The Geo. T. Smith Middlings Purifier Co.

TORONTO, April 27th, 1889.

THE GEO. T. SMITH PURIFIER CO., Stratford, Ont.

GENTLEMEN: Replying to yours of the 18th inst., I have always been pleased with the result of the changes you made in my mill at Lambton Mills, and which has now been running about six months. From the time you first turned wheat on the mill, the flour has been good and the finish close. The machinery, millwright work and material of all kinds are entirely satisfactory, and our business relations agreeable. I was influenced by these facts to place my contract with you in preference to other mill furnishers from whom I had favorable offers for changing my Thorold mill to 300 bbls. capacity, using your full centrifugal system, which I think superior to any other system which has come to my notice.

I have another mill built by E. P. Allis & Co., but prefer your system to theirs.

Yours truly,

W. P. HOWLAND.

THE WELLAND MILLS.
Sir Wm. P. Howland, Proprietor.

THOROLD, ONT., Dec. 20, 1889.

S. S. HEYWOOD, Esq., Manager G. T. SMITH M. P. CO.,
Stratford, Ont.

DEAR SIR: Replying to your favor of the 7th inst., enquiring as to how we are pleased with our mill that you built for us this summer, I am happy to say we are very highly pleased with the mill throughout, and I believe we have the best mill in Canada to-day. I may say that until now I have been in favor of the long system, but our mill, which is on the short system, is such a complete success and so far exceeds our expectations in every way, that I am now perfectly satisfied that the short system is the true and proper system when properly put in.

You are already aware that we can with *perfect ease* turn out 400 barrels of flour every twenty-four hours. We can do this and not crowd a roll or machine in the mill, although your guarantee was for a 300 barrel mill only. For quality of flour and cleanliness of finish I have yet to see anything to equal us. The machinery is the best that can be made, the workmanship and general get up of the machinery cannot be excelled, and it runs and works to perfection. The whole plan of the mill is so simple and perfect that it is impossible to speak too highly of anything in connection with it from beginning to end. Wishing you success and prosperity, I am,

Respectfully yours,

R. B. ROUNTREE,
Manager Welland Mills.

ST. CATHARINES, July 23rd, 1889.

GEO. T. SMITH PURIFIER CO., Stratford, Ont.

DEAR SIRS: Your esteemed favor of the 17th inst. came duly to hand requesting to know how we were pleased with the mill you built for us last winter. In reply would say that the mill has proved in every way a great success. Your contract with me was for a 300 barrel per day capacity. The mill will exceed this 50 bbls. per day at least. The workmanship is all done in a first-class manner, and the quality of the flour produced by it, in our opinion, *is not excelled by any mill yet built.* It has been running night and day for some time, and so far it has given us entire satisfaction.

Yours truly,

JAMES NORRIS.

NORVAL, ONT., 23rd July, 1889.

THE GEO. T. SMITH M. P. CO., Stratford, Ont.

DEAR SIRS: On the 28th of November last I contracted with your agent for a four break full roller mill of 300 barrels capacity. Work was commenced on the first of February, 1889, and now I am happy to say that I have a mill that can make in 24 hours 400 barrels of as good flour as any in Canada, and this with a very low yield and clean offal. My mill is built so that one-half can be run alone, or fall wheat can be run on one half and spring wheat on the other.

For the nice arrangement of these two mills in one, much credit is due to your draughtsman. Of the millwright work I cannot speak too highly. Your foreman is a practical man, and does things right. In fact, every man on the job did his part with credit to himself and satisfaction to all concerned.

Your special machines, which comprise eleven belted double Roller Mills, six No. 3 Purifiers, twenty No. 0 Inter-Elevator Bolts, two No. 0 Centrifugals, Bran and Shorts Dusters, Packers, &c., are got up in good style. They run light, are stable and handsome. Nor does the work they do fall short of their outward appearance. Each handles its stock with ease, and separations are made which bring the best results at the finish. The belting you supplied is simply first-class, and reflects great credit on our Canadian manufacturers, as well as yourselves for using such stock.

I cannot close this letter without a word of recommendation for your agent, whose courtesy and business-like manner in dealing with the public should gain for you the patronage which you deserve.

Yours truly, ROBERT NOBLE.

PEAREN BROS.' ROLLER FLOUR MILLS,
BRAMPTON, ONT., Dec. 21, 1889.

MESSRS. GEO. T. SMITH M. P. CO., Stratford, Ont.

DEAR SIRS: We take pleasure in informing you that the short system flour mill of 100 barrels capacity built by yourselves for us last season is very satisfactory. We did not ask for tenders from any other mill furnishers, believing at the time we placed contract, that you would build us a good and complete mill, and since we have been running it we have not regretted doing so. The Brown engine with cylinder 13 x 36 built by you at your works in Stratford is a fine piece of workmanship, and for economy in fuel and easy working we do not think it can be surpassed. In regard to the mill, the planning and arrangement of the machinery is excellent. The machinery and millwright work is first-class in every respect, and we feel satisfied that no expense was spared on your part to give us satisfaction.

Yours truly, PEAREN BROS.

PRESTON & MCKAY, Merchant Millers,
BOISSEVAIN, MAN., Dec. 13, 1889.

S. S. HEYWOOD, ESQ., General Manager
GEO. T. SMITH M. P. CO., Stratford, Ont.

DEAR SIR: As you will doubtless be interested in knowing how our mill is running, we write you to say that since starting everything has run like clockwork, and we have been running night and day. We are turning out work equal to anything manufactured in this country. Our flour is giving general satisfaction and we have been so busy since starting we have hardly been able to take care of all the work offered. All the machines are models of fine workmanship and smoothness of running, while the mill has been planned by your clever draughtsman to facilitate the operations of the miller and convenience of all concerned. So far as our experience goes we do not know of any one mill furnishing house in America that manufactures as fine and complete lines of mill machinery as you do, as you seem to have secured all the latest and best lines produced by any single house. Your milling expert deserves great credit for the results we are obtaining as regards quality of flour and yield. We shall take pleasure in showing any one our property here.

Yours very truly, PRESTON & MCKAY.

We are the Canadian manufacturers of the genuine Brown Engine. Our drawings and patterns came direct from the Brown Engine Co., of Fitchburg, Mass. Many of the *so-called* Brown Engines manufactured by other Canadian manufacturers are comparatively worthless, and should not be confounded with the genuine Brown.

SECOND-HAND MACHINERY FOR SALE.

1 No. 2 Smutter, manufactured by W. & J. G. Greey,	$ 50
1 No. 2 Smutter, manufactured by Howes & Babcock,	70
1 Run Chop Stones, against sun, four feet six inches,	60
1 Four Break Machine, rolls 6 in. x 20 in., Goldie & McCulloch,	300
1 E. P. Allis & Co. Four Break Machine,	400
7 Garden City Purifiers, each	50
6 Barter Purifiers, each	100
1 Single 9 x 30 Roller Mill, Gear Drive, manufactured by John T. Noye Co.,	$125
1 Double 9 x 18 Roller Mill, Gear Drive, manufactured by Barter,	200
8 9 x 14 Porcelain Rolls (new), each	30
1 Single 12 x 24 Roller Mill, Belt Drive, manufactured by Goldie & McCulloch,	100
3 Jones Stone Rolls for middlings, each	40
2 Jones Iron Rolls for Breaks, each	30

We have for sale a full line of special machines of our own manufacture, which includes a full line of Upright and Horizontal Cleaning Machinery, and Upright and Horizontal Bran Dusters.

We are Canadian Agents for the Knickerbocker Co., of Jackson, Mich., for the manufacture and sale of the Celecrated

Cyclone Dust Collector.

THE GEO. T. SMITH MIDDLINGS PURIFIER CO.

STRATFORD, ONT.

Electrical Mechanical and Milling News

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ELECTRICAL,

Mechanical and Milling News,

PUBLISHED ON THE FIRST OF EACH MONTH BY

CHAS. H. MORTIMER,

Office, 14 King Street West,

TORONTO, - - CANADA.

ADVERTISEMENTS.

Advertising rates sent promptly on application. Orders for advertising should reach this office not later than the 25th day of the month immediately preceding our date of issue.

Changes in advertisements will be made whenever desired, without cost to the advertiser, but to insure proper compliance with the instructions of the advertiser, requests for change should reach this office as early as the 22nd day of the month.

SUBSCRIPTIONS.

The Electrical, Mechanical and Milling News will be mailed to subscribers in the Dominion, or the United States post free, for $1.00 per annum, 50 cents for six months. The price of subscription may be remitted by currency, in registered letter, or by postal order payable to C. H. Mortimer. Please do not send cheques on local banks unless 25 cents is added for cost of discount. Money sent in unregistered letters must be at senders' risk. The sending of the paper may be considered as evidence that we received the money.

Subscriptions from all foreign countries, embraced in the General Postal Union will be accepted at $1.25 per annum.

Subscribers may have the mailing address changed as often as desired. *When ordering change, always give the old as well as the new address.*

The Publisher should be notified of the failure of subscribers to receive their papers promptly and regularly.

EDITOR'S ANNOUNCEMENTS.

Correspondence is invited upon all topics pertinent to the electrical, mechanical and milling interests.

THE annual meeting of the Millers' and Manufacturers' Insurance Co. was held at the offices in this city, on February 28th. Particulars of this meeting will appear in our issue for April.

THE deputation of Manitoba millers who recently visited Ottawa to urge a readjustment of the flour duties, had also an interview with the President of the C. P. R. We observe that while Mr. Van Horne promised to carry seed wheat free of charge between stations and to give liberal rates on seed barley and oats taken into the Province, he promised nothing on the line of the more important subject of lower rates on wheat and flour exported from the Northwest.

SOME electric light concerns have a peculiar method of doing business. We read that a certain Canadian company will light a certain Canadian town for thirty days as an advertisement, and that a hospital in an Eastern Ontario city will be lighted for one year free of cost. Such advertising as this will be found to be very expensive and of doubtful utility, while intense eagerness to make contracts at any price is demoralizing to any business, and usually reacts severely upon the prosperity of the firms who seek to do business on this plan.

IN connection with our remarks last month regarding the apparent inactivity of the officers of the Dominion and Local Millers' Associations in the matter of presenting facts for the consideration of the Farmers' Institutes, we are informed that the case for the millers has been presented at *nineteen farmers' meetings*, the majority of which were meetings of Farmers' Institutes. We are further advised that the activity manifested by the millers of the Northwest in support of the movement for the readjustment of the flour duties, was prompted by letters published in the press of Manitoba from the Secretary of the Dominion Millers' Association.

ASSOCIATIONS of persons engaged in the various electrical industries are being formed in many of the States of the Union. The main object for which these associations have been called into existence is to guard electrical interests from unjust legislation by the national, state or municipal governments. These associations will doubtless perform an important work in the direction indicated. Inasmuch as legislation affecting Canadian electrical interests is already being sought for, it becomes a question worthy of consideration whether the time has not arrived when an association, embracing the objects of those of the United States, should be formed in the Dominion.

A BILL to amend the Act respecting Trade Marks and Industrial Designs, which has passed its second reading in the Dominion Parliament, provides that if any person makes application to register, as his own, any trade mark which has already been registered, and the Minister of Agriculture is not satisfied that he is entitled to its exclusive use, he shall cause all interested to be notified that the question is for decision by the Exchequer Court of Canada, and no further proceedings shall be had until the rights of the parties have been adjudged, or agreed upon. All errors in registering are to be corrected by the said Court, and the Minister of Agriculture is to be guided by its findings.

THE Montreal Board of Trade is urging the Government to adopt and make known a permanent policy with regard to the amount of tolls to be charged on grain passing through the canals for Montreal. For several years past the procedure has been to pass an Order-in-Council authorizing a special toll of two cents per ton for the forthcoming season of navigation only. The cereals to which this rate was applicable were wheat, Indian corn, peas, barley and rye. The Government is being urged to include oats in the above list. The fact that a large number of vessels are already loading at Chicago for Buffalo, but none for a Canadian port, clearly indicates that the uncertainty regarding the amount of tolls to be charged by the Government is affecting injuriously the traffic of Canadian water-ways. In view of this fact, the Government should certainly remove the uncertainty existing in the minds of forwarders by fixing the amount of the tolls to be charged for a series of years.

THE Interstate Commerce law is bitterly opposed by some American journals on the ground that its operation tends to throw a large amount of traffic which properly belongs to American lines, into the hands of Canadian railroads, especially the C. P. R. The *Milling World*, of Buffalo, which ranks among the most persistent opponents of the measure, has this to say on the subject: "Recent Canadian dispatches speak of a great glut of freights on the Canadian roads, caused by big shipments of corn from Nebraska over the "Soo" route through Canada, to be delivered at Boston and other points in New England. This corn, in reaching its destination, is hauled twice as far over our own railways, at local rates, as over the Canadian railways; but the full rate through Canada is from 3 to 10 cents per 100 pounds cheaper than the rate of the trunk lines. The trunk lines can not lower their "short haul" rates to meet Canadian competition. They are forced to depend upon their local trade instead of cheapening the rates for through traffic to meet the requirements of the Interstate Commerce Act. So Boston gets the corn, and the Canadian roads get the traffic. It has been reported that there is a blockade of 10,000 loaded cars awaiting movement. What American interest is served by this state of things, growing out of this fool law?"

WE were under the impression that the threats of the farmers in certain localities to form stock companies to erect and operate mills as a means of enabling them to be independent of those so-called extortioners, the millers, was simply a device to secure the abandonment of the system of buying wheat by tester. We could not persuade ourselves that with their opportunities for observation, the farmers could seriously entertain the opinion that they would make money by entering the milling business. It appears, however, that such is the conviction which some of them at least hold, as we read that the farmers of Walpole and Oneida townships have formed a joint stock company with a subscribed capital of $11,000 to erect a new roller mill in Hagersville. It seems to us a mistake on the part of these farmers to erect a new mill when the millers are offering their properties for sale at a substantial reduction on first cost. However, its an ill wind that blows nobody good, and in the interest of the mill furnishers, some of whom have been complaining of the dullness of trade of late, we hope the farmers' fascination for the milling business will continue. We are not very sanguine on this point, however, being rather inclined to the belief that the results of two or three such experiments will suffice to make the farmers who may engage in them sadder and perhaps wiser men. Here's to the granger millers.

THE farmers of Middlesex County to the number of 150 held a meeting in London on Feb. 15th, to consider the question of buying wheat by tester. The discussion was a lengthy one, not always lucid, but very interesting, and to some extent amusing. Before it had gone very far, it became evident that the farmers were far from being a unit on the question. For example: Mr. John R. Little is reported as having said that the sole object of the millers in this movement was to get a law passed by Parliament to compel farmers to sell by the tester. Any movement in this direction should come from the farmers. He characterized the tester way of selling grain as a fraud. On the other hand, Mr. C. Simmonds, representative to the Agricultural and Arts Association of Ontario, made the unvarnished statement that the tester was a benefit for Lobo (township), for *they raised a good class of wheat, and they got more per bushel by the tester*. The farmers got paid for the quality, and *they should leave their chess and dirty grain at home* to feed the cattle, and the tester would be of great benefit. Other farmers also stated that they had sold by the tester system, and had found it satisfactory Mr. David Plewes, who was present as the representative of the Dominion Millers' Association, was made the target for all sorts of questions. A motion that the present tariff of 50 cents per barrel on flour was sufficient to protect millers, was voted down, and an amendment carried that the Dominion Government be petitioned to reduce the duty on wheat from 15 cents to 8 cents per bushel. Mr. Simmonds hit the nail on the head when he implied that the "kickers" against the system of buying by tester are the farmers who want to sell chess and dirt for the price of clean wheat. Viewed from this standpoint, what could be more humorous than Mr. Little's contention that no change in such a system should be made unless initiated by the farmers.

IT is reported that a large number of petitions are being presented to the Dominion Parliament requesting the appointment of a railway commission. It must be apparent to all who are acquainted with the unfairness which frequently marks the imposition of freight rates, that some supervision of the conduct of the railways in this regard is necessary. Canadian roads should not be allowed to carry the traffic of a foreign

nation at a lower rate than that of the people whose money was given so freely to make their existence possible. Neither should it be possible for a railroad to charge one shipper as much for hauling his goods 200 miles as another whose goods it carries double that distance. Long hauls should perhaps be proportionately cheaper than short ones, but distance should to a large extent regulate rates. Under the present state of affairs, however, where competition does not exist, the unfortunate shipper frequently receives but scant consideration, and the burdensome rates imposed upon him places him at a serious disadvantage in competition with others more fortunately located. The railways should be compelled to base their charges upon principles of equity and common sense.

THE contest has been keen between several of the larger cities of the United States, notably New York and Chicago, for possession of the proposed World's Fair of 1892. The matter has just been decided by a vote of the representatives in Congress, the decision being in favor of Chicago. Canadians will no doubt be pleased with the selection. The central situation of Chicago makes it the most desirable site, and in addition the enthusiasm which its people have already manifested on the subject, is a guarantee that nothing will be left undone to bring the great enterprise to a successful issue. Canada, and especially Canadian railroads, will derive some benefit from the circumstances which will make it necessary for hundreds of thousands of visitors to this Fair to pass through a portion of our territory.

IT is pleasing to note that in New York city, where the war of public opinion has so long been waged against the electric light companies, people are beginning to be sensible at last and to take sides with the companies. Even the newspapers are beginning to see the error they have committed in madly attacking innocent parties, and the board of electrical controllers receiving a sound drubbing from all quarters. The latest news is that this board of politicans is to be abolished by the State, and a board of practical electrical experts substituted in its stead. The electric light companies in New York are to be congratulated upon having had so many points scored in their favor, and we trust it will not be long ere the electric interests and the city will again be working together in harmony, which, after all, is the only way in which the ends sought can be satisfactorily attained.

MR. W. Y. Emery, of Port Burwell, Ont., is seeking to distinguish himself by opposing, professedly in the interests of the farmers, the efforts of the millers to secure the readjustment of the flour duties. He asks: "If the duty is increased, what is to prevent the extensive millers and grain dealers of this country from forming syndicates for handling the whole wheat crop?" Perhaps the best reply that we can make to this is, that the oatmeal millers of Ontario, comprising in number a mere tithe of the flour millers and grain dealers, resorted to every means they could think of to maintain a combination, but completely failed. As regards Mr. Emery's contention that "the present tariff on flour and wheat is an equitable one to all concerned, we may say that he does not represent the opinion of the farmers on whose behalf he professes to speak. The Central Farmers Institute declares that "the milling industry of this Dominion is suffering by discrimination in the tariff, and should receive relief."

THE action taken by the Central Farmers Institute upon the request preferred by the Dominion Millers Association for co-operation in securing an increase of the flour duties to $1 per barrel, may be taken as an illustration of how far intelligent men in this country will allow themselves to be ruled by political prejudice, even to the disadvantage of their personal interests. We need not reiterate arguments to prove that the injury imposed upon the miller by the tariff in its present form, must be felt by the farmer also. The facts are well known, having been repeatedly stated through the public prints. In the light of this knowledge, however, the Central Farmers Institute, resolves "That whereas we believe that the milling industry of this Dominion is suffering by discrimination in the tariff and that they should receive some relief, this institute memorialize the Dominion Government to place wheat and wheat products upon the free list. It is here admitted that the milling industry is suffering (and it might have been added, the farming industry as well) by discrimination in the tariff, yet what improvement in the situation is likely to be effected by the resolution quoted? None whatever. It was a foregone conclusion that such a memorial as the Institute proposes to send to Ottawa would receive no consideration from a Government which was returned for the purpose of administering a protective policy. What the millers ask and have a right to receive is, justice under that policy. The fact that a majority of the members of the Central Farmers' Institute are politically opposed to the Government should not have prevented them from helping their own interests and those of the millers by declaring, as did the Winnipeg Board of Trade, that so long as a policy of protection to home industries is the declared policy of this country, all classes of manufactures are entitled under that policy to equal protection.

THE probabilities of success which have attended the putting in operation of a line of steamers between St. John, N. B., and the West Indies, should be a matter of congratulation to every Canadian. As our readers are aware, the steamer Portia of this new line, made her first voyage a few weeks ago, and the management declare that the result has far exceeded their anticipations. Accommodation could not be provided for all the goods forwarded for shipment. There is found to be, as was stated by the late Hon. John Macdonald, a strong desire on the part of the people of these islands to trade with Canada. Dressed pine lumber, flour and oatmeal, rank prominently among the imports of the West Indies. Some idea of the extent of the flour demands may be obtained from the fact that at the port of Georgetown alone, the average monthly consumption reaches 11,000 barrels, while the yearly statistics show the imports at this port to be 138,744 barrels, and of corn and oatmeal, 1,366,474 lbs. A member of the new Canadian Steamship Company has expressed the opinion that Canada could capture much of the market as soon as the millers here can satisfy the people that Canadian flour is suitable for use in the hot climate of the West Indies. On this point the opinion of one of our most prominent millers has been given, and is here quoted as a valuable contribution to the subject at the present time. In response to an inquiry, Mr. M. McLaughlin, of Toronto, in a letter to the Secretary of the Toronto Board of Trade a year ago, said: "The chief obstacle to the establishing and maintaining of a flour business with the West Indies and British Guiana, provided there were proper freight facilities, is this: the growing of wheat in Canada has not yet reached such dimensions as to insure a surplus for export from every crop. Without such a surplus, that can be relied on as permanent, business cannot be established and retained against the competitors who are in the field permanently. This objection will be overcome in time by the development of the wheat country of Manitoba and the North-West. The Hon. Mr. Macdonald, in his paper, makes the statement that Canada flour is of too high a grade—too expensive—and will not keep in southern latitudes. That it is of a high grade must in itself be a strong recommendation, not an objection. That it is too high in price is not because it is too high at our seaboard at such years as we have an exportable surplus, for in such years we can and do compete in price with the whole world. The third objection—its non-keeping quality—refers rather to flour made in Canada years ago than to what is made in the best Canadian mills now. I am confident that Canadian millers now make flour entirely free from this objection. With a permanent exportable surplus which we will eventually have and with shipping facilities as good as our competitors have, Canadian millers can successfully compete in quality and price with the world for the trade of the countries mentioned." The proper freight facilities have now been provided, and if the time has not quite arrived when we can be assured of a surplus for export from every crop, it certainly is very close at hand. Under these circumstances, Canadian millers should take steps to convince the people of the West Indies that the flour manufactured here is adapted to their requirements. So far as the price is concerned, that will necessarily depend to a considerable extent upon the rates of freight obtainable. The railways would be serving their own interests, while assisting the industrial development of the country, by offering such rates as would enable our manufacturers to successfully compete for this valuable trade. We hope to see the matter taken up by our millers and other manufacturers for whose products a market exists, with an earnestness and determination worthy of the important bearing which it promises to exert upon the prosperity of this country. The Dominion Millers' Association and the Canadian Manufacturers' Association would serve the interests of their members by giving this question their most serious consideration.

The Vancouver Board of Trade has sent nineteen samples of British Columbia wheat to Montreal, to be tested for making flour

IN several of the smaller towns, the price of arc lights has been cut down to ridiculously low figures, and in one case at least, they are being furnished at ten cents per night each. Rates of this kind can end in nothing but ruin to the investors. We advise all to beware of purchasing electric light at such extremely cheap figures. As a rule, it will be found that the earning capacity of the apparatus has been greatly overrated, and after the investment has been made, a train of incidental expenditures, not calculated on at the outset, begin to pour in, and what at first glance looked to be a good speculation, turns out to be a ruinous one. There is another danger cropping up out of these outrageously low rates, which is, that other towns hearing that such a town is being furnished with light at such a rate, at once jump to the conclusion that their town must be furnished at the same rate, and at once set to work to endeavor to pull down the figures of their local lighting company. The results in this case would not be so bad were it not for the fact that the local companies in many cases seem as though they would rather lose their capital than lose their municipal contract, and so cut the prices down to suit the town authorities, the result being unsatisfactory service and ultimate failure. If the local companies would only take a firm stand and compel the municipal authorities to thoroughly investigate the figures paid in other places where competition is keen, we think much of the coming evil might be averted.

THE prospectus of the Electric Mutual Insurance Co of Boston, is before us. This company has been organized solely for the insurance of electric light stations in the United States and Canada. It is a well known fact that insurance companies generally consider an electric light station a prohibited risk, and it has been almost impossible to place insurance on them at all of late, except at such high rates as were beyond the reach even of companies that were in a prosperous condition. The new company propose to insure all strictly first-class stations at one per cent., and will decline all risks of such a nature that they would have to be rated above two per cent. They also propose to put all stations insured by them under a rigid annual inspection, so as to maintain a standard of safety, with the ultimate object of improving the condition of all the stations until they can be rated as first-class risks. The prospectus further states that the promoters of the company are sanguine in their belief that through their selection of risks, and the avoidance of loss, by gradual improvements that will be carried out, and by the system of inspection that will be maintained, the loss ratio can be so reduced as to enable the company to return to policy holders from fifty to seventy-five per cent. of the premiums paid on the basis of rates previously named. We commend the new enterprise to our readers as one meeting a long felt want. One valuable feature is, that the company can never meet a loss of more than one station at a time, for even where there is more than one station in a city they are generally so widely separated as to be completely isolated from each other.

PERSONAL.

Mr. Walter J. Menelly chairman of the Board of Steamboat Inspectors in Toronto, has been called to fill a similar position at Ottawa. Prior to his departure from Toronto he was presented on behalf of the Canadian Marine Engineers' Association with a handsomely engrossed address and a gold-headed cane.

PUBLICATIONS.

It is evident that the editor of *The Arena* intends to keep his pledge of openness to all sides in the discussion of the great religious, social, ethical, and economic problems of the hour. The March number of *The Arena* will contain the first paper by the Rev. Geo. B. Cheever, D. D., the veteran Orthodox minister, on God's Voucher for the Verbal Infallibility of His Word and Man's Destiny through Eternity. Bishop Spaulding, of the Catholic Church, and Canon W. H. Fremantle, of Oxford, England, representing Protestantism, are announced to review Col. Ingersoll's paper on God in the Constitution at an early date.

Messrs. Robin & Sadler the well-known leather belting manufacturers of Montreal and Toronto, have sent us a very handsome hanger card. The front shows a hide in natural color on a background of dark navy blue; the central portion is marked off and bears the statement: "This portion of the hide only used in our standard belting." In gold letters on the front of the card is the firm's name and address, while on the reverse side is given their price list.

We have received a copy of a new illustrated catalogue of perforated zinc and wire cloth, issued by the B. Greening Wire Co., Hamilton, Ont. It contains 50 full sized cuts of perforated zinc, and besides shows various grades of wire cloth, oat and malt kiln floors, etc., giving it great value for the miller, millwright and manufacturer of grain cleaning machinery. Two pages are devoted to valuable tables on sizes, lengths, weight and strength

edition. The whole is bound in paper cover, on the back of which appears a cut of the Victoria Wire Mills, established 1859, and incorporated 1889. This is the first of eleven catalogues which the company have in press, relating to meadow lathing, ornamental iron work, flower stands, florist's designs, wire fencing, bank and office railing, etc., any of which will be sent free on application. The company have sent us also a sample of Brown's patent steel wire cloths, of which they are the manufacturers for Canada.

TRADE NOTES

Mr. H. W. Petrie is furnishing the machinery for Messrs. Murphy, Gates & Co.'s large new saw mill now being built at Owen Sound. The engine is 16 x 24 inches, with two tubular boilers, heavy saw rig, double edger, shingle mill and jointer, in fact a complete outfit.

When we know an article to be a first-class one, we do not hesitate to recommend it. It is admitted by all flour mill machinery makers that it is a difficult thing to make or to obtain a good babbit metal; in fact, the old method is a thing of the past, and babbit metal, owing to its unreliability, is of little use now in the new style of machinery. A better metal is required—something that will stand the pressure and speed of the rolls without wear and without heating. They require the best box metal obtainable. The manufacturer claims that Copperine is the only reliable metal for this purpose; that it never fails to run cool, the standard of quality being always the same, and that once the different parts of mill have been fitted with this metal, one can rest assured there will be no further danger and trouble with hot boxes. It is a convenient metal to use. Anyone with slight mechanical ingenuity can make a journal bearing with copperine. This metal is said to be now used by most of the flour mills throughout the Dominion. Besides its excellent qualities it is easily obtained, as nearly all the hardware stores in the Dominion are keeping it. We refer our readers to the advertisement of the manufacturer, appearing in this issue.

We have received, unfortunately too late for insertion in this number, a change of advertisement from the Cochrane Roller Mill Co. of Escanaba, Mich., in which they direct attention to their grain chill rolls, and chilled wheels for ore, coal mines and lumbermen. The company use in the manufacture of these articles Lake Superior charcoal iron of a special mixture. Referring to this line of manufactures the company say: "It is a well known fact that Lake Superior charcoal iron is the best to be procured in America for chill work of all kinds. We have furnaces quite close to Escanaba, the "Jackson Iron Co." and the "Iron Cliff Co.," who have a reputation of producing a charcoal pig equal to any in the United States. Both of these companies make charcoal pig for us, and run their furnaces at stated times specially on our work. We are thus enabled to obtain just the right mixture for our chill work. Our chill wheels are having a very heavy run, they are admittedly the most perfect chill wheels that are used in the iron mines and by the lumbermen of Northern Michigan and Wisconsin. When we state that we are getting from one quarter to one half cent more per lb. than any other maker, that though we make 50 a day, we now have orders for over 300 on our books, and that we receive orders (repeats) from time to time for 50 to 100 at a time, your readers can readily judge that they must be good ones." The company are prepared to supply the trade of Canada with these goods.

LUMBERING

Mr. A. Affleck of Lanark, Ont., has added a new saw to his mill.

Mr. Garrow's saw mill at Nipissing Junction was burned down a week or two ago. No insurance.

About 25,000,000 feet of timber is booked to be shipped to the States via Rideau canal next summer.

Mr. K. Van Wyck, proprietor of the Parkhill, Ont., planing mill, is reported to be financially embarrassed.

Mr. Peter McLaren, the millionaire lumberman of Perth, has been appointed to the Senate in place of the late Senator Turner.

Mr. R. Simpson of Collingwood, Ont., will take charge of the new mill which he completed lately for the Imperial Lumber Company in Nipissing district.

Commenting upon the development of the lumber trade of British Columbia on the opening of the legislature of that province a few days since, one of the representatives informed the assembly that the new mills at present in course of erection in British Columbia represented an aggregate capital of $1,000,000.

Messrs. Murphy, Gates & Co., of Hepworth, Ont., are calling for tenders for the erection of a saw mill on the Bay Shore at Owen Sound, which, when finished, will be one of the best in that section of the province. The capacity will be about 30,000 a day. The mill of the company at Hepworth have recently been remodelled, new engines and boilers added, and the capacity doubled.

The reports of the Minister of Crown Lands, recently issued, show that there are 25 saw mills in British Columbia, with a daily capacity in the aggregate of 970,000, or about 275,000,000 feet per annum. The acreage of timber leases held from the Provincial Government amounts to 135,063 acres, and on Crown Lands 10,-[illegible]00, timber leasehold, 9,429,565; private property, 3,342,352; total, 31,878,384; royalty collected, $12,576,59; rebate on timber exported, $3,051,48.

MILLING FLOUR & GRAIN

Gananoque, Ont., is to have a roller mill.

The Keewatin mill is shipping bran and shorts to country points in Manitoba.

The erection of large grain warehouses in Windsor, Ont., is being agitated.

The stone process grist mill at Norquay, Manitoba, is being moved to Maniton.

The mills at Galetta, Ont., have been changed from the old stone process to the roller process.

Mr. Jos. C. Strachan, late of Grand Valley, Ont., has taken charge of the Ontario Mills, Port Hope.

The Bradford, Ont., flour mills are again in operation after undergoing repairs to the extent of $2,000.

Mr. P. Kyle, who purchased the property of Mrs. A. Merrick, Merrickville, purposes converting it into a roller mill.

The stock of Lockwood & McKenny, corn millers, St. John, N. B., has been seized under Absconding Debtors Act.

The farmers of Hibbert, Fullarton and Logan, are talking of erecting a large flour mill near the station at Mitchell.

Jeffries & Sinden's grist mill, near Lynedoch, Ont., has been completely renovated, and fitted up with the roller process.

There were 367,389 bushels of Manitoba wheat in store at the Lake Superior elevators at the time the last export was made.

James Calvert, of Thedford, Ont., is making extensive repairs in his roller mill, putting in over $1,000 worth of new rolls, etc.

Mr. Jas. Hortop, of Eden Mills, has again assumed possession of the Elora flour mills, and will carry on business in both places.

The Exeter grist mill has been purchased by W. Browne, of Simcoe, Ont., for $5,000. He will remodel it at once to the roller process.

Howson Bros., of Teeswater, Ont., have rented the Exeter flouring mills of Mr. A. L. Gibson, and will take possession shortly.

David Wigle, having purchased a half interest in his brother Colin's Riverside Roller Mills, will remove to Amherstburg, Ont., shortly.

A. M. Robertson, in charge of the mechanical department of the Ogilvie Milling Co. at Winnipeg, has recently been visiting Minneapolis.

The Manitoba millers' deputation to Ottawa, say they are perfectly satisfied that Manitoba will get what is asked respecting the duty on flour.

It is said the farmers of Tiny and Flos intend to form a joint stock company with a capital of $10,000, to build a roller mill at Elmvale, Ont.

In Ontario, according to the latest report of the Bureau of Industries, the average weekly wages for millers were $9.75 for 70 hours per week.

The Pakenham, Ont., grist mill has been started again after having been thoroughly overhauled, and a full set of roller process machinery put in.

It is said that the Oshawa Milling Company have decided to close down for the present, as there is no money in the milling business in the present state of the Canadian market.

Mr. Arch. E. Cameron, for the past five years head miller for M. F. Beach, Iroquois, Ont., has accepted a similar position with the Carberry Milling & Brewing Co., Carberry, Man.

"Nellie Bly," the young lady correspondent of the New York *World*, who circled the world in 74 days, is said to be a daughter of the late W. F. Cochrane, inventor of the Cochrane roller mill.

The historical fact has recently been unearthed that the paternal ancestors of Thomas A. Edison, the well-known electrician, were millers, some of whom emigrated from Holland to America in 1730.

Mr. John Hill has sold his mill at Port Robinson, Ont., to Mr. Macartney, of Thorold, and Mr. W. A. Walker will take charge. The mill will be remodelled, and all the latest improvements added.

The municipality of Rosedale has passed a by-law granting a bonus towards the erection of a mill at Neepawa, Man. Other municipalities in the vicinity will be asked to vote bonuses to assist the same project.

At a convention of Russian millers held last month, one of the subjects discussed was, "How the Government (by which this meeting is organized) may promote the growth of a Russian flour export trade."

The imports of oatmeal into Glasgow during the past five years from Canada and the United States, where the millers endeavor to rival the best makers of Scotch oatmeal, have been as follows: 1889, 22,994 sacks; 1888, 3,498 sacks; 1887, 9,758 sacks; 1886, 55,538 sacks; 1885, 67,114 sacks.

It transpires that no truth existed in a recent report that the large purchases of Manitoba wheat by the Ogilvies had left their Northwest rivals, the Lake of the Woods Milling Co., without supplies. The latter claim to have plenty of wheat to keep their mill running until the new crop shall be marketed.

"Exchange and Testing of Wheat," was among the subjects discussed by the South Wellington Farmers' Institute. Messrs. Jas. Goldie, Guelph, Wm. Farrish, Rockwood, and William Hortop, Eden Mills, addressed the meeting from the millers' standpoint. The following resolution was adopted: "That the farmers and millers present at this meeting consider that it is in the interests of both farmers and millers that the product of the farm and the mill should be sold at its market value, and that it is advisable that a system of exchanging wheat for flour should be discontinued, as it has been found to be unsatisfactory in its operation to all concerned."

News comes from Ottawa that the bill to grant certain powers to the Canadian Millers' Mutual Insurance Company has been thrown out in committee. It was incorporated under provincial legislation, and the Minister of Finance objected that it sought to do a general business without complying with the general Act requiring companies to make a deposit.

The council of Mount Forest, Ont., are considering the proposition of a gentleman desirous of purchasing the old Yeomans mill property in that town, and erecting thereon a four storey brick merchant flouring mill of 100 barrels per day capacity. The council is asked to assist in the construction of a dam estimated to cost $1,000.

The Minneapolis *Northwestern Miller* says: A. Moore, of McLaughlin & Moore, Toronto, Can., spent last week in the city, accompanied by his wife. They were the guests of John J. Girard, second miller of the Washburn A, who some years ago was the Toronto firm's miller. It was in their mill that Mr. Girard lost his arm. McLaughlin & Moore are thinking of making improvements to their mill, and the junior partner was here looking up the advantages of different systems. In this he received valuable assistance from Mr. Girard.

The January fire-losses in the United States and Canada footed $9,180,000, against $6,899,000 in 1889, against $16,040,000 in 1888 and against $11,550,000 in 1887. The milling and allied industries were taxed $994,000 for the January losses this year. Mills and grain elevators appear to be a very burnable class of property. Elevators in particular seem to invite conflagration. During the past thirteen months nearly fifty elevators, large and small, have been burned in the United States and Canada, entailing a total loss of about $2,600,000.—*Milling World.*

We regret to learn of the destruction by fire of the fine flouring mill belonging to the Peoples Milling Co., at Meaford, Ont., which occurred at an early hour on the morning of February 20th. The fire engine was promptly on the scene, and did excellent service in saving the wharf storehouse, which had about 10,000 bushels of grain stored. The steamer Favorite, which was lying a few rods from the mill, was saved with great difficulty. She was slightly scorched on the starboard side. It is a mystery how the fire originated. Loss between $25,000 and $30,000; insured for $14,000 to $15,000 in different companies.

Judge Blodgett, sitting in the United States Circuit Court at Chicago, has decided in a case brought by The Consolidated Roller Mill Company, vs. The Barnard & Leas Manufacturing Company, that the roller process patents mainly relied upon by the Consolidated Company, being those of Gray, Odell and Bierkholz, could only be sustained for such special devices as they covered, and that the inventors entered the field at so late a date that they were not entitled to have the doctrine of equivalents enforced in their behalf. The decision will relieve a large number of millers from the fear of suits for infringement.

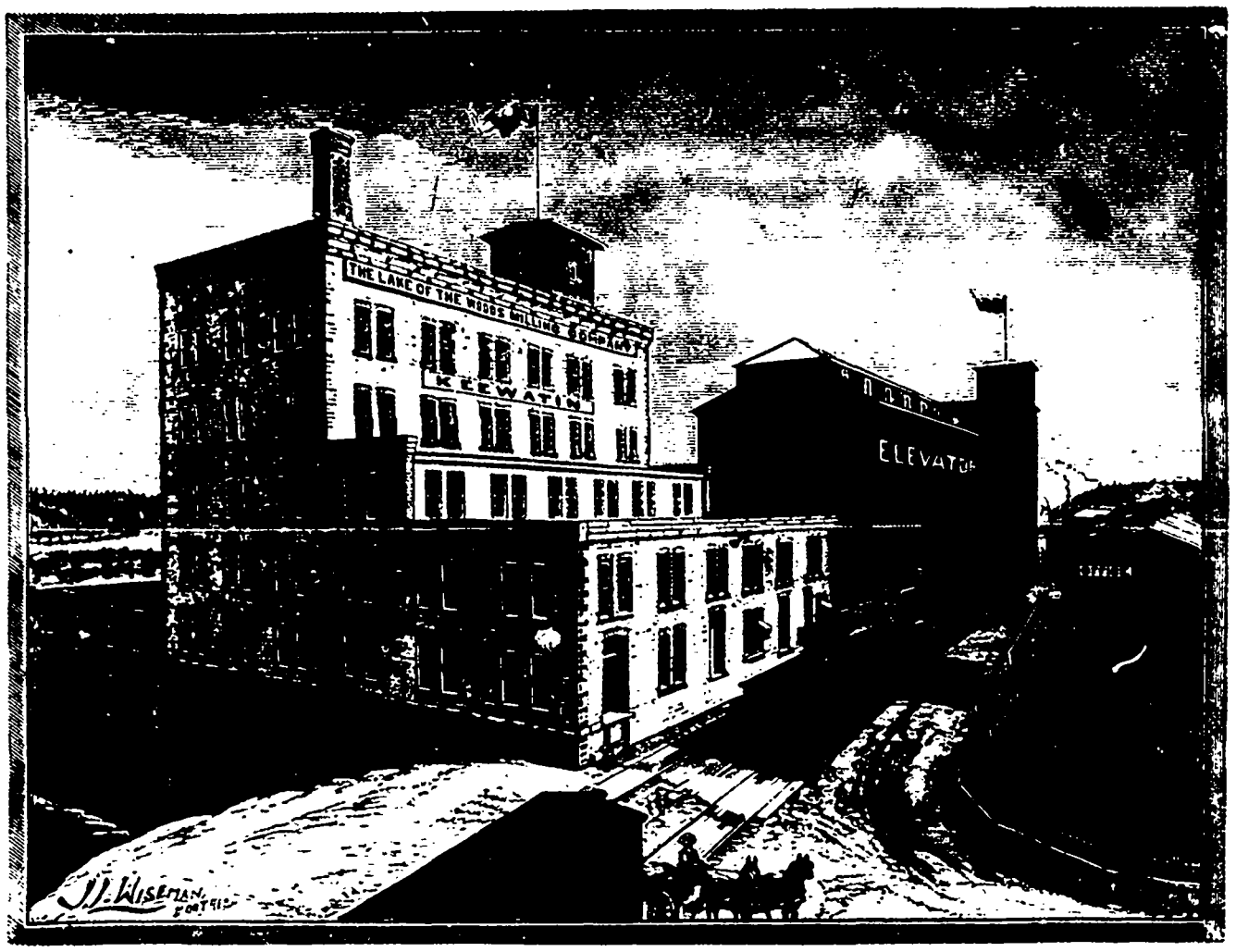
Mistakes are often made by operative millers in changing the corrugations of rollers instead of the differential speed, and again in changing the differential instead of the corrugation. This practice, no doubt, tends to shorten the life of roller mills, and adds very much to the working expenses, besides causing disappointment and delay. If rolls were treated as they ought to be, we should not find them so often in the repair shop—either to be recorrugated or to have them turned up for cylindrical trueness. We are perfectly aware that many mills endeavor to do good work when the corrugation is injured at one end and entirely gone on the other, and even when they are out of true cylindrical form; but it is just about as possible to expect good work from a millstone in wind and out of balance. Millers changing corrugations, should bear in mind that finer or coarser corrugations need different differentials to avoid trouble and do their respective work correctly.—*Millers' Review.*

A correspondent of the Brantford *Expositor* gives the following pen picture of Mr. Thomas O'Neil, the well-known miller, of Paris, Ont.: "If the compositor does not spell it with an "a" there will be a libel suit on your hands. *Mr. O'Neil is proud of that* "a" in his patronymic. It reminds him of the ancient times when his ancestors were kings in the Green Isle—as they were. Mr. O'Neil is well able to trace his descent from the lordly old sovereigns, who at one time held full sway in Ould Erin, and whose mark remains on the history and traditions of the Isle to this very day. But enough of his ancestry. He is not at all like the Englishman who boasted of his descent, all of whom were under the sod. Mr. Thomas O'Neil is one of the most active and enterprising merchants and manufacturers in the town of Paris to-day. He early transformed his flour mill into an improved roller mill, and further than that, aided by his clever son, Mr. D. O'Neil, he has since been enabled to produce a brand of flour which has not been excelled in the province. As it is now, the mill is run "for all it is worth" to supply home and foreign trade, but yet the demand for the O'Neil output is actually more than the mill's capacity, day and night, can satisfy. In this connection it is but fair to state that the experience, invention, genius and energy of Mr. Dan. O'Neil has done much towards making the mill what it is to-day—namely, one of the best equipped and most satisfactorily managed in the province. Mr. O'Neil, Jr., has in operation some of the products of his fertile brain which tend to give to the flour a quality which no other mill, not so arranged, can turn out. The several brands of O'Neil's flour now actually supply the local market, while the product for export can not be made fast enough. Your correspondent can not but speak in the highest terms of Mr. Thomas O'Neil as a municipal representative. This gentleman has served his town in various capacities for many years. As Councillor, Reeve, Mayor, he has done himself credit and the people good service, and as he stands to-day there is not a man in the community more highly respected than Thomas O'Neil. In temperament he is mild (perhaps that is not the doctor's terms), in disposition, he is a kindly, charitable, Christian gentleman, in all his business relations with his fellow men he is systematic, yet considerate. I do not think there is one man in Paris or out of Paris who can conscientiously say an ill word of him."

A MAMMOTH CANADIAN MILL.

FLOUR milling has made great advancement in this country during recent years, especially in our great prairie region westward from the lakes. Of the additions to Canadian mills during recent years, undoubtedly the most important is the mammoth industry located at the town of Keewatin, and owned and operated by "The Lake of the Woods Milling Co., Limited. This mill, though established but a short time, is already well known throughout Canada's broad domain, from ocean to ocean. Nor does its fame stop here, for beyond the Atlantic the favorite brands of flour from this mill find ready sale, in the markets of the United Kingdom. The construction of the mill was begun in the year 1887, and the establishment was completed and ready for operation about a year later. It was put regularly in operation in the fall of 1888, and has been kept running since that time.

A representative of the ELECTRICAL, MECHANICAL AND MILLING NEWS, who visited Keewatin recently, has undertaken to give a description of this great mill, understood to be the largest industry of the kind in Canada. At the outset, it would perhaps be well to say something about the town of Keewatin, by way of introduction. Keewatin is situated on the main line of the Canadian Pacific railway, about 125 miles east of Winnipeg, and a short distance east of the eastern boundary of Manitoba. Though located in the northwestern corner of Ontario, it is to all intents and purposes a Manitoba town, as its business is entirely with Manitoba. The place is also situated on an arm or bay of the Lake of the Woods, a large and picturesque body of water, which is becoming famous for its scenery and many attractions for travellers in quest of a delightful spot to while away the hot summer months. At Keewatin the Lake of the Woods empties its waters into the Winnipeg river, a stream which runs in a northwesterly direction, connecting the Lake of the Woods with Lake Winnipeg. The Winnipeg river is between 20 and 25 feet below the level of the Lake of the Woods, and this fall of water from the lake to the river provides a great water power, which is destined to become a source of great wealth to the country. But as if the natural fall of water were not sufficient, nature has provided for the utilization of this water power to wonderful advantage. In fact, the geography of the locality would seem to indicate that the place had been prepared and laid out by nature for a great manufacturing centre. After the Winnipeg river receives the water of the lake, seething in its tumultuous descent, the river runs along parallel with the lake for a distance of two miles. For this distance a narrow ridge of land separates the lake from the river. As already stated, the river is from 20 to 25 feet below the level of the lake, and by cutting a short canal through this ridge, abundant water power can be had at any point along the strip of land mentioned. How wonderfully is this land out for the utilization of the water power afforded!



It is needless to say that such a place and such advantages will be made use of. Keewatin now has quite a lumber manufacturing interest, and its advantages have attracted thither the great milling industry of which we are about to speak. The flour mill of the Lake of the Woods Milling Company is situated on this ridge of land, thus affording ample shipping facilities.

Keewatin is located just at the eastern edge of the great hard wheat belt of Western Canada, and through this place the millions of bushels of Manitoba wheat must pass, on the way to eastern markets. It is therefore right at the base of supplies for an unlimited quantity of wheat, the choicest in quality which the world produces. With its great water power and its unfailing wheat supply in close proximity, what more appropriate place could be found for a great milling industry?

The mill, as shown in the accompanying engraving, is a solid stone structure, built from the granite stone quarried on the spot. It has six floors, including the ground floor, or basement, partially below the level of the railway track. The capacity of the mill is 1,500 barrels per day. The engraving shows the mill building with the two elevators on the railway track to the east of the mill. The two storey portion of the main building shown in the engraving on the right hand side, is used for storage and packing. The low portion to the left in the engraving is the wheel room. The canal comes in from the rear of the elevators and enters the wheel room. The mill was originally built to manufacture 1,200 barrels of flour per day, but it has been increased in capacity during the last year to its present proportions, and it is now the largest mill in Canada. This increase in capacity has been rendered necessary to meet the steadily growing demand for the product of this mill, and it is the intention of the management to further increase the capacity to 2,000 barrels per day.

We will enter the mill by the door opening on the railway track, as shown in the engraving on the right. The floor of this apartment is on a level with the floor of a car, to facilitate handling to and from cars. This portion of the building is used as a storage room. Flour for shipment in barrels is loaded into cars from this floor. The second floor immediately above is used for packing flour and feed. All immediate orders are loaded from this second floor. From this floor sacks of flour, etc., are spouted into cars in rapid succession. So quickly is this work performed that a car of 20 tons can be loaded in from 8 to 10 minutes. There is actually no lifting or heavy labor attached to loading cars. A fireproof wall separates the mill proper from the packing and storage apartments.

Passing on into the mill proper, we find we have entered the grinding floor, which is filled with the latest improved roller machinery. From here we pass down to the ground floor, or basement. The ceiling of this apartment is twenty feet high, and with a cement floor, resting on the solid rock which has been quarried out. The foundation of the mill is therefore on the solid natural rock. This portion of the building is taken up with shafting for driving the machinery above. From this floor we may enter the wheel room. Here power is furnished by two water wheels, and transmitted by two immense driving shafts. Here also is a separate or third wheel, to drive electric light plant. We are shown also a large fire pump, driven by a friction from main shafting. This pump is placed only a few feet above the water level of the canal, and is capable of throwing as much water as two steam fire engines. The canal can be seen here which conducts the water from the lake to the wheels. The canal is capable of supplying four times the amount of water at present required for operating the mill. It is a never failing source of supply, and as the water is drawn from a lake, there is no trouble from ice in the winter, such as is experienced with water powers on running streams. Lake of the Woods is a large body of water, furnishing a greater available volume of water than the famous water power of the Mississippi river at Minneapolis. The lake drains a large territory, comprising portions of the state of Minnesota and the provinces of Ontario and Manitoba. It is about seventy miles long and receives the waters of a number of rivers, streams and other smaller lakes, so that there is no danger of a shortage in the supply of water.

Passing back through the wheel room to the ground floor of the mill proper, we take the elevator and proceed upward. Passing the grinding floor, as previously described, we step off on the third floor, which contains a number of bins, and spouting apparatus for distributing stock to rolls. The fourth, fifth and sixth floors contain the purifying, bolting and separating machinery, reels, etc. It is needless to particularize as to the machinery. Suffice it to say that the mill is filled with the latest improved machinery obtainable, and every improvement in milling is at once adopted. One point, however, may be noted, and that is in regard to the arrangement of the machinery. Every thing is so placed as to provide room and convenience in getting around the machinery. Owing to the large size of the building, there is an absence of that crowding and squeezing which is necessary to get through some mills. A portion of the east end of the mill is separated from the rest of the building by a fire-proof wall, which runs from the bottom to the top of the building. Thus enclosed in this end of the mill is a space of about 25 feet, which is used for cleaning machinery alone. This department of the mill has been greatly improved within the last few weeks, and now contains two separate lines of wheat cleaning machinery. Wheat is put through these two cleaning systems before reaching the rolls. This cleaning department is one of the great features of the mill, and upon which the superintendent in charge particularly prides himself. Wheat is simply cleaned perfectly, and the berry comes out actually polished, before being sent on to the rolls. The cleaning department also contains bins, capable of holding sufficient wheat for 24 hours' grinding.

The mill is lighted throughout with the incandescent electric light, there being 150 lights in all, with two large arc lights outside to illuminate the surroundings, and allow of work being carried on at night, such as loading cars, etc. As previously stated, the power for the electric light plant is furnished by a separate water wheel, so that should the rest of the machinery be shut down, the lights can still be kept up. In this way repairing or other work can be carried on at night, while the mill is closed down a very convenient arrangement.

The systems of fire protection in the mill are such as to secure great safety. Automatic sprinklers are placed on every flat, one to each ten feet of floor surface. These sprinklers are connected with a large tank in the cupola, ten feet above the top of the mill, which is always kept full of water. The sprinklers are also attached to

[illegible] fire pump situated in the wheel room, and [illegible] be put in operation in a moment. Should a [illegible] in the mill, these sprinklers will begin their work throwing water of their own accord. Stand [illegible] also placed ready for use on each flat of the [illegible] also in the cleaning department. These have [illegible] watched, and are kept filled with water, under [illegible] and ready at a moment's notice. This is the [illegible] in Canada fitted with automatic sprinklers.

The mill is heated with steam throughout, from a [illegible] the basement, for which refuse from the cooper [illegible] supplies fuel. Coils are located on every flat, and [illegible] temperature is kept at a comfortable and equitable [illegible].

The elevators, two in number, have a capacity of [illegible] bushels of wheat. No. 1 elevator is the one with [illegible] to the track, the farthest from the mill. This is [illegible] receiving and cleaning elevator. Wheat is all taken [illegible] at No. 1 elevator, and is emptied from cars and [illegible] at the rate of three cars per hour. It is then [illegible] on to elevator No. 2, which is simply a storage [illegible], being forwarded by means of a large carrier. [illegible] elevator is operated by a wire cable from the mill. Wheat for immediate grinding is taken from No. 1 ele[illegible] to the mill by means of a great belt carrier, 300 [illegible] long. Elevator No. 2 is emptied by carriers in the [illegible]. These elevators are the largest in Canada, [illegible] the exception of the Canadian Pacific elevators at [illegible] William, Lake Superior.

At the time of our visit both elevators were filled with [illegible], and in addition, 70 cars of wheat were on track [illegible] to be unloaded. This is the largest quantity of [illegible] in store at any point in Canada, and it shows that [illegible] Lake of the Woods Company has been able to se[illegible] its full share, and more than its share of the crop of Manitoba wheat for 1889. It also ensures the mill an [illegible] of wheat for grinding until the crop of 1890 [illegible] be ready for market, which will be in about seven [illegible] from now. The receiving and cleaning machin[illegible] in elevator No. 1 has recently been overhauled and [illegible] improved. A car of wheat can now be put through in [illegible] ten minutes.

In addition to these elevators at the mill, the company [illegible] last season a number of elevators at leading [illegible] markets in Manitoba, and leased several other [illegible] elevators. Next year a number of new elevators will be [illegible] in Manitoba. Grain buyers are kept at all [illegible] principal points in Manitoba, who purchase wheat for [illegible] company direct from the growers. A large quantity [illegible] of wheat has also been purchased this year from grain [illegible] dealers, by the car lot or in larger quantities. The [illegible] company is therefore well supplied with all the wheat [illegible] needed for the present season, and further purchases [illegible] being made every day.

Another feature of the mill which it will not do to [illegible] overlook is the cooperage. The cooper shop is located [illegible] a little distance from the mill, and in it are manufac[illegible] barrels from material growing in the district. Dry[illegible] kilns have been established, and flour barrels are [illegible] manufactured on the spot, to supply the barrel trade. Thus flour can be shipped in either barrels or sacks, to [illegible] the requirements of the varied trade of the com[illegible] pany. For the maritime provinces and the lumber trade flour is usually required in barrels. This is the only western mill which is able to ship flour in barrels as well as sacks.

The Keewatin mill is the only one west of the Lakes which has the advantage of water power to its full capa[illegible] city the year round. This is a great advantage to the mill, and a very material saving in catering for its [illegible] trade. Flour from the mill is being shipped regularly both east and west. Westward shipments are made to British Columbia, and eastward to all points in [illegible]. Export orders are all filled for Great Britain. The principal grades of flour manufactured are Patent, Hol[illegible]land and Strong Bakers'.

The company has principal offices at three points in [illegible]. The head office for Eastern Canada is at Mon[illegible]treal, where the president of the company, Robert Mey[illegible]er, resides. W. A. Hastings, manager, also re[illegible]sides at Montreal. All the eastern business is trans[illegible]acted at the Montreal office. Geo. V. Hastings, super[illegible]intendent, has his office at Keewatin. The third princi[illegible]pal office is at Winnipeg, where S. A. McGaw is in [illegible]. Mr. McGaw is at the head of the grain buying de[illegible]partment. Country elevators and buyers at country [illegible] points in Manitoba are regulated from Winnipeg, and all purchases of wheat are made from the Winnipeg office, which latter place is rapidly becoming the great [illegible] wheat centre of Canada.

The paid-up capital stock of the Lake of the Woods Mill[illegible]ing Company is $500,000. With this ample capital the management is enabled to take advantage of any[illegible]thing which may tend to assist the company in its oper[illegible]ations. The success of the enterprise is therefore assured, and the Lake of the Woods Milling Company is certain to be long known in connection with the flour milling industry in Canada.

DEMONSTRATED AND DISPUTED POINTS IN MILLING.

By J. Murray Cast.

Up to within a very recent period, all the cleaning the wheat received before grinding was simply an aspirating process, produced by natural air currents. The wheat was threshed by the flail, or tramped out by cattle, and then carried in bags to a loft above the barn floor, and on windy days was shovelled down, and by the natural air current, the chaff was separated from the wheat. Within a recent date this principle has been embodied in mechanical devices, by which the air currents are artificially produced. The common hand-fanning mill was the first to appear; then came the smutter; then the gravity separator, by which means the wheat and light grains were separated by difference in specific gravity; then came the scourers and brush machines; then the wheat-splitting machine, which is practically a wheat cleaner.

In the meantime many mechanical devices for cleaning wheat appeared, and have been abandoned, but are constantly being re-invented by those who are not versed in the history of wheat cleaning machines; and for the benefit of such inventors I will mention a few of these machines.

One is a machine commonly known as a "decorticator." It depends in principle upon a severe scouring action produced by cutting surfaces. One of the most common forms is that of a sandstone cylinder, within which are arranged rapidly running beaters, which throw the grain against the stone with sufficient force to cut away a considerable amount of bran, and also to produce an "ended," or scouring of the end of the berry. So far the system looks feasible and practical, and in operation it produces samples of pollard, or dust, which are very delusive. A great number of these machines were sold in America upon the basis of their samples. "You don't want that in the flour" was the argument; but the fact in time appeared that the large percentage of what appeared to be impure material was not foreign matter, but simply particles of bran. By passing the wheat through the second time, the third time, and so on until all the bran was cut away, the same samples appeared. It was also found that this severe abrasion destroyed the outer coating of the bran, which is the tougher part, so that on passing the grain to the millstone or rolls, it broke up into finer particles, and was more easily reduced into bran powder, and therefore was an actual damage instead of a benefit. Yet it cost the millers many thousands of pounds to learn this.

Another form of this same principle consists of a series of rapidly running emery wheels. The effect is precisely the same, but the machine can thus be made much smaller. I have had quite a number of customers that required me to put in these emery wheel scourers in reconstructing their mills, forming their opinions upon the basis of samples, but in every case they have run the machines only for a short time, and then thrown them out.

Another form of this delusion is in the use of wire cardboard, the same as is used in carding wool, and placed around an inner and outer cylinder, cone shaped. This is less objectionable than the others, as the abrasions or cutting of the bran is not so deep, yet it does not leave that polished surface which the wheat berry should have in order to mill to the best advantage. So I may conclude that it is one of the demonstrated principles in wheat cleaning that the berry should be cleaned and polished without destroying the outer coating of the bran, and for this cause, all machines which produce a severe abrasion are objectionable.

There is another plan in wheat cleaning worthy of mention, which has been discovered and re-discovered many times, and each inventor has dreamed of fortunes, palatial homes, and world wide honour and renown. That plan consists in the removal of the outer coating of the bran before grinding. The mechanical operation is a very simple one. It consists of damping the wheat, preferably with warm water, until the bran is thoroughly moistened, and then rubbing it with any kind of severe rubbing device, when the outer coating will peal off in large, light bran flakes. This leaves the berry in a half pearled condition. The beards at the end are all removed, the cap over the germ is also removed, and the berry appears to be in a splendid milling condition. But experience demonstrates that the remaining bran has been so weakened by the removal of the outer tough coating, that it readily pulverizes and the advantages hoped to be gained are thereby neutralized. Besides this, the bran scales are unsalable, and the power required to mill the wheat very greatly increased, besides the difficulty of wetting and drying. This plan was one of my own delusive phantoms some fifteen years ago.

> But the fondest hopes my soul had ever known,
> Were doomed to vanish in a jiffy.

I believe it can be regarded as a demonstrated point in wheat cleaning, that any attempt to remove the outer *coating of bran is injurious rather than* advantageous.

The wheat-splitting machine, or first break in long break system milling, I regard as strictly a wheat cleaning process, as it adds nothing to the capacity of the succeeding breaks; but, inasmuch as it embodies some of the disputed points in milling, I desire to *consider it separately in my next article.*

There still remains one point connected with wheat cleaning worthy of consideration, and that is, "How far can the washing of wheat be carried to advantage?"

The washing of wheat performs two functions- it cleans it and also tempers it for grinding in cases of *hard varieties. The necessity of the washer for Indian* wheats and others of similar variety, which are both filthy and hard, is now recognised as an absolute necessity. But whether it would prove profitable to wash all varieties of wheat is still an undemonstrated problem.

If soft wheats are washed, it must be by a process *that would give the wheat an instantaneous but very* severe dash through the water, giving it no time to absorb moisture to any extent, and then by the use of strong air currents to evaporate or expel the surface water. I am of the opinion that Duluth, and all varieties of hard spring wheat, as well as all other hard *varieties, should be washed to produce the best results.* In flour, where a sufficiency of water exists, a very effective device may be made for accomplishing this in the following manner: Let there be arranged a small rotary hydraulic pump, so that it will deliver its stream of water against a copper wire sieve. Then let the *wheat be delivered into the water at the point of exit* from the pump; this will carry the wheat against the sieve, the water passing through, and the wheat dropping down over an inclined sieve for drainage. From thence let it pass into an atmospheric elevating spout in which a sufficient suction is applied to elevate the *wheat to the top of the mill, during which time it is* being dried by the rapid air current; from there spout to wheat bin for tempering. By this process the wheat would not be in the water over one or two seconds, and only a sufficiency of water would remain in the bran to toughen it, without affecting in any manner the gluten or starch; and if it did not so affect the wheat, and at the same time insured a better colour of flour, it then becomes a question as to whether or not all wheats, except those which are very damp, cannot be improved by a system of instantaneous washing. I am inclined to believe they can. Dry bran pulverizes into fine particles by the scraping action of rolls; damp bran does not so much. And if we can dampen the bran evenly, and with so limited a quantity of water as not to affect the inner berry, we necessarily insure a broader bran, and whiter flour from the breaks. The process I mention being instantaneous, every berry is alike affected, which gives it a double advantage over the dampening process, viz., that of perfect uniformity to dampen, to which must be added the benefit derived from washing. The question is an undivided one; time and experience alone will demonstrate whether or not I am right in my prediction, that ultimately all wheats, soft and hard—except those very damp and fresh from the thresher—will be washed before milling.

THE FIRST BREAK.

There is probably no one point in milling upon which there has been more dispute than the first-break. To accomplish this break has lead to a great variety of machines and different styles of corrugations, foremost among which are the seven designs illustrated. A number of years ago a craze ran through America among the stone millers to put in a "degerminator," a machine calculated to split the wheat berry and remove the germ and seam impurities before sending it to the millstone for grinding. The theory was that the germ and seam-dirt produced the dark color in stone milling, and, this being removed, the stone miller might be able to make a whiter flour, that would enable him to compete with roller-milling. The bait was a very tempting one, and of course very many millers bit at it. Some of the more ardent advocates of this system made ideal illustrations in which the wheat berries were shown split beautifully through the seam and laying on their backs, while the liberated germs were jumping out like fleas from a London boarding-house-bed on a July morning.

This looked very nice in theory, but in practice it was

found that only a small percentage of the germ was thus liberated. Then brush-scalpers were brought out to give the wheat a brushing after being split, for the more complete removal of the germ and seam-dirt. This system met with many advocates, and many machines were sold for the purpose. But even with the most severe brushing not more than half the germ was removed, as in most varieties of wheat it clings tightly to the end of the berry and will not come out until the bran is thoroughly opened. Besides this, in the use of a brush the grains of wheat, opened but not separated in halves by the break machines, were thus brushed asunder, when the broken edges of the wheat came in contact with the brush and scalper, and the percentage of dark flour was thus very greatly increased, sometimes quadrupled, which made it an expensive and wasteful system, and therefore impractical. Besides this, when the wheat berry is separated in halves, it is questionable whether or not about as much impurities will gather in the recesses of the fracture, and thus be borne along to the next break, as are removed from the seam. At any rate, the system of splitting and brushing has so many disadvantages that it may be regarded practically abandoned, and the best evidence of this is that a majority of the machines originally put in for the purpose are now standing idle, and no prominent builders are now offering them to the trade, although a few of the smaller ones are still undertaking to sell them.

I was one among the first to build a wheat-splitting machine as a specialty in America, brought out in 187-. I constructed a number of varieties, or designs, nearly all of which designs have been copied in the various countries of Europe and are probably being built more extensively than any other machine for the purpose. My experience with first-break machines has probably been as extensive as that of any milling engineer. I say this without any personal vanity, and I may, therefore, be presumed to speak with some degree of authority on this matter. I early discovered that the advantages hoped to be attained in stone milling by the use of the first-break did not extend beyond what additional cleaning the wheat berry got by the jarring and scouring action of the break machine and scalper; that the degerminating motion was a delusion, and that the "seam dirt" did not exist in clean wheat to an extent capable of producing a perceptible difference in the color of the flour. And though I was at that time building a break-machine and scalper, for which we had a ready demand at large profits, yet I did not advocate it further than a wheat-cleaner, and never have. But so rooted had become this notion of degerminating in the minds of the stone millers that they would have the machine; and so my company built it and sold it, but always, if possible, in connection with a bran and smooth roll, from which the miller obtained considerable benefit, although he might be laboring under the delusion that his benefits came principally from the first break and scalper. He was satisfied and paid for his machines, and the Case Company sustained their credit and position, and made money.

This "seam-dirt" and "degerminating" theory has impinged itself upon the French stone millers, and quite a number of machines are being built and sold there for this purpose, among which is a duplicate of my own machine. In France, where they have a cleanly harvested wheat, and of excellent quality, there can be no perceptible advantage where suitable wheat-cleaners are used. I do not wish to be understood to be opposed to the use of a first-break machine, under certain conditions and to the advantages to be derived from it under such conditions; but I desire to take a comprehensive view of the entire subject in all its bearings, so far as I can in a limited article. The staunch advocates of the "seam-dirt" theory will show you the flour made from the first-break, and in a voice of triumph will remark, "You don't want that in your flour, do you?" Of course we do not; but it must be remembered that the dark coloring matter does not necessarily come from the seam.

Upon analysis, when the wheat has been well cleaned before breaking, it will be found that the coloring matter consists principally in particles of bran scoured off in the break-machine and scalper. Pass the wheat through the break machine without splitting it, and then through the scalper, and you will have the "dirt," minus the flour, made when the wheat is split, try it. The blue color of the flour is due to mill-dust or spouts, and smoke in the mill, and settlings on the wheat when it is not properly cooled after cleaning. It only takes a trifling amount to produce the blue color, since generally this is not found to exceed 1 per cent. of the offal made. The advantage to be derived from a first-break machine is purely that of a final wheat-cleaning. The first-break adds nothing to the capacity of the succeeding break-rolls. It therefore becomes a question as to what system is the best to produce the best cleaning with the least waste.

In the cuts I give seven different styles. The double arrow indicates the fast roll. Fig. 1 represents a fast roll with one-half-inch cut operating against a smooth surface. This smooth surface may be either a stationary roll, a moveable roll, or a plain chilled-iron block. If the smooth roll is made to move, it should be as slow as possible. The fast roll may be run at any desired speed, from 250 to 800, there being no pressure of any consequence on the bearings, and consequently the bearings will not heat. A small machine, by speeding up, may be made to do a greater quantity of work. Each tooth forms a hammer and strikes the grain similarly to what may be done with a small tack-hammer by hand, and the effect is substantially the same. The berry opens out at the weakest point, which is the crease, and if only gently touched, only a small percentage will be separated in halves, and consequently in sending to the scalper there is no scouring action on the fresh broken parts of the wheat, and therefore only a small percentage of flour is produced. This plan, however, has one disadvantage, and that is if the machines are set close, so as to produce a complete opening of all the grains, it will soften to some extent the middlings, so that less semolina is made, and there will be greater difficulty in making a clean finish of the bran. It is a principle not known to all milling engineers and millers, that to bruise the gluten next to the bran will make the bran much harder to clean, therefore in the use of this principle it should never be set close enough to soften the berry.

Fig. 2 is a similar machine to Fig. 1, but has a corrugated instead of a smooth roll. This is a better design for soft wheats, although the split will not be quite so good, and more flour is made, yet there is less pressing action.

Fig. 3 is either as one-fourth or one-eighth cut, is in extensive use. It produces a much larger percentage of flour than Fig. 1 and breaks a larger percentage of wheat crosswise, especially hard wheats. It has the advantage of not softening the wheat, but will not make so broad a bran.

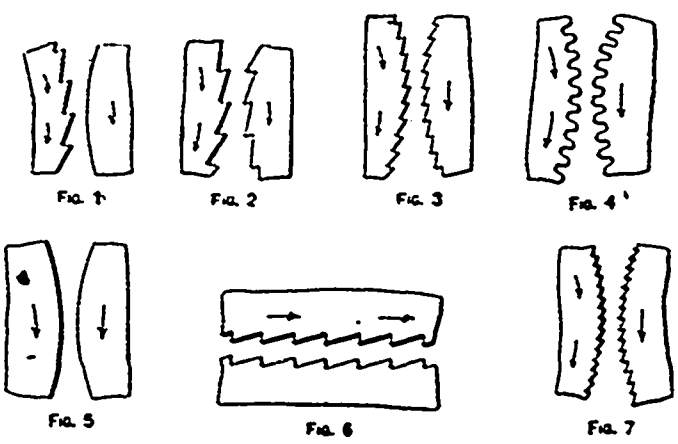


Fig. 4 has been used to a large extent by the dull-tooth advocates in milling; but I have found it decidedly objectionable, as it both bruises the wheat and shatters the bran and makes it more difficult to clean. It also injures the middlings greatly by the softening, crushing action, leaving them in a shattered condition.

Fig. 5 represents two smooth-rolls running at equal speeds. This has been experimented upon by a great many of the uninformed, but has met with no favor. It softens the middlings, increases the break-flour, makes the general results throughout the mill softer, increases the fine pollard, makes the bran harder to clean, and is objectionable every way.

Fig. 6 represents a disc-machine, of which there are a great variety, but all work substantially on the same principle. If there is but a small amount of corrugated surface on the purifiers, they will make a fairly good break. The action on the wheat is somewhat similar to that produced by Fig. 2, and the break looks much the same, except that Fig. 6 will separate more of the grains in halves, and, being held in the disc longer, there is a greater scouring action and consequently more flour is made.

Fig. 7 may represent a first-break when no splitting is attempted, and where the wheat is broken down at once, and a large proportion of coarse semolina made. In ordinary practice a twelve cut is used, cut deeply, and back of tooth running against back. If the wheat is perfectly clean and dusted over a wire reel before going to this break, it will produce results just as good as to pass it through the first-break machine and split the wheat. Some of the largest mills in America are running in this manner, making only three and four breaks. It can not be successfully contradicted that a larger percentage of coarse semolina can be made, and of a far better quality, when wheat is reduced down to about the ordinary third break at the first operation, or I may say between the second and third. That is to reduce it sufficiently that the bran is fully opened and germ relieved almost entirely.

There can be no objection, however, for the miller to have in a first break wheat-splitter. He can then use it simply to jar the wheat, and then in passing the scalper the surface dirt is removed, and in passing to the next pair of rolls operate upon it as above specified. Then whenever there is a batch of very dirty wheat the break-machine may be set up and the wheat opened. In small mills, however, that run exclusively upon native wheats, either in this country or on the continent, it will not generally pay to put in an extra roll, extra elevator and extra scalper for this purpose. There is still another style of first-break corrugation, which I have used in two, three and four-break mills to great advantage, which I have not here illustrated, for the reason that patents are now pending upon it. *London "Millers' Gazette."*

TESTING OF THE VALIDITY AND VIGOUR OF SEED GRAIN.

Editor Electrical, Mechanical and Milling News.

THE summer of 1889 was not a favorable one in some parts of the Dominion for maturing a high quality of seed grain. Rust prevailed to such an extent as to interfere with its usual development and plumpness. Where the rust was severe the grain is unusually light, and its percentage of germinating power has been considerably reduced. This is especially the case with oats. Judging from samples received for testing, this injury has been greatest in the Maritime Provinces, and in some districts in Ontario. The important bearing of well developed, vigorous seed, of high germinating power, on good crops is now recognized by all thoughtful farmers, and no one who has any seed on hand, the vitality of which is questionable, should allow himself to remain long in uncertainty as to its value. The seed testing department at the Central Experimental Farm is now in full operation, and every farmer in the Dominion is invited to send any samples of which he may have doubt to this institution for test. The time occupied in testing is usually about a fortnight; an ounce or two is sufficient for the purpose. Samples may be sent through the mail to the Experimental Farm free of postage, and the returns will be made as promptly as possible, and free of charge. The name and address of the sender should be written plainly, and accompany each package.

WM. SAUNDERS,
Director Experimental Farm.

Central Experimental Farm, Dep't of Agriculture.
Ottawa, February 15th, 1890.

SHAFT SPEED REQUIRED.

THE following table gives the minimum shaft speed in rotations per minute, of wrought iron shafts, (not subject to bending nor to sudden changes of load or speed) of different diameters, to give various horse powers. They are based upon the rule which multiplies the desired horse power by 190 for wrought iron, and divides the product by the cube of the diameter in inches. Thus, a wrought iron shaft 3.5" actual diameter, to give 50 horse power, should turn $50 \times 190 \div 42.875 = 221.5$ times per minute, as a minimum.

Actual shaft diam. inches.	Diam.	Cube of	HORSE-POWERS.														
			10	20	30	40	50	100	200	300	400						
	1.	1.	1900	3800	5700	7600	9500	19000	38000	57000	76000						
1.25	1.25	1.953	973	1947	2920	3893	4867	9734	19467	29201	38939						
1.5	1.5	3.375	563	1126	1689	2252	2815	5630	11259	16890	22521						
1.75	1.75	5.359	353	703	1058	1411	1763	3527	7053	10580	14107						
2.	2.	8.	238	475	713	950	1188	2375	4750	7125	9500						
2.25	2.25	11.390	167	334	500	667	834	1668	3336	5004	6672						
2.5	2.5	15.625	122	243	365	486	608	1216	2433	3648	4866						
2.75	2.75	20.796	91	183	274	365	457	914	1827	2741	3654						
3.	3.	27.	70	141	211	282	352	764	1408	2111	3185						
3.25	3.25	34.328	55	111	166	222	277	443	886	1329	1773						
3.5	3.5	42.875	44	89	133	177	222	297	594	891	1188						
3.75	3.75	52.734	36	72	108	144	180	241	482	723	964						
4.	4.	64.	30	59	89	119	148	297	594	891	1188						
4.25	4.25	76.765	25	49	74	99	124	248	497	745	994						
4.5	4.5	91.125	21	42	63	83	104	208	417	625	834						
4.75	4.75	107.109	18	36	54	71	89	179	358	537	716						
5.	5.	125.	15	30	46	61	76	152	304	456	608						
5.5	5.5	166.375	11	23	34	46	57	114	229	343	458						
6.	6.	216.	9	18	26	35	44	88	176	264	352						

—*Power and Transmission.*

Messrs. Goldie & McCulloch are putting in the machinery and power in the old trunk factory in Acton, Ont., for Mr. John Cameron, who will carry on a large planing mill business.

"CLIMAX" FIRST-BREAK.

THE accompanying illustration represents a new first-break for wheat recently placed on the market by Messrs. James Jones & Son, of Thorold, Ont. The inventors and manufacturers state that after making careful practical experiments with the different methods of reducing wheat to flour, and having observed the experience and practical workings of other methods, they arrived at the conclusion that the climax had not yet been reached, as in all existing methods there was not sufficient pure flour made from the wheat used. The cause of this was found to be in the manner in which the wheat was reduced. After trying different corrugations on the rolls and varying differential speed to suit the different material to be ground, but failing to secure what they deemed proper results, they changed to the convex and concave principle with fair results on soft wheat. Finally they adopted the convex and flat principle, using a corrugated roll on a flat corrugated surface. This gave better results than anything they had heretofore tried or seen, and they were led to produce the machine which we illustrate.

This machine consists of a roller having furrows in it working against a flat surface made of chilled iron and corrugated. The machine is so constructed that either a sharp or dull surface can be used at the pleasure of the miller. This is a great advantage where hard and soft wheat are ground on the same mill. This break when placed at the head of the mill, leaves the material in perfect condition for subsequent operations. The advantages claimed for this break over all others are that it makes more and better middlings at one operation, leaves the bran broad, makes but little flour, and will work as well on hard as soft wheat. The manufacturers in designing this machine have acted on the principle that if impurities are not made, they will not have to be contended with further on in the process.

Further particulars concerning this new machine may be obtained by addressing the manufacturers as above.

HIGH VS. LOW TENSION ELECTRICITY.

By "PROGRESS."

THE attacks made upon electric companies by the press of this country and the United States may after all not prove an unmixed evil, but on the contrary be conductive of benefit to those engaged in the constantly increasing industries of electric light and power distribution, as tending to educate the public mind and remove much of the prejudice caused by a want of knowledge on the part of the people.

There are two principal methods in use in central station practice in supplying electricity to consumers. That known as the low tension incandescent system using a voltage or pressure of not more than from 200 to 220 volts, and the alternating and continuous current systems, usually called high tension, and using an electro-motive force of 1000 volts and upwards. The distinctive low tension system is cumbrous and costly in its application, requiring immense conductors for its distribution, involving considerable loss of potential even under the most favorable conditions, and being entirely unsuitable for reaching over 800 yards or so from its source of power. The high tension current on the contrary, using comparatively small wire, can be economically carried several miles, thus reaching at a minimum of cost, both for first outlay and subsequently for running expenses, the most distant consumer.

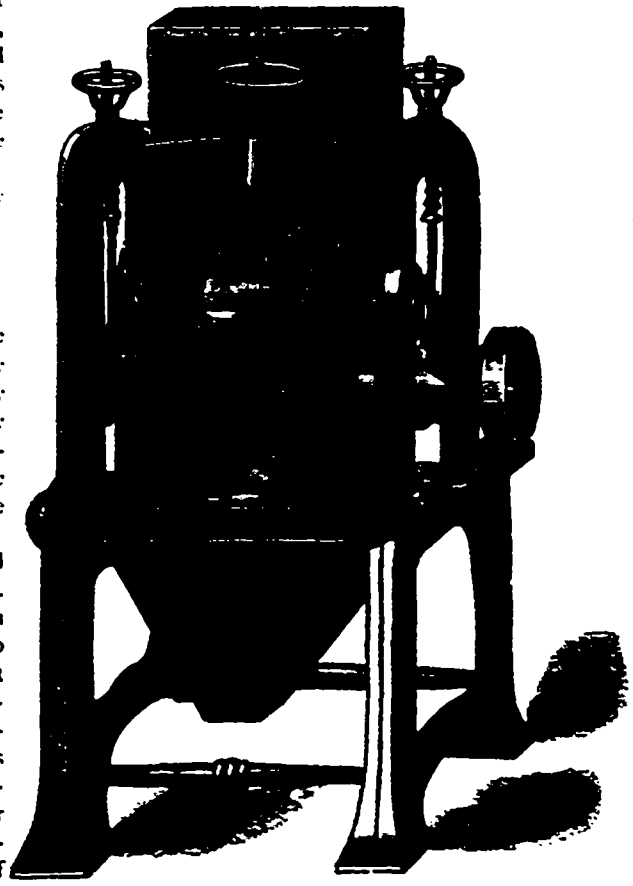
It is not denied that under some circumstances of bad construction, poor material and careless or ignorant handling on the part of employees and others who should know better, these high tension currents may become a source of danger; but that is no argument that with reasonable care in construction, modern methods of insulation and increased knowledge on the part of the public, they will not be just as safe and free from accident as any of the thousand and one appliances of civilized life.

There should be no more reason to condemn the use of electricity in its more advanced form because in some cases accidents have happened, than there would be to refrain from the use of illuminating gas, or to cease to take advantage of the quick transit afforded by the railroad train. Such a proposition would be entirely at variance with modern progressive ideas.

This is an age of advancement, there is a demand on all sides for the soft, beautiful and healthful electric light. It will be the light of the future—a future fast coming into the present—and economic considerations demand something more than the slow moving, restricted application of a low tension distribution which can not cover, and has no chance to cover, the area of a city. It is the very nature of the case that the best residences are scattered for miles around the suburbs, and being so scattered, independent stations, restrictions of low tension currents, could not reach enough of these houses to bring the price of light even within the reach of a semi-millionaire. What is the rational conclusion? Simply that a higher tension must be used to carry the current economically to where it is wanted, and converters brought into play to reduce the potential to one perfectly safe for use in the interior of dwellings. But here comes in the howl of "danger."

It is unfortunate that the exponents of low tension systems should in their efforts at self-aggrandizement seek to throw discredit upon the entire business of electric light and distribution of power, excepting only that small section which they have taken upon themselves to exploit, by inspiring the publication of sensational, exaggerated and garbled articles in the public press, and even in attempting to obtain legislation to limit the voltage of electric circuits. It is doubly unfortunate that the man whose brilliant achievements have led to his being looked upon as the father of electricity, instead of turning the light of his genius and inventive powers or efforts to extend the scope of electric developments and an improved method and protective devices to render more safe the use of such currents as are necessary to the economical distribution of electricity, should ally himself with the public executioner in his efforts to discredit a rival method which has grown and will grow despite all the opposition that can be offered to it.

The impartial judgment of an intelligent public, however, will soon be able to appreciate the significance of these efforts and sum them up at their true value. Admitted, that with improper insulation and neglect of ordinary precautions or carelessness, there is risk in



handling high tension wires, what then? How about the use of gas? Is it not a fact that gas has killed more people in one county or province than tallow candles probably have in the whole world. On the same theory we should stick to candles. Take any of the operations of civilized existence—take for instance the lumber cutting industry. It used to be done with the up and down frame saw. It was a perfectly safe proceeding, and seldom known to hurt anybody, but a very low tension way of producing lumber, not at all suited to the rapid ideas of the present day. We must have lumber and want it cheap, so we introduce the six-foot circular. Now and then a man is cut in two, and in the course of a year many others are maimed, but it seems a perfectly natural proceeding, and there is nothing heard of legal enactments to abolish the use of a circular saw. If the theory be accepted that a process must be rendered absolutely harmless before it can be adopted, what becomes of our present system of railroad travel? A locomotive that failed to kill a man if it run over him would be of no earthly use to haul a train. The old-fashioned stage wagon of our forefathers—the low tension system of locomotion—while reasonably safe for its occupants in the matter of murder, arson and sudden death, is too slow for the ideas of the present day, and the fast express, though it does occasionally strike an open switch and go down to destruction, is considered a necessity of modern civilization.

On whichever side we look, we find this state of evolution from crude and slow beginnings to the rapid developments of modern art. It is not that life is held more lightly now than in the days of our fathers—quite the reverse; men used to be gibbeted in old Halifax for stealing to the value of sixpence but while taking advantage of the rapid developments of science, new methods of protection are being devised, precautions are taken which reduce to a minimum the chances of accidents, and improvements in construction largely reduce all risks.

A few years ago, 20 lbs. to the inch was considered a fair pressure for steam boilers even with that there were accidents but it was not economical, and now, with improved methods of construction, boilers are made to carry 80, 100 and even 160 lbs. to the inch with just as much safety and vastly more economy.

It is just so with electricity. With improved methods of insulation, and careful and thorough work, present prejudice will be swept away; the cumbersome, costly and uselessly "safe" will give place to the high-tension, far-reaching economical currents that, properly protected, will carry the new illuminant into the residential districts of the largest city. The consumer and the producer will alike benefit, and systems that now are no good to produce either a dividend or a decent light, will be relegated to the limbo of the harmless and obsolete along with the tallow candle, the pit-saw and the bull team.

Since the above was written news is to hand that the Senate Committee of the Legislature of Virginia have reported adversely on the Bill to limit the voltage of the electric current, though it was supported by Edison in person and Mr. Harold P. Brown, of execution notoriety.

THE MILLING SITUATION.

Editor ELECTRICAL, MECHANICAL AND MILLING NEWS.

SIR,—Will we submit to be gradually exterminated? is the question which is or ought to be asked by every miller in Canada in view of the present state of affairs. Her Majesty's parliament in session at Ottawa has apparently come to the conclusion that fruitless discussions as to the comparative merits of single or dual languages are of more importance to the country than the settling of a question that affects more people in a day than anything yet before the House does in a year. It is certain that our representatives at Ottawa do not seem to care to stir up a discussion over the millers' case, for fear they might prejudice the chances of their respective parties in the next election.

Now it is also sure that in the course of the next two weeks the proposed changes in the tariff will be brought down by the government, and now is the time to jog the memory of our representatives on both sides of the House, and remind them of their promises. Let every miller in Canada but say in plain terms to his representative that he will and must have justice, and there is no power at Ottawa can resist. We are not suppliants going hat in hand for favors; we are not the humble slaves of party prejudice; we are business men of all shades in politics and religion seeking one common object—even-handed justice under the existing laws of the land.

The best plan that suggests itself to the writer, is that every member of the D. M. A. write to the representative of his riding asking him plainly what he intends to do about it—not what he will do if some one else says or does something, but what he is prepared to say and do on his own account.

Do not delay performing this plain duty; do not give your representative the excuse that he was not asked to move in this matter. Write first, and do your delaying afterwards.

The importation of American flour is still on the increase, and even now car load after car load is being entered for home consumption in Toronto—not Quebec, St. John or Halifax, but right here in our home market. Strong bakers' flour made from Dakota hard wheat can be sold, duty paid, in Toronto at 15 to 25 cents a barrel less than the cost price of our Canadian product, and a handsome profit realized by the dealer, who, by the way, can save a little more than the amount of the duty through the discrimination in freights in favor of the American shipper.

Of course there are some millers who are so wealthy that they do not care whether their mills are running to pay or not. Now, in charity to those not so fortunate, these gentlemen should add their voice to ours and assist us in obtaining justice.

The farmers of Ontario have at last arrived at an understanding of the situation, and while they do not propose the same remedy as the millers, they have put themselves on record as being willing to forego their protection of 15 cents per bushel on wheat in order to do away with the present unjust tariff arrangements. This was even more than the millers had any reason to expect at their hands, especially when they (the farmers) were smarting under the refusal to do away with the obnoxious rebate on corn for feeding purposes. Backed by the farmers and the solid influence of Manitoba, it will require very little to turn the scale in our favor, and as the writer said eight months ago, the matter is now in our own hands. Let us act.

Yours truly, JOHN BROWN.

RECEIVING TANKS ON HEATING SYSTEMS.

THE return of drips in heating systems that take steam directly from low pressure boilers may be managed readily enough; but when high pressures have to be maintained in the boilers for the purpose of running pumps or elevators or furnishing power, and the steam for heating has to be passed through reducing valves, some new elements of difficulty come into play and call for careful consideration. Our illustrations this month show receiving tank as applied to such systems.

Our attention was recently called to a heating installation that was giving great trouble from pounding and rattling, and upon examination the receiving tank was found to be arranged as in Fig. 1. As the faulty arrangements in this instance are very frequently met with, we shall describe them somewhat in detail. The returns entered the receiver through a three-inch pipe, shown at A, this pipe entering through the head near the bottom of the tank. The supply for the pump F (which returned the water from T to the boilers) was taken from the bottom of the tank through pipe E. An escape pipe was placed in the top of the receiver as represented at B, to relieve the pressure. Cold water was also admitted when necessary, through C, and in cold weather, when all the radiators were in use, this cold water supply was admitted very freely, the claim being made that the return through A was so great in such cases that the water in the tank would get so hot that the pump would not work, although it was placed properly so that water would flow into it of its own weight.

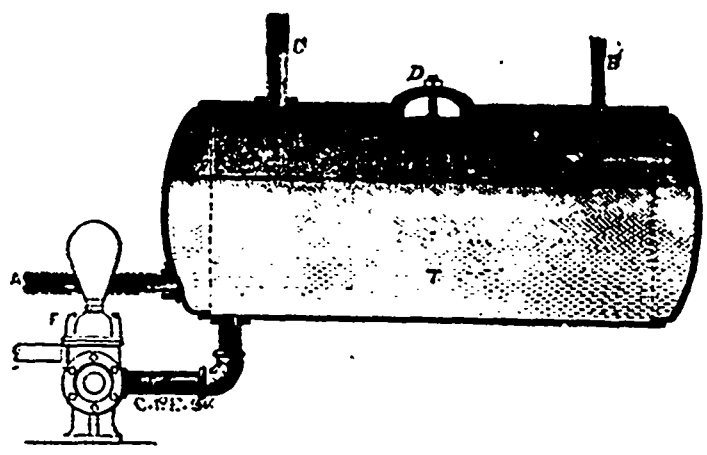


FIG. 1. INCORRECT ARRANGEMENT

A glance at the arrangement of the system will show the steam-heating engineer the cause of the trouble. The return pipe entering below the level of the water in the receiver, a considerable portion of the steam that is returned is condensed at once upon striking the cold water, and the concussion and rattling noise so produced is communicated through the piping to every one of the buildings heated. The trouble with the pump is that returns enter close by and at right angles to the pipe through which the pump takes its feed, so that the steam that enters A along with the water of condensation breaks the current in the suction pipe.

A proper arrangement of these connections is shown in Fig. 2, where the return pipe A enters at the top, discharging the water of condensation upon the surface of that in the receiver. The escape pipe has been removed, and the vapor collecting over the water cannot pass off. By this removal of the escape pipe, a great saving of heat, and therefore fuel, is effected, which saving can be approximately calculated by means of tables of the properties of steam. The pipe being 1½ inches in diameter, and the pressure in the tank being, let us say, one pound above the atmosphere, a simple calculation shows that a prodigious quantity of steam will flow through it and go to waste in the course of twenty-four hours; and any one who is sufficiently interested to make the calculation will find that an escape pipe like this one is a surprisingly expensive thing.

The return pipe, A, when arranged as in Fig. 2, acts as a relay, and if the pressure from accumulating vapor in the receiver equals that in the heating system the water of condensation will flow into the receiver only as fast as it accumulates in the pipes. Thus the connections and returns may be kept flooded so that all noise in the pipes will be prevented. It is well, when all the pipes to the radiating surfaces are of good size and the pressure throughout the system uniform, to run a small pipe from the steam main to the receiver so as to prevent the water from being blown out of the return pipe. This will make the flooding of the connections sure, and the small pipe may very easily be so arranged as to remove the drip from the main steam pipe, as well as to keep up the pressure in the receiver.

A drip valve should be placed at the lowest point of the return pipe for draining it when it is not in use, and one should also be placed on the receiver to remove air and prevent an air-bound in first starting up the system.

In Fig. 2 the pipe that supplies the pump (E) is represented as connected to the head of the tank. This is by no means essential; the best place to connect it will readily be found from the circumstances of each individual case. If it is run into the bottom of the tank, as in Fig. 1, it should project four or five inches into the tank, so that any sediment that may be in the water may deposit on the bottom plates and be removed through the blow-off shown at D in Fig. 2, and not pass through the pump. The engraver has represented the cold water supply pipe, C, as running the length of the tank before it discharges. This is also not an essential feature. We should prefer, in fact, to have C discharge into the tank directly, without the intervention of the elbow and horizontal pipe.

In Fig. 2 a second return pipe is shown at B, to illustrate a point that it is sometimes useful to know about. Ordinarily all the drip would be returned through the one pipe, A. There may be some radiators, however, that are supplied through pipes that are too small to allow of the free passage of sufficient steam; or some of the radiators may be so nearly on a level with the water in the receiver, T, that they will not return their drips freely enough through A. In such cases it is often advantageous to allow these radiators to return their water through a separate pipe, B, that enters the tank eight or ten inches or a foot lower than the surface of the water in pipe A. This will give the ill-conditioned radiators the advantage of a correspondingly less static pressure to return against, and will equalize the circulation all over the buildings. *The Locomotive.*

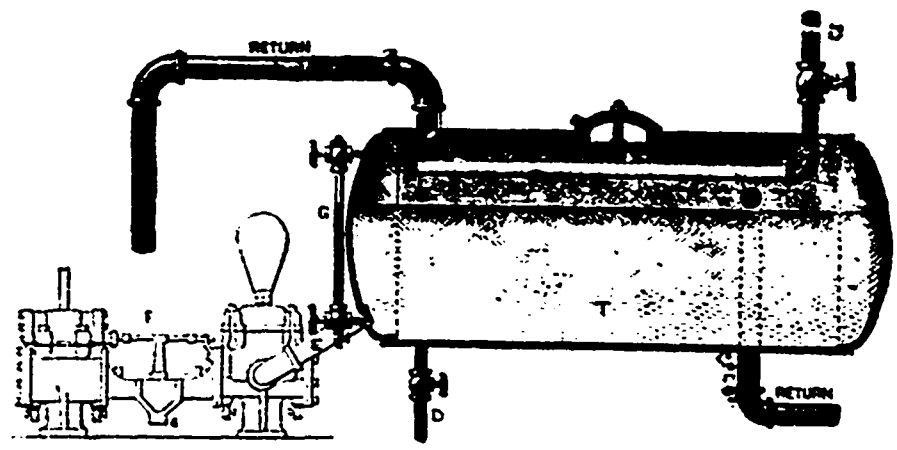


FIG. 2 CORRECT ARRANGEMENT.

THE "BROWN" ENGINE.

EDITOR ELECTRICAL, MECHANICAL AND MILLING NEWS.

DEAR SIR,—In your February issue you state amongst other machinery items, "Messrs. Goldie & McCulloch, of Galt, have recently made the following sales of Wheelock engines: W. Doherty & Co., organ manufacturers, Clinton, to replace Brown engine." It is very well known that we are the manufacturers of the Brown engine, and this item is well calculated to convey the impression that the engine replaced in Doherty's shops was manufactured by us, was an inferior one, and was replaced by a Wheelock as a superior one. This impression I wish to correct. The Brown engine drawings and patterns from which we manufacture were procured direct from The Brown Engine Co., of Fitchburg, Mass., the inventors of the engine, and the first engines built in our shops here were built under the personal supervision of Mr. Brown himself. Some engine builders here in Canada, with no unsurmountable objections to reaping where they had not sown, attracted by the superiority of the engine, attempted to copy it, and placed upon the market a comparatively worthless imitation, which in appearance was well calculated to deceive, and labelled it "The Brown." It had no more claim to the reputation of "The Brown" than a counterfeit dollar has the reputation of a genuine one. The Brown engine in Doherty's organ factory was manufactured by Goldie & McCulloch themselves. As I am unwilling to profit (?) by the reputation which they earned as manufacturers of this style of engine, I ask you in justice to all parties interested to publish this explanation. *No Brown engine built by us was ever displaced by a Wheelock or any other engine.*

Yours truly,

THE GEO. T. SMITH M. P. CO. OF CANADA (LTD.),
S. S. Heywood, Manager.

LOSS OF POWER BY RADIATION OF HEAT.*

THE intellectual life of every man actively employed can be well illustrated by the geometrical figure of a plane surface, differing from each other as one man differs from another. Treating the brain as the central point of each figure we perceive the intellectual force reaching out in many or few directions to seize upon new matter, bringing it back to the central point to be digested and assimilated. In this way new life is constantly received.

We speak of a "well-rounded character," of a "well-rounded life." Why may we not also speak of a well-rounded intelligence?

Let us work this idea out for a moment and see what the application of it will bring to us. We all know the man, the reach of whose intellectual forces, stretching out in every direction like the radii from the centre, balanced perfectly, assimilates by every ray, and produces that perfect plane surface, the circle. That man surely should be said to have a well-rounded intelligence. He is the man whose past growth has but quickened and strengthened his present power of assimilating new truths, new facts, new experiences. This man does not believe that he has touched and absorbed all possible knowledge. Nay, more than that, he welcomes always, with kindly interest, new discoveries of valuable fact or application; and because he thinks that a particular thing is good, he by no means refuses to recognize that another particular something may be, for the purpose in hand, better.

We all know the antithesis of the man just spoken of. To our view he appears a quadrilateral with sides so unequal that the only dimension he seemingly occupies is length. There is no mental breadth to him. The area of his mental grasp is reduced to very low terms. Along the almost mathematical line of his intelligence he works, accomplishing more or less as the case may be. He has no room for new knowledge. What he has acquired has filled him full. He is, possibly, a large man, in length, while the area of his intellectual force is small.

Between these extreme forms are to be found the rest of mankind. Some with sharp angles, some with obtuse angles, some a combination of the two.

Then there is the man who is best represented by the figure with one or more re-entering angles, the basic points of which have become ossified.

No longer can they assimilate; they have become simply sharp projections, against which new living knowledge impales itself and withers, useless, hanging there, as in old times skeletons of men hung in gibbets, until time dismembered them and the parts fell back to earth, good for nothing but to cumber the ground.

We come now to the subject matter of this paper. And the application of what has been said has much to do with it, because it is only of late years that definite knowledge has been available upon this subject, and because the Magnesia sectional steam pipe and boiler non-heat-conducting covering is a comparatively new discovery, made some three years ago. What it accomplishes is a new truth. And the intellectual rays, which had in former years reached out and absorbed *impressions*, not knowledge, of the values of various coverings formerly used, have, in some cases, formed those figures with the re-entering angles of which we have spoken. Some architects, some mechanical engineers, some engine builders, some mill managers, some in all lines employing steam, can be represented by the circle in our figure of speed. Is there any geometrical figure which does not represent others in these same occupations?

To him who holds the purse, and pays for the coal consumed, it is of importance that between the energy of the burning fuel and the power developed by the engine there should be the least possible loss. Every unit of heat radiated by boiler pipe, cylinder or heater is absolute loss, and must come out of that purse. In an electrical plant this matter is of great importance. There is less opportunity to have results obscured. There is, proportionally, a large possible loss between the coal on the grate and the far end of the cylinder, and this loss should be reduced to the minimum. Is it not always the best economy to throw away as little as possible, to save from waste *all* that can be saved? Is not the very *reason for being*, of the architect, the mechanical engineer, in fact of every man who is paid for his advice and direction, just this; that he shall bring to bear upon the subject, and impart to his client

* Read before the Boston Electric Club, Dec. 23, 1889, by F. C. Child

...est knowledge concerning the various matters about ... he is consulted? That he shall keep abreast of ...ade of discovery and improvement, and that upon ... subjects he shall know, not trusting to mere hear... or to unintelligent prejudice for his impressions.

How can the man of the re-entering angles ever *know* a truth, discovered after the basic points became ...wn? How is it that his advice is sought? Why ...ent length of years alone, or youthful self-conceit to ...y the place properly belonging to that intelligence ...ch digests knowledge and applies results? As illus...ion, let me mention a case coming within my know...

Some little time since a gentlemen from a neighbor... city called upon me for information upon the subject ...coverings in general and their comparative values. ...ing an intelligent man he said frankly at the outset ...at he knew very little on the subject. He had, how..., in common with all of us, heard the word "asbest..." used as a shibboleth for years, but he desired ...ccurate knowledge, and after he had digested the infor...ion he should act on his judgment. I devoted ...ficient time to him to put him in possession of the ...ent points of the subject. His understanding was ...ear. He left me to seek elsewhere further light upon ...e matter. After some days he returned and directed ...at the Magnesia covering be applied to his work. In ...e course of conversation he remarked that he had ...ered great diversity of advice from those to whom ...e had gone. One man, who had been years in the ...siness of selling steam plants, told him that the best ...ing for him to use was hair felt, even though the steam ...essure might run up to 125 pounds to the inch. Now, ...as a matter of fact, the man who gave that advice simply ...owed himself an unsafe guide; and from his inability ...o keep abreast with modern knowledge, that he had no ...onception of the fire hazard which his advice was to ...ast upon the innocent inquirer, and that his advice ...as little short of being morally criminal.

The subject of the fire hazard of organic coverings ...as been pretty thoroughly investigated and can be ...retty well known, when there is any inclination to get ...at the facts which long years of travelling in has deep...ed. How many fires (cause unknown?) have really ...originated from the slow carbonizing of organic material ...on steam pipes? It is but recently that the hair felt ...overing on the steam end of a Worthington pumping ...engine, within ten miles of us, not only burnt itself but ...destroyed some thousands of dollars worth of walnut ...casings. Cases of the combustion of these organic ...coverings are numerous and are well known to all ...except the men of the re-entering angles.

To return to our investigator: He said that Messrs. ...Rollins, in explaining the covering which they desired me ...to use, took me to a boiler room to allow me to examine ...it. The engineer in charge of the plant, who appeared ...to be an intelligent man, took me to one side and re...marked that he did not want to do any harm to this ...covering concern; they were friends of his, "but I have ...been making careful tests, before and since the covering ...was applied and I cannot see that it saves me one ...dollar."

What do you say to that engineer?

The reply was obvious; that to the man nothing good ...could be said which would be of use; but that his ...employers would undoubtedly further their own interests ...by allowing him to be replaced by a man with brain ...power enough to enable him to discover the saving which ...was certainly made, although the covering was one of the ...inferior ones.

Again, in low-pressure work for heating, where the ...steam is off the pipes a part of the year, many of the ...organic coverings become harboring and breeding ...places for vermin.

The man who makes the specifications for the heating ...plant is often he of the re-entering angles. Most people ...naturally think that he knows about these matters. He ...ought to know, those who employ him believe that he ...knows, but really he is sometimes densely, perversely ...and persistently ignorant on this subject. The contract...ors figure on his specifications. Here is the real reason ...for so much cheap and miserable work.

How appreciate the great loss of heat from uncovered ...as to perfectly covered pipes. Many have an indistinct ...impression that there may possibly be some slight loss. ...But there is in many cases aa absence of knowledge ...upon this subject where it should be complete. The ...most correct data available show that the radiation from ...an uncovered 2-inch steam pipe, with 60 pounds steam ...pressure, is 391.83 kilo. centigrade heat units 1 foot 1 ...hour, or 21.739.78 kilos. of coal for 100 feet per year of ...300 days of ten hours each; 1 kilo. equals 2.205 pounds. ...Properly combining these figures we see that there are ...23+ tons of coal lost by radiation from that uncovered pipe. If the coal costs $4.00 per ton, the radiation from this 100 feet of pipe will amount to $95.87. From the same pipe covered with Wm. Berkefeld's fossil meal composition $\frac{92}{100}$-inch thick, the most powerful inorganic non-heat conductor used as a covering at the time these investigations were made, there were radiated 24.109 kilo. cent. heat units, 1 foot 1 hour, or 1337.63 kilos. of coal for the year. This would be $1\frac{474}{1000}$ tons of coal at $4.00 per ton amounts to $5.89. Then $95.87 less $5.89 equals $89.98, the saving effected by covering this pipe with Wm. Berkefeld's fossil meal composition $\frac{92}{100}$ of an inch thick. Or, in other words, the saving effected was over 93 per cent. of the total possible radiation, using a thickness of one inch this loss would be reduced to $5.50.

From the same data we find (page 44), it stated that while through 25 m. m. of W. B. fossil meal was 7.7 heat units, through 25 m. m. of carb. magnesia it was 6.7 heat units, therefore the proportions 7.7 : 6.7 = $5.50 : $4.80 gives us the coal value of heat lost by radiation through the Magnesia covering. To put this in another form: From the running foot of 2-inch pipe uncovered, the loss is 96 cents, while from the same pipe covered with the Magnesia, the loss is less than 5 cents; or a saving of over 91 cents per year. To accomplish this saving the cost of the covering should be taken into account. This was 27 cents. Therefore the investment in the Magnesia covering is paid back in less than four months. The data which we have used were obtained by the use of a calorimeter measuring the quantity of heat passing through covering. The other possible method of arriving at this knowledge would be to accurately measure the condensation of the steam. In these experiments, owing to several reasons, it was not deemed advisable to rely upon the second method. Recently, however, I have seen in the *American Engineer*, of June 12, a report of the proceedings of the Michigan Engineering Society containing a paper by Professor Cooley, of Ann Arbor, Mich., in which he says:

"The benefits of covering steam pipes to prevent radiation are strikingly illustrated by the following example: The Thomson-Houston electric light plant in Ann Arbor has about 60 feet of 7-inch pipe connecting the boilers with the engines and two large steam drums above the boilers. In March, 1887, the steam at the far end of of this pipe was tested to determine the amount of entrained water, the pipes and drums at the time being uncovered. An average of nine experiments gave 31.01 per cent. moisture. In June of the same year, after the pipes were covered with Magnesia sectional coverings, the quality of the steam was again tested, the average of five experiments giving 3.61 per cent. moisture; the tests were made by the same men from the same connections, and in the same manner. The pipes and steam drums in March were subjected to a draught, which, of course, aided the condensation. Enough water passed into the cylinders to retard the engines, producing a disagreeable noise. In June the weather was warmer and the pipes and steam drums were well protected. The quality of steam at the boilers was tested in June, and showed about three per cent. moisture. Assuming that 100 I. H. P. were being developed at the time, and that each horse power required 30 pounds of steam; if the steam is assumed to have 25 per cent. entrained water due to condensation in the pipes and connections, then 4000 pounds steam will need to be produced in the boilers, or 1000 pounds more than necessary. To produce this steam will require about 125 pounds of good coal per hour, or 1000 pounds per day of eight hours. One half ton per day at $3 per ton for 300 days, $450. The actual cost of the covering put on complete probably did not exceed $150."

If the coal be figured at $4 per ton, as in the first method, the saving due to the Magnesia would amount to four times its cost each year. The steam pressure here was much higher than 60 pounds and we can, therefore, safely hold that the two demonstrations practically prove each other.

The nearest approach in efficiency to the Magnesia covering made by any of the so-called "asbestos cement feltings," or "asbestos coverings" is not more than 68 per cent. to 70 per cent. Hence it is plain that it is economy for the steam users rather to pay the price of the Magnesia covering than to accept the other coverings offered as substitutes for the Magnesia as a free gift, for within the year the free gift nets him a loss over and above the cost of the Magnesia.

The Armington & Sims Engine Company has lately fitted up its works with the view of determining the efficiency of boilers, engines, dynamos, etc. It naturally sought the nearest approach to complete prevention of loss of heat by radiation, and after investigation of the subject ordered the Magnesia applied, although it is understood that other coverings were offered them free of cost.

It is found in practical operation that the covering of the steam cylinders of engines with the Magnesia covering, by reducing the condensation within the cylinder materially, increases the duty performed; so much so that many of the most successful builders of engines, where obliged by their contracts to produce the maximum duty per pound of coal always use this Magnesia. Among engine builders there is of course keen competition. In too many cases, owing to absence of knowledge on the part of purchasers, this competition degenerates into a mere scramble to name the lowest price. I have noticed, sometimes, that this struggle seemed on the part of the purchaser to result in benumbing the faculties so that the power of comprehensive judgment was partially paralyzed.

Compound engines have been delivered, set up, and accepted, where no provision had been made to prevent the loss of heat by radiation from the exhaust steam chest or receiver and the pipes leading from the high-pressure to the low-pressure cylinders.

When contracts are not carefully made on the part of the purchaser then it is that some inferior non-heat conductor, as, for instance, clay and refuse fibre, asbestos cements, horse manure and lime, or any one of fifty comparatively worthless substitutes are used because they cost the contractor nearly nothing and the purchaser doesn't know. Some time since it became desirable at a large mill to overhaul a run of 18-inch riveted pipe about 900 feet long. The covering which had been applied to this pipe some year or a year and a half before the time of which I speak, had practically disappeared, it being an organic covering protected with sheets of asbestos paper between it and the pipe, the asbestos protection, as usual, proving of very little use. There were, I believe, some few patches of the covering left here and there. The question of covering this pipe was carefully considered with the result that the Magnesia covering was applied at a cost of some $1,700, or over $700 more than the inferior coverings were offered for. Now note results. In the first place 20 per cent. of the boilers supplying this pipe have been shut down, effecting a saving of from $4,000 to $4,500 per year for coal alone, which would pay the cost of covering $2\frac{2}{3}$ times each year. In the second place the Magnesia will be as effective ten or fifteen years hence as it has already proved to be. In the third place, should any change be made in the pipe, this covering can be readily removed and again reapplied without loss. At the Pemberton mills I am informed this Magnesia covering has been applied, taken off the pipes and reapplied in some places several times without injury to it. At another mill the flue conducting the gases from the battery of boilers to the economizer was covered with this Magnesia. The mechanical engineer in charge, reports that the results of careful tests lead to the conclusion that in this position the Magnesia pays its cost each five months, and its cost there was more than threefold the price which the asbestos cements could have been applied for.

An interesting verification of the remarkable non-heat condensing quality of the Magnesia covering occurred in Lynn, Mass. In the heart of the district in that city, recently the scene of the disastrous conflagration, there was located the machine shop of Messrs. Rollins & Glozier. A 2-inch steam pipe there was covered with this material. The heat of the fire at this place has been curiously determined to have been between the minimum extreme of 2756° Fah. and the maximum extreme of 2950° Fah., in this way: Cast iron melts at 2756° Fah; wrought iron at 2950° Fah. A portion of the cast-iron bed of a lathe was fused into an irregular mass, and on it, partly imbedded, was a wrought-iron nut not melted. The steam pipe spoken of fell a distance of 20 feet, and some of the Magnesia covering was broken by the fall, but so effective was its heat resisting and non-heat conducting power that the pipe was found to be uninjured, and it is being used again in the building which is being erected to take the place of the one burned. That the Magnesia should have endured the ordeal successfully was not unexpected, for we know that it is used by the Herreshoff Manufacturing Company as a lining to the shells of its coil boilers, and it is there subjected to a very intense heat resulting from the forced draught used in this type of boiler. Instances could be multiplied indefinitely, but I refrain from occupying further time with them, citing, however, one recent pertinent case.

The trial trip of the new cruiser "Baltimore" took place in the middle of September. It is reported to have been in many ways eminently satisfactory. The report goes on to state: "Another noteworthy fact was the comfortable condition of the fire and engine rooms.

A new duplicate crew had been provided with the expectation of relieving the firemen in two-hour turns; but after the first two hours of the run the first watch refused to quit work and insisted on running the ship throughout the entire four hour's trial." Boiler and all steam surfaces were covered with the Magnesia covering.

So it appears that not only is the man who pays for the coal interested in this question of most perfect insulation, but also the men who operate the plant as well. In time those architects, those mechanical engineers, those engine builders, and those other advisers, who are paid to advise soundly and correctly, and who are now represented by our figure with the re-entering angles, will of necessity change their form and begin to assimilate these new facts, or ossification will so spread throughout the whole figure that they will be relegated to the shelf for curiosities as showing what strange geometrical forms the intellectual life of man may take.

NINE YEARS WITH THE ARC LAMP.*

By M. D. Law.

IN being honored with an invitation to read a second paper before the National Electric Light Association, I cannot help but feel that there were points of interest to some of you in my other paper presented at the Niagara Falls convention. The subject of this paper is one that is of interest not only to every central station man, but also to those who handle arc lights in isolated plants; and if I can give you but one point that is of value, I shall feel amply repaid for my labor. There are a large number of irregularities in arc lamps that can be remedied by a judicious study of their actions, and, after the cause of their trouble has been found, it should be remedied, even if the lamp has to be rebuilt.

In order to find the special trouble that arc lamps are subject to, a careful record should be kept of each and every lamp. To do this give each lamp its individual number, which should be firmly attached to the lamp box and never removed, then by the use of a numbered book, allowing a page for each lamp, a record may be kept of all lamps, where they are, when changed, with the kind and amount of repairs.

This method of keeping a lamp record allows of finding the peculiar trouble that the lamp is subject to, and the remedy can be applied, preventing any further trouble until the washers, clutches, rods or bushings, have to be removed. If a lamp is continually being changed for the same cause, there is some one thing that is radically wrong which is causing the trouble, this should be found and rectified, for instance, a lamp may work perfectly on the test rack, but, after being in use for a short time, would have to be changed for dropping. If from the records of that lamp this is found to be its general complaint, then look for the trouble, if a Brush lamp, in the winding that is, there may not be the proper resistance of wire on the magnets, or there is too great a difference in resistance between them, which should not be more than one ohm or the result is a side puller.

The resistance of the magnets should be kept as near as possible to eighty five ohms, never allow more than three ohms variation from that amount.

Binding of the mechanism, large washers, or too high adjustment of the arc, will cause dropping. In hunting for the cause of this trouble in the Brush lamp, I found that with proper construction, it could be made to work without dash pot or spring, better than the old style with dash pot and spring.

I assume that in a differential magnet there must be a point of equilibrium between the two magnetisms, and that, if the cores were actually suspended at the center of this point, that any variation of current would affect the core quicker if so suspended than if it were forced to or from that point by a spring, this I have found to be the fact. Then by making the lamps so that the core could be adjusted to or from the center of magnetism and get the proper separation of the carbons at that point, would effectually prevent dropping of the carbon rods; and after a Brush lamp is once adjusted in this manner, it will not get out of adjustment until the washers are worn too large. This can be done without glycerine being used in the rods, which is a great source of trouble.

Another point wherein expense is saved in the Brush lamp is in the winding of the cut out magnet. Divide the magnet in two parts by an extra fiber head, and then by winding the fine wire at the top with a resistance of 15 ohms, and the coarse wire can be wound on at the bottom, allowing the end to make connection with the cut-out armature at least one-half an inch from the head of the magnet, this will reduce the chances of burning out. If there is a bad contact when the lamp cuts out, even if it does burn out, only one wire will have to be removed. If the following rules are strictly adhered to in the putting together of a Brush lamp, it will be found to burn correctly with but little adjusting:

See that the device carrying the lower carbon holder is parallel with the side rods, also that the screws, etc., at its base work freely, and allow it sufficient lateral motion in all directions to affect the adjustment for which the device is provided.

See that the lower carbon holder is in line with its support, or the carbons will not center.

See that the brass tube carrying the upper carbon holder is straight, smooth, and free from small or flat places, and that it moves freely in its bushings, which should not be too loose, as this will allow the carbon too much lateral motion, and liable to slip past or wedge.

See that the upper carbon holder is in line with the rod.

The last adjustment is very important, and is made by clamping a steel rod of the same size as the carbons to be used in the holder, and revolving it between the thumb and the finger, noting whether the lower end of the testing rod revolves on its own axis or "wabbles;" in the latter case, push the holder up to the lamp box, and by means of the testing rod, bend it slightly in the proper direction to correct the error, then see that the carbon holder has not become loosened; test again, repeating the process until the desired adjustment is reached.

Examine the lifting washers which surround the carbon rod, see that the hole is counter sunk on each side, so as to make the available thickness of the washer where it touches the rod but little more than a sixteenth of an inch. See that the hole in the washer is of such a size that one side of the washer may be raised one sixteenth of an inch from the horizontal floor on which it rests, before it clamps and commences to lift the rod. See that the holes in the washer and bushings are nicely polished. The lifting finger, designed to lift the washer, should move freely in its guide and get a good hold under the edge of the washer, and allow the latter to rest flat on the floor under it when the finger is down. In the case of double lamps, the lifting finger should be so adjusted as to lift the second rod one-sixteenth of an inch ahead of the first.

See that the movable brass parts connecting the lifting finger with the movable magnet cores, work freely at their joints, so that no binding of the parts may be possible.

The spring which partly supports the magnet cores should be made of steel "pianoforte wire," twenty seven thousandths of an inch in diameter, wound closely over a mandrel of such size, that the spring when released shall have an external diameter of seven-sixteenths of an inch, and shall consist of about thirty-eight turns of wire exclusive of the hooks at the ends.

See that all the parts of the dash pot are free and do not bind. See that the armature of the cut-out moves freely on its pivot, and when it is down its end is about one-quarter of an inch from the core of the cut-out magnet, and when it is raised and makes contact with the copper wire projecting from the cut-out magnet, that its end comes about thirty-three-seconds of an inch from the cut-out magnet core.

The brass spiral leading from the cut-out armature is not used as a spring, but as a resistance. It must be pulled out or pushed together as the case may require, that it shall exert neither a lifting nor depressing influence on the armature.

This spiral is made of brass wire twenty-nine-thousandths of an inch in diameter and about thirty inches long before being coiled. The size of this wire is important, as it should be of just right resistance, that the lamps may cut in when the carbons come together, for this same reason the armature is not allowed to come close to the core of the magnet, but should be made to come as close as possible that a better contact may be made, thus reducing the liability of burning out.

The principal improvements that can be made in the Thomson-Houston lamp are the making of the clutch of German silver or some more durable metal than brass, as the bearing point of the clutch against the rod is so small that it very soon wears and thus throws the lamp out of adjustment. When one of these lamps is found dropping, it can very often be reached by lowering the adjusting nut No. 692 a trifle, when the lamp will again burn correctly, and, in some cases, this may be repeated several times without any other change in the lamp.

Another great point of improvement in this lamp is increasing the thickness of the insulations which are too small in nearly every case, especially is this the case with those under the binding hooks at the top of the lamp box, which I find work excellently well when made of porcelain.

When the insulator in part No. 701 gives out, the current shunts through the cut-out magnet, causing what the men term cut-out armature magnetized. This is a very important point which produces flaming and dropping.

The general causes of the Thomson-Houston lamps dropping are numerous, but if all the working points move freely and without lost motion, it will reduce the number to the few following points. Badly worn spots in the carbon rods; this is a common fault of all arc lamps. The clutch or lifting springs may have lost their temper, these should be made of bright instead of black steel. Clutch arm bent. Clutch or carbon rod bushings may become worn. The adjustment nut No. 692 may be too high, the clutch or tension spring may be too tight. Crooked frames, bent rods or rods striking the chimney, tight bushings, fine wire broken, dirty rods, or the adjustment nut No 692 being too low; brush in the bushings may be too tight or become corroded or burned, and the magnetizing of the armature before spoken of will cause the lamp to flame and drop.

With the United States or Weston lamp, the principal cause of trouble is the tripping from first to second set, and when this happens so that the second set burns first, it generally means a new set of contact springs and new magnet if the lamp burns entirely out of carbons; some of the causes for tripping are, rod sticks or wants new contact brush, lever hook loose, rod scrapes chimney on first set or too much hook on first set, adjusting screw on long hook set too high, lost motion in rocker shaft.

Causes of long arc are, platinum collar dirty or worn out, trip lever sticking or too loose, carbons not burning in proper proportion, burning holder before the carbon rod is down far enough to make contact with trip, small hook dirty, rod crooked near the top, weak magnet, fine wire burnt, clutch holder or armature sticks, rod a little thick at the top and brush too tight.

Causes for dropping out are, weak magnet either fine or coarse, lost motion in rocker, stiff clutch, too much clutch, not enough clutch, slight nigger in coarse wire, plunger too stiff or too loose, plunger bent, broken or crooked plunger rod, bad carbons, which may on starting become soldered together and cannot lift.

The globe holder or carbon holder of the arc lamp is a very much neglected part—that is, the insulations are not made heavy enough, but that the carbon dust or copper droppings falling over the insulations will give sufficient leak that a person standing on the ground and touching the bottom of the lamp may receive a very bad shock, this insulation should be made heavy and so placed that the carbon dust may not fall on it, as it is sometimes impossible to hang lamps under awnings high enough but that, when a person passes under them, they may be touched by any conductor which they may have in their hands. No part of the lamp outside of the globe should be allowed to have current in it. Arc lamps should be suspended by some perfect insulator, the regulator porcelain insulator and hook being the best in our experience; this is a very important point and is often neglected. Lamps being hung from an ordinary screw eye by a piece of wire are frequently seen, when it is as important that the lamp should be as well insulated as the balance of the circuit. Dirt must not be allowed to accumulate on any part of the lamp; rods, switches, bases and globes should be kept well cleaned, and all binding screws kept tight; the rods should be kept thoroughly wiped every day with a clean cloth or waste. Never allow crocus or emery to be used, as it badly wears the rods in the center. A better plan is if the rods become rough or dirty, bring the lamp in and polish on the buffing-wheel, which will allow of its being kept of an even size its entire length. A properly tended lamp will need but little adjusting, but when it is required, a regular appointed man should attend to it, or the lamp returned to the station for repairs.

The longest record for any one lamp in a constant street service is three years and nine months without any adjustment other than the ordinary cleaning by the trimmer.

In order to get a good lamp record, no lamp should leave the test rack unless it is perfect in all parts.

The most vexatious part of the arc lamp is the globe; it swells the item of expense in spite of the utmost care, besides being a great source of complaint, for I never knew one to be well enough cleaned but there would be a complaint that it was not polished. The fused copper dropping and burning onto the glass makes them look dirty in spite of the best cleaning.

I have found, after a careful experiment, that it pays to put wire nets, which should be made of copper, on all globes, even for street lighting; having them covered with wire nets, prevents pieces from falling out even after they are badly cracked, and if the globe entirely gives way, the net will prevent its falling on some one's head.

Undue heat after the carbon has burned close to the holder, is one of the greatest causes for broken globes. This can be partially overcome by leaving the globe about one and one-half inches from the carbon holder.

In looking over the reports of former meetings of this convention, it is easy to see that nearly all of the discussions have been on how to save coal. Of course, this is a point where large money may be saved by use of proper boilers and settings, but the best of these will do no good without proper firing.

There are many other points in the management of an electric light station which are just as important; the most serious of these is the pay roll, as two men more than is necessary will cost nearly as much as a ton of coal per day, and thirty tons of coal per month would be quite a saving, and yet while keeping the number of men as low as possible, none but first-class men should be employed, that all work may be done in a first-class substantial manner. Especially must trimmers attend to their duty well, as the quality of their work dictates the amount of rebates to be allowed during the month. Another important man in this respect is the dynamo-man. He should give the dynamos the most assiduous attention, that the strength of the current may be kept constant, while flashings and interruptions of the current may be reduced to a minimum, for no matter how well every other department of a station is carried on, if the current is allowed to vary from the standard, complaints will follow, and they are expensive.

There is nothing that angers a user of electric lights so much as to have them flash; it may be only one or two seconds that they are out, but it always seems like a much longer time, especially if in a crowded hall. Rather have the record for continuity of lights so good that even the gas fixtures may be removed; this can only be gained by close attention to the machines, wires and lamps.

I call to mind one place that we have lighted continuously, without any other method of illumination than arc lamps, for over eight years, and during that time the lights have never been out during lighting hours.

The waste in the use of carbons is a very important feature. These should be dealt out and every stump returned; the amount saved in laying by the four and five inch stumps to be used in the summer months will make a saving of at least ten thousand carbons per year for a one thousand light station.

At the time I first started dealing out carbons and bringing in stumps, I saved on an average over thirty dollars per month, and then only trimming about four hundred lamps per day.

A very important feature of arc light stations is the inside wiring and line construction which is very much neglected. All inside wiring should be of best quality of insulation, and run on glass or porcelain throughout their whole length.

An arc light wire should never be concealed.

The use of soft rubber tubing for passing through floors, ceilings, walls, etc., should never be allowed; the only suitable material for such work is hard rubber tubing.

While I am a great believer in the use of the best quality of insulation, for line construction, yet it is not best to depend entirely on such insulation for safety.

Put up the best wire there is, and then apply a rigid system of inspection and tests, not by that abomination of tests, the magneto bell. Not only should the tests be made on dead lines, but should be made at least once in two hours on all live wires, and when grounds or bad leaks are discovered, they should be immediately cleared, by that means preventing the second ground, which is the element of danger.

I have repeatedly had lines that would test clear at the time of putting on circuits, but two hours after, solid grounds have been discovered, located, and found to be wires broken down, hanging over the electric light wires and reaching down to the sidewalk, where they are a source of danger to every passer by, besides every boy that passes must feel of it to see if there is any electricity in it.

My orders are to drop all work that is not absolutely necessary to clear grounds.

In Philadelphia we receive great help from the Electric Bureau of the city, by their promptly reporting all wires discovered that are down on us.

All lines should be cut by one man, who is especially instructed and detailed for that work, as then you are enabled to pick out a thoroughly reliable man and drill him in the work that he is to

*Paper read before the National Electric Light Association of the United States, Kansas City, Mo.

ben by never allowing a circuit to be opened, and teaching all men to never depend on any insulation, but to treat all wires and lamps as if they were charged with an electric light current, danger to employees will be reduced to a minimum.

Supplementing the paper, Mr. Law said: In presenting this paper I have done so with a view to benefiting if possible, the central station men. You will find in the paper a few rules for the operation of the Brush, Thomson Houston and Weston arc lamps which have come directly under my personal supervision. If these rules are strictly followed out in the repairing of lamps, it will cost but little trouble, and but little necessity of putting them on the testing rack. Another point to which I would like to call your special attention is in the matter of testing arc light lines. It has only been within the last six or eight months that we have been putting a thorough test to line wires. Since the time of the Niagara convention we have perfected the system which I specified at that time. I can now positively locate a ground at the station before leaving to hunt it up. These tests are made at regular intervals of about two hours during the night and two on all live circuits. As soon as those grounds are discovered my foreman is notified, and I also receive a notice myself, and the proper men are detailed to remove them as soon as possible.

DISCUSSION.

MR. FRANCISCO: If it is not a secret of the business, I would like to ask Mr. Law with what instrument he tests grounds at the stations.

MR. LAW: I do not know that there is anything about our station that we call private. The manner in which I have been testing grounds at our station for the past year or eighteen months, is by the use of a set of incandescent lamps in series; that is, I use 47-volt lamps for a 60 light machine; these lamps are put up out of the way and a wire run from each one of these lamps to the switch plate. There is a lever arranged to turn around in a circle making a short circuit of one, two, three, four, five, etc., to cut out one or all of these lamps. Now, if a wire drops down on an electric wire grounding it, the distance which that wire is away from the station is simply a measure of potentials. Every two hours we test each one of our circuits in the first place by testing across the circuit. The number of incandescent lamps then burning up to 48 volts indicates the number of lamps that are actually burning on the circuit, less the resistance of line, which I find amounts to about ten miles of number 4 wire for every arc lamp; then we test by placing one side of the incandescent circuit to ground and the other side to line, then by turning off my incandescent lights until I bring the voltage up to 47. I find a certain number of lamps burning. We will say ten lamps on the positive side. Now I turn my attention to the negative side and go through the same operation. If I find that I have fifty lamps on the negative side I know that the ground is ten arc lamps away from the station on the positive side, and if your circuit books and diagram books are correctly kept, you can tell in two or three moments time exactly the location of that lamp. In 99 times out of 100 we go to the right lamp.

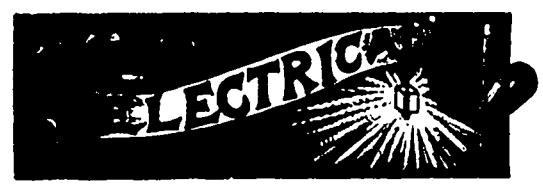
MR. LOCKWOOD: I think this is a subject that deserves a great deal of attention. I think more would be done to prevent damage to electrical interests by false representations of the press, by giving them no foundation for any report, than by any other means that we have at our disposal. While I think the Law system a very good one, I think we have now at command one which is much better.

MR. DE CAMP: I would like to ask a question. In Mr. Lockwood's paper he speaks of an arc lamp being burned at the Centennial in 1876. I will ask if any gentlemen present saw the light? I was at the Centennial probably a hundred times, and never saw it.

MR. GARRATT: I did not see the lamp at the Centennial but as a matter of early history in regard to the arc light industry in this country, I did see an arc lamp run in Boston in 1865, that, however, was not to be called commercial in the sense in which you use it to-day. It was an arc lamp with clockwork feed.

MR. LOCKWOOD: While I did not see any lamp at the Centennial, I will state that Frank B. Rae of Detroit, will give the gentleman the information he wants. My reason for thinking so, is that Mr. Rae gave me not long ago an account of an interesting experiment he made at the Centennial. He found that by making a flat helix of fine wire and connecting it with the receiver of a telephone, that he could approach a dynamo and before he got within, say five or six feet, and sometimes fifteen or twenty, by holding it out ahead of him, and moving it through the air, he would get induction and then by comparing that with the tones of a flute that he attuned to respond to a certain number of vibrations, he could tell the number of revolutions the dynamo was making by multiplying by the commutator sections.

F. S. TERRY of Chicago: I will say that I saw that lamp in Philadelphia.



Morrisburg, Ont., is agitating for the electric light.

The Royal Electric Co., of Montreal, has declared a quarterly dividend to shareholders of 2 per cent.

Much regret has been occasioned by the death of Mr. Boisfeuillet, manager of the Hamilton Electric Light Co.

Letters patent have been issued incorporating the Hamilton Electric Light Company, with a capital of $200,000.

The Royal Electric Co., of Montreal, are engaged in the manufacture of electrical plants for the Halifax Illuminating and Motor Co., and the Vancouver B. C., Electric Company.

The Reliance Electric Light Co. has offered to supply the town of West Toronto Junction with 50 lights at 40 cents each per night for a period of five years, the plant to revert to the town at the end of that time.

The Brooks Manufacturing Company, has been organized at Peterborough, Ont., for the purpose of manufacturing electric light carbons, lamps, chandeliers and other articles. The officers of the new company are: James Stevenson, M. P., president; Thomas Brooks, vice-president, J. W. Taylor, superintendent, John Braden, secretary-treasurer, James Stevenson, Thomas Brooks, George A. Cox, J. W. Taylor, George Stevenson, John Braden, directors. The company will commence operation at once.

A Brantford paper points out that Professor A. Melville Bell, resided for twelve or fifteen years in that city, and that it was during this period that his son, Prof. Graham Bell, inventor of the telephone, made his first public experiment with the instrument. It says: "We remember well a number of leading Brantford gentlemen being guests of Prof. Bell at his residence on Tutelo Heights, to experiment with a very crude telephone, which Graham Bell had been working at. It answered the purpose, of course, but was not nearly as handy or effective as the present instrument. It was here, too, that the first telephone line was strung from Prof. Bell's to the city, some two miles, so that Brantford may very justly be designated the birthplace of the telephone, if not the birthplace of its inventor, who came from Scotland as a young man with his father, and was a resident and frequent visitor as long as his family had their home here."

No recent occurrence has shown so clearly the advantages of incandescent electric lighting for public buildings as the burning of the Toronto University. Had this institution been supplied with its own electric lighting plant the great calamity which has so recently visited our city would in all likelihood never have occurred. It has been clearly demonstrated that incandescent lamps are well adapted for microscopic work, and we sincerely trust that the new building will not be considered complete until equipped with a first-class lighting plant.

Nothing has succeeded better in marking the strides which applied electricity has taken during the last five years, than its application to meteorological apparatus. It is only a few years since the meteorological observer had to climb to a dizzy height in all weather in order to read the dials of his anemometer, and to ascertain the direction of the wind by the vane. To-day this same observer can sit comfortably in his drawing-room, and read both the direction and velocity of the wind, and the rainfall in hundredths of an inch as easily as he reads the time of day from his mantel clock, and all this has been accomplished by that subtle agent, electricity.

We learn from the *Northwestern Miller* that E. C. Hughes, one of the electricians of the Pillsbury A mill, has lately been experimenting with the heating capacity of electricity, and has demonstrated that almost any degree can be produced with comparative ease. At the suggestion of Wm. Bradley, the flour analyist, he has gotten up an oven for baking and testing gluten which is a great success. The gluten is placed in a cylindrical brass case about an inch in diameter, which in turn is placed in the oven, the latter also being cylindrical in form, and under a heat of about 500 degrees, the gluten is baked in about 12 minutes. The test of the gluten lies mainly in the height to which it will rise. The oven is very simply made, consisting of a cylinder of tin, about five inches in diameter, and perhaps a third deeper. Around this the wire through which the current passes is wrapped. A heat of 680 degrees is very easily attained, this being the limit to which the thermometer used will indicate. Mr. Bradly for a time used for testing gluten some apparatus obtained in London, but the electrical oven is very superior to it.

In various quarters there are signs of great discontent among telegraph operators, and it is even said that the feeling may result in a general strike. The great trouble with the telegraphic service is, that it is overcrowded, and that the glut of good men, always a noticeable feature, is even more marked now that competition among those who employ operators is at a minimum. In fact, it sometimes looks to us as though the period of competition were, in the long run, the worst part of the business, because by raising salaries temporarily and inducing recruits to enter the field, they serve only to intensify the struggle and distress when combination is again the order of the day, and when by the consolidation of force and the closing of hundreds of offices, the chances of remunerative occupation are reduced to what may be called the normal state. At the present time the operators are none too well paid, while their hours are long, and the work is exacting, but how a strike would remedy this state of affairs, even in a year of political activities such as this promises to be, we do not quite see. Unless we are greatly misinformed, there are a large number of persons familiar with telegraphy who would be ready to fill at once the positions vacated, and hence a strike might be highly disastrous to those engaged in it. In fact, the low rates of pay amongst operators are mainly due to this fact, and if the conditions were otherwise, salaries would at once advance. Better far than a strike would be some effective discouragement of the swarm of beginners who are cajoled into learning telegraphy by lying stories, and who became operators only to cheat themselves and help starve others already at the key.

LUMBER PRICES.

LUMBER.

CAR OR CARGO LOTS.

1¼ and thicker clear picks, Am. ins.	$30 00@32 00
1¼ and thicker, three uppers, Am ins.	37 00
1¼ and thicker, pickings, Am ins.	27 00
1 x 10 and 12 dressing and better	18 00 20 00
1 x 10 and 12 mill run	13 00 14 00
1 x 10 and 12 dressing	14 00 16 00
1 x 10 and 12 common	12 00 13 00
1 x 10 and 12 spruce culls	10 00 11 00
1 x 10 and 12 maple culls	9 00
1 inch clear and picks	28 00 30 00
1 inch dressing and better	18 00 20 00
1 inch siding, mill run	14 00 15 00
1 inch siding, common	11 00 12 00
1 inch siding, ship culls	10 00 11 00
1 inch siding, mill culls	8 00 9 00
Cull scantling	8 00 9 00
1¼ and thicker cutting up plank	22 00 25 00
1 inch strips, 4 in. to 8 in. mill run	14 00 15 00
1 inch strips, common	11 00 12 00
1¼ inch flooring	14 00 15 00
1¼ inch flooring	14 00 16 00
XXX shingles, sawn	2 30@2 35
XX shingles, sawn	1 30 1 35
Eastlake galvanized steel shingles, 24 W. G., per square	5 25
Eastlake galvanized steel shingles, 26 W. G., per square	5 00
Eastlake painted steel shingles, per sq.	4 00
Eastlake painted steel siding, per sq.	3 50
Manitoba galvanized, steel siding, per square	4 50
Manitoba painted steel siding, per sq.	3 50
Special galvanized steel siding, per sq.	4 50
Special painted steel siding, per sq.	3 50
Imitation brick siding, per square	3 50

YARD QUOTATIONS.

Mill cull boards and scantling	10 00
Shipping cull boards, promiscuous widths	13 00
Shipping cull boards, stocks	14 00
Hemlock casting and joist up to 16 ft.	21 00 22 00
" " " 18 "	22 00 23 00
" " " 20 "	23 00 24 00
Scantling and joist, up to 16 ft	14 00
" " 18 ft	15 00
" " 20 ft	16 00
" " 22 ft	18 00
" " 24 ft	20 00
" " 26 ft	22 00
" " 28 ft	24 00
" " 30 ft	26 00
" " 32 ft	26 00
" " 34 ft	28 50
" " 36 ft	30 00
" " 38 ft	32 00
" " 40 to 44 ft	35 00
Cutting up planks, 1¼ and thicker, dry	25 00 26 00
" " board,	18 00 22 00
Dressing stocks	16 00 22 00
Picks, American inspection	40 00
Three uppers, American inspection	50 00
Cedar for block paving, per cord	5 00
Cedar for Kerbing, 4 x 14, per M	14 00

B. M.

1¼ inch flooring, dressed, F. M.	28 00 32 00
1¼ inch flooring rough, B. M	18 00 22 00
1¼ " dressed, F. M	25 00 28 00
" undressed, B. M	18 00 19 00
" dressed	18 00 22 00
" undressed	12 00 15 00
Beaded sheeting, dressed	22 00 35 00
Clapboarding, dressed	12 00
XXX sawn shingles, per M, 16 in.	2 65 2 75
Sawn lath	2 00 2 20
Red oak	30 00 40 00
White	35 00 45 00
Basswood, No. 1 and 2	18 00 20 00
Cherry, No. 1 and 2	70 00 70 00
White ash, No. 1 and 2	25 00 25 00
Black ash, No. 1 and 2	20 00 30 00

MONTREAL PRICES.

Lumber, Etc.

Ash, 1 to 4 in., M	$13 00@18 00
Birch, 1 to 4 inch, M	15 00 25 00
Basswood	12 00 20 00
Walnut, per M	50 00 100 00
Butternut, per M	22 00 40 00
Cedar, flat	00 06 00 10
Cherry, per M	60 00 80 00
Elm, Soft, 1st	15 00 17 00
Elm, Rock	25 00 30 00
Maple, hard, M	20 00 25 00
Maple, Soft	16 00 18 00
Oak, M	40 00 95 00
Pine, select, M	35 00 40 00
Pine, 2nd quality, M	20 00 25 00
Shipping Culls	13 00 16 00
Mill Culls	8 00 10 00
Lath, M	1 50 1 90
Spruce, 1 to 2 inch, M	10 00 12 00
Spruce Culls	4 50 6 00
Shingles, 1st quality	2 00 3 00
" 2nd "	1 25 1 50

Cement, etc.

Portland Cement, per barrel	$ 2 70@3 00
Roman " "	2 70 3 00
Fire Bricks, per M	20 00 30 00

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AN invention, with less merit, could not have withstood the onslaughts that have been made on it. Notwithstanding the untimely death of its inventor, and, in the United States, its financial supporter, as well as the keenest and most bitter opposition, it is again ready to do service and be a help to the millers in Canada and the United States. In the latter country its merits are being appreciated on all hands, and it is meeting with a rapid sale.

It will save you

- Twenty-five per cent. in power over any other known practical system in the world.
- Attention in its operating.
- Having your rolls out of train.

It will give you

- A more even granulation.
- A higher percentage of Patent Flour.

IT IS PRACTICAL; IT IS ECONOMICAL;

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We have much pleasure in announcing to the milling public of Canada that we have granted to THE HERCULES MANUFACTURING CO., of Petrolea, the sole right to manufacture the Cochrane One Belt Drive Continuous Trains of Rolls under the Canadian patents granted to the late W. F. Cochrane, that they have purchased our patterns formerly used at Dundas in its manufacture, and that they are prepared to fill all orders for same.

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