes that there is that which scattereth abroad, and yet increaseth. In nothing is found penny wise and pound foolish, and the success of the electric light in factories is another laurel added to his great and growing wreath. The fact that his mills and factories would, for the first time, be illuminated by electricity sufficed to draw a great crowd of visitors to the spot from the city, and the population of Hull was out en masse to see what would be the result of the last experiment of the active business mind which has almost built up the young city. There are few in Central Canada who will not accept his conclusions as correct, but his most ardent admirers were hardly prepared for the sight that awaited them. Crossing to Hull from Ottawa just as twilight was fading away, the northerly bank of the city seemed bathed in a mellow moonlight, but as it was long before the hour of Luna to be on her course along the horizon, the effect could not be attributed to her gentle influence. On reaching the Union Bridge the cause was self-evident. Hull seemed to have instituted an independent "order of full moons." Three grand lights, in size larger than any star, with a wonderful brilliancy, and not less inviting to the eye than the moon, lighted up the whole scene, showing the fine tracery of the bridge, the fine spray of the Chaudiere, and the bold outlines of the buildings on both banks of the river with wonderful distinctness. Advancing towards Hull, the light became gradually brighter, the shadows defined more sharply, and faces and colors more easily distinguished, and even the most skeptical were fain to confess that the light was a grand success. It was, however, in the vicinity of Mr. Eddy's mills that the beauty and effect of the light was most brilliantly brought out. The wide spread yards were all as bright as day, the windows of all the shops showed as if suns were beaming inside them, while the lights in the other mills and the shop windows of the city wore a sickly glare, like the dying torches at the end of political demonstrations. In the big mill, in which all the machinery had been stopped, and which was thrown open to all visitors, the sight was a study. The building was crowded with visitors, and here better than anywhere else the purity of the light was visible. The most delicate colors were as plainly discernible as in the brightest sunlight. Among the dresses of the many ladies who crowded the place with very young children, the gayest toilets shone out in their full beauty. No confounding greens with blues, no turning delicate maues into vulgar reds. It was no wonder that the expressions "C'est beau," "C'est magnifique," were frequent on the lips of the lady visitors. The work that Mr. Eddy has undertaken in introducing this light into his premises it would not be easy to rightly picture, and the best description of it will give but a feeble idea of its magnitude. The total number of lights employed is forty, extending from his residence at the corner of Main street and Brewery street to the river bank opposite the Parliament Hill, and all through the various apartments of his numerous factories, storehouses and mills. These lamps are located as follows:—One in the front of his private residence, which throws a brilliant light over the whole square down to the river's edge; four in the ash factory, two being on the first floor where the planers are situated, and two on the second floor which is occupied as the window-frame and cabinet makers' department; one is

located in the box shop, by no means the least extensive of the premises; two others are in the circular sawmills; three more are found in the large sawmill; two on the upper platform; two more in the small sawmill; three under the main platform; four in the mill shop; one in the machine shop; five in the match shop; one in the washboard shop; two in the lower sawmill, one on the lower platform, and four in the lumber yard. Each of these lamps has an illuminating power equal to two thousand candles, and sheds a brilliant light, with strongly marked shadows, over an area of 12,000 square feet, the whole of the lamps having an illuminating power equal to 80,000 candles, and lighting a combined area of 480,000 square feet. The machinery from which this light is derived is placed in what was formerly the stone grist mills occupied by McCormack & Sons at the back of the match factory. The machine used is the "Brush dynamic electric," size number 8, and driven by a powerful turbine wheel. Its dimensions are 89 inches in length, 28 inches in width, 36 inches in height, with a weight of 4,800 pounds. The electricity is generated from an armature, which revolves at the rate of seven hundred revolutions per minute, driven by a belt twelve inches wide over a pulley 20 inches in diameter. The armature is placed between four heavy relays of insulated copper wire, containing in all 20,000 feet lineal measure. The whole machinery is located in the electrician's room, and under the present charge of Mr. George W. Hoag, of Mr. Brush's electric works, of Cleveland, Ohio. In this room is also found the automatic governor, an ingenious invention which regulates the current of electricity according to the number of lights in use, thus enabling any number of the lamps to be shut off or used without altering the speed of the main portion of the machine. The lamps used are of the size known as number 3, each carrying double rods, which enable them to be supplied with four carbons, each twelve inches long, copper-plated, for the better conducting of the electric current, manufactured according to the Brush patent from coke. The lamps are calculated to burn for 16 hours without a renewal of the carbons, and the cost of each lamp is calculated to be only one cent per hour, each lamp being supposed to burn from an inch and a-half to two inches per hour, the upper carbon position burning about double the quantity consumed by the negative. The apparatus is of the same kind as has been so extensively introduced into the United States by the Brush Electric Company of Ohio, and into Europe by the Anglo-American Light Company of London, England. The same sized machine, with its full power concentrated in one light, is now in use on one of the finest vessels in the British navy. Mr. Millan, Mr. Eddy's manager, will have the general management of the apparatus, assisted by Mr. Mousseau, head millwright of the establishment, when Mr. Hoag returns to the United States, as he will do in the course of a few days. An event will long be remembered in Hull, and it need not be wondered at that it was made a festival of in the city. During the evening the Hull band, led by Mr. Durocher, was out, and played for some two hours about the city and serenaded Mr. Eddy. The turning out of the corps was voluntary. In getting the best and cheapest light for his place that he could, Mr. Eddy has done the public as well as himself a benefit, for the Union Bridge and its approaches were never so well lit as they were last night by his "new order of full moons."—*Citizen.*

Beechwood for Paving.

The Edinburgh authorities are at present making a test of the capabilities of beechwood as a paving material, and for this purpose have laid a wide crossing at the junction of Melville street with Queen's Ferry street with well-seasoned blocks of this wood. A slip of chilled iron, grooved to afford a grip for horses, is introduced between each block, and the interstices are all filled in with creosote.

"Their Name is Legion"—the people who praise that matchless medicine, *Dr. Eddy's Blood Bitters*. It acts at once upon the Secretions, the Bowels, the Liver, the Skin and the Kidneys. It purifies the Blood, dispels all full humors, and strengthens the nervous and debilitated system. No known remedy can do more. Try it and be convinced.

THE MANUFACTURE OF WOOD PULP.

Wood pulp, which has of late years acquired some importance as a substitute for rags in the manufacture of coarse and fine papers, is obtained in two different ways:—1, mechanically, by the mechanical disintegration of wood, 2, chemically, by treating the wood with chemical reagents.

1. Preparation of cellulose by the mechanical method.—Wood lately felled and stripped of its bark is ground between heavy millstones beneath the surface of running water, passing thence through a sieve or bolter, as a fibrous mass, which can be used, with or without admixture of rags, as a substitute for ordinary paper pulp. The wet mass of woody fibre is deprived of its superfluous moisture by pressure and in that state is sent to the paper-mills. This compressed fibre, even when boiled, will not give a fine-grained paper, for which purpose an addition of 25 to 80 per cent. of rags is necessary. Wood paper acquires a yellowish or greyish tinge with exposure, for which reason also it is unsuited for finer purposes. Wood fibre is not pure cellulose, but contains a mixture of intercellular substance, which has held the plant-cells together. Pure cellulose forms 30 to 60 per cent. of ordinary wood pulp. Wood pulp is very short in the fibre, owing to the method in which it is prepared, whereas pure cellulose is longer in the fibre, feels better, and is more suitable for papermaking. Wood pulp is therefore employed for the coarser sorts of paper, whilst the chemically prepared cellulose is well adapted for the finer kinds.

In 1871 some experiments were made by O. Noyh, of Zwickau, in regard to grinding wood after steaming it in steam boilers. The results were most satisfactory, and the method is now used in the fabrication of brown papers. Independent experiments were made about the same time by E. F. Meisner, of Roth Damitz, near Stolp, Pomerania, in the boiling of wood with and without caustic lye, grinding, and preparing paper from wood fibre obtained by the first method, with and without an admixture of rags. A partnership was concluded between H. Voelter and O. Meyh for the working of certain of these new processes, which are now known in Germany as the Voelter-Meyh patent. Aug. Erfurt, manager of the wood pulp and paper works of Beznar & Co., endeavored to improve the process by the ebullition and prolonged immersion of the wood in soda lye. Erfurt subsequently varied this process by boiling the wood twice before cooking it in the caustic soda, a process which yielded wood pulp of a superior quality. The papers so produced have been gradually improved, and now packing papers of excellent quality are thus manufactured, which can be used for a variety of purposes for which ordinary papers are more or less unsuited. For many purposes the natural brown colour of the paper is a recommendation, and not only for cartridge-cases, book covers, packages, and the like, but also for floor-papers it is found most useful. Erfurt prepares his "lignite pulp" in four qualities, which can be used separately or combined in different qualities of paper.

2. Preparation of cellulose by the chemical method. The preparation of cellulose by chemical means has recently made greater progress, as a much finer and whiter product is thus obtainable than by the mechanical method; still there is, unfortunately, one great disadvantage common to all the processes yet adopted—the expense, costly machinery and processes being employed for an object really attainable by other means. These consist in the continuous action of chemical reagents, whereby the expenditure of fuel is rendered unnecessary, and the great wear and tear of plant involved by the use of high steam pressure avoided.

A fresh starting-point in cellulose manufacture was afforded by the establishment of the Manachunk Wood Pulp Works Company, at Philadelphia, in 1864, whose products were exhibited in Paris in 1867. At this establishment the cellulose is prepared by Houghton's and Couper's methods, by boiling the wood in acetate of soda under very high pressure. This branch of manufacture has been further investigated and improved upon by various parties.

In 1868 the Gloucestershire Paper Company started a large cellulose and paper manufactory

in England, for papermaking without rags, thereby affording demonstration of the fact that paper can be manufactured from cellulose without any admixture of rags. A heavy outlay, stated to amount to £25,000, was involved by the experiments of the company.

In 1870 a company of English and Swedish capitalists started five large cellulose manufacturing establishments in the American system in use at Cape Mills, Norway, N. B.

On this system the five manufacturing establishments are now worked as well as six large manufacturing in Germany. Some manufacturers have adopted other methods, and have engaged in fresh experiments and researches, chiefly with a view to the economy of construction in the apparatus employed.

In the different methods hitherto adopted acids (sulfuric and nitric) are used, to the action of which the wood finely rasped is exposed until the fibre is fully burst, whereby a portion of the cellulose is converted into glucose, whence alcohol is obtained by fermentation; after this the wood is treated with acetate of soda until all the soluble matter is extracted, and finally is washed. This method does not admit of the acid being used again, and moreover requires the vessels employed to be of more than ordinary resistance to materials.

In Watt & Burgess' method, finely chopped wood is treated with acetate of soda of 4 degs. Beaumur, under a steam pressure of 60 lbs. to the square inch. Here very much depends on the shape of the wood in a highly comminuted form, as sawdust the circulation is impeded; shavings, on the other hand, take up too much space, so the wood is treated with the lye in a series of digestors under high steam pressure, and the soda afterwards extracted from it by the action of steam. As the lye contained therein is removed by the steam, and the residuum retained in vessels of special construction, it is obvious that the method adds considerably to the cost of the process, and it is preferable to use the acid once only and allow it afterwards to evaporate naturally in open pits, or to remove it by heating in closed vessels so contrived as to entail no extra firing. Cellulose prepared in this way requires no mechanical manipulation, but is simply bleached with chloride of lime before use. Chemically prepared wood pulp is superior to that prepared by mechanical means, being more elastic and longer in the fibre, and as before mentioned, can be employed for paper making without any addition of rags.

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