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DOMINION MECHANICAL & MILLING NEWS

DEVOTED ESPECIALLY TO THE INTERESTS OF OWNERS AND OPERATORS OF

Flour Mills, Saw Mills, Planing Mills and Iron-Working Establishments.

Vol. XII.—No. 1. TORONTO, CANADA, JANUARY, 1889. { Price, 10 Cents. $1.00 Per Year.

GREEY'S IMPROVED SYSTEM OF CONNECTED ROLLS AND ROPE DRIVE.

THE accompanying engraving represents an important improvement made in the arrangement of mill machinery during the past two years. By this arrangement a considerable amount of machinery is saved and the space formerly required for the driving line shaft below the rolls is left perfectly clear, giving better access to the spouting from the rolls to the elevators. The manufacturers claim that the greatest benefit of this device arises from the saving in power. Owing to the driving friction being removed from the roll and tightner bearings, sometimes as many as fifty-six in number, and being placed in specially prepared journal boxes, only eight in number, a very considerable saving in power is effected, and moreover, when that driving strain is taken off the roll journals, the rolls have no tendency to get out of line or "train" as it is usually called.

There are many other points of advantage which the manufacturers claim for this system. These our readers may obtain full particulars of by addressing the manufacturers, Messrs. Wm. & J. G. Greey, No. 2 Church St., Toronto.

GREEY'S IMPROVED SYSTEM OF CONNECTED ROLLS AND ROPE DRIVE.

An Ottawa despatch says that several applications have been made to the Customs Department through the Inspector of Customs in Manitoba by residents of the southern portion of the province, asking permission to have their wheat ground in mills situated in the United States, but near the international border, in cases where there are no Canadian grist mills within a reasonable distance. This is a practice which has been permitted for some years in the Eastern Townships, and the Minister of Customs is now considering certain regulations granting the same concessions to people in Southern Manitoba until mills have been established on the Canadian side of the line within fairly reasonable access by the settlers.

WHAT SHALL WE DO WITH OUR BOYS?

By "Automatic Cut-Off."

WHEN our fathers, and even many of ourselves who are middle aged, were boys, this question did not trouble parents; for as soon as many of us were able, it was necessary that we should go to work at something and help bring the weekly earnings up to what was required to keep the wolf from the door. A few of the boys starting in the world in this way, succeed, and become self made men, and are written about, talked about, and held up to the rising generation as patterns for all to copy.

I remember when a boy hearing one of the self-made men of Canada address some school children. He said, "Boys, when I was young, I had a hard time of it; I had no home, and no bringing up; I just 'come up afoot.'" This gentleman was then mayor of a neighboring city. His family consisted of two boys, and his cry was, "What shall I do with the boys?" He did not want to apprentice them to any trade, and although they were well educated, it did not help them, for they are to-day poor, shiftless mortals, neither good for use nor ornament.

To our sober, industrious, every-day mechanics, this question is of great importance. It is often a troublesome one to solve. With our present admirable school system, our boys can start out in life with a much better education than their fathers had. It is pretty certain that most of our sons will be kept at school till they are 15 or 16 years old, and can be far enough advanced to matriculate for college. Still, it is sometimes difficult to decide just what to do with the boys. One says, "Now, there is my boy Dave, he is about ready to leave school; he is quick to learn and is willing to work, but he does not seem to know just what to settle down to." Another says, "There is my boy Joe, he is a natural mechanic, and wants to be a machinist; I have a few dollars to help him along with—shall I send him to a technical school, first, or to the shop? Which will be best? I am sure he is the makings of an extra good man, and I do not want to make any mistake about it. If I send him to the school first, will he come home with his notions set too high? While, on the other hand, if I apprentice him to the trade first, will he do as well when he leaves to go to the school? or will he think he is too much of a man for such a thing?"

We see many cases where boys have been put at the wrong business—spoiling a good man at one calling, to make a poor one in another. The question is: How can we best help ourselves and others to decide these things? What will tend to help us in this matter?

In the first place, we all cheerfully pay our taxes for school purposes. We are also justly proud of our great free school system. The working man pays no small share of these taxes. Most of his children will be working men and women. This being the fact, we ought to have what is needed most in after-life, taught most in the schools. Take our High School curriculum; it is divided into two branches—you may say, a collegiate and a mercantile branch. Now add a mechanical branch. Teach the boy who is going to college the proper course for matriculation! Teach the boy who is going into mercantile life, the particular branches that will help him, that he will require every day! and teach the boy who is going into mechanics what he will require. Do not bother his head with dead languages or "'ologies." Give him a good sound knowledge of natural physics, higher arithmetic, mechanical drawing, and things he will need when he starts to learn his trade; and in the examinations, give those who are

proficient in either branch, marks just alike. I would go further—I would give every boy some manual training. It will do him good in more ways than many people think of.

I saw a short time ago that the Trades and Labor Council of Toronto, condemned manual training in public schools. Why they did so, or what their object in doing so was, I confess is an enigma to me. They usually uphold anything that will be a benefit to the working man, and by what manner of reasoning they conclude that manual training is against their interests, passes my understanding. They pay taxes to help make boys good lawyers, doctors or ministers, by special instruction, but their own sons who are determined to be mechanics, must not have any special chance in their school days. Why? Will these boys when they leave school, and are apprenticed to any mechanical business be any the worse for special study and manual training? If they are quick, and soon master their tools, will they not be worth more money to their employers, and consequently get more for themselves? When I learned my trade, if I could have shown my employer that I could take a hammer and cold chisel and chip a sprue off a casting without hitting my hand twice while I hit the chisel once, or if I could have shown him that I could grind a drill properly without spoiling a ½ inch of steel and a ½ hour's time, I know that I could have got enough money out of him to have paid my board the first year, instead of working for $2 a week and board myself. Nor would it have hurt me while I was at school to learn these things, neither would it have injured the business of the "jour" in the shop at that time.

I wondered when I read the resolution of the T. & L. Council condemning manual training, if the members were all old bachelors and had no children to educate and provide for. If the T. & L. Council and all labor organizations, would expend their energies in getting the employers to only take the proper number of boys, and give them a good chance to become first-class mechanics, paying them fair wages from the first and increasing as the boy becomes more proficient and useful, they would be helping to mend matters in the labor world. If they would also do what they can to help prepare good boys to learn trades, they would certainly be doing a good work in the labor world.

I have some boys in my family, and I hope they may be able to get manual training in our schools, and a technical training in a school of science. I am sure it will not injure them or their fellow workers, and if the employer does not substantially appreciate it, I have missed my guess.

BOILER INSPECTION.

THE following address delivered by the President at the Convention of Boiler Inspectors held at Pittsburgh, Pa., Nov. 20th, is worthy of the careful consideration of every steam-user :—

Gentlemen of the Convention : We have assembled for the purpose, as I understand it, of taking counsel one of another as to the best means of accomplishing the objects for which the office of boiler inspector was created. The number of lives annually lost by explosions of steam boilers is so great, that it appears almost incredible that a majority of our states and cities have done nothing towards securing a proper inspection of so necessary and yet so dangerous an adjunct of our manufacturing and mercantile industries. In all manufacturing establishments of any importance, steam power is a necessity ; and in hotels, mercantile establishments and other large buildings, it has come to be regarded as an essential requisite. Nothing that is so extremely dangerous, so liable to cause loss of life and valuable property, as steam boilers undoubtedly are, should be permitted to be controlled by men who are ignorant of their management and know nothing of their danger. One more source of trouble and serious accident, resulting from the use of steam boilers, is chargeable to the unwise policy of steam users employing inexperienced and incompetent men as engineers ; a position so responsible as that of engineer of a stationary engine is acknowledged to be, should not be occupied by a man who knows nothing of the management either of an engine or boiler. Why does any man incur such a risk to his own safety and that of his property? There is but one answer ; an incompetent man will work for less money than a competent man will. Should this be allowed, should any man, because thereby he may save a few dollars a month, be permitted to endanger the lives of his employes and of his neighbors?

Most men of middle age have a vivid remembrance of the frequent occurrences of boiler explosions on our waterways ; they were happening weekly. I once recollect of three explosions in one week on the Mississippi river, with a loss of one half million of dollars and sixty odd lives. There were hundreds of lives and thousands of dollars worth of property continually being killed or burned, or finding a final resting place at the bottom of some river or lake. It is not so, to-day, for we seldom hear of the boiler of a steamer exploding, although there is a larger number of marine boilers at the present time than there was before or during the war. What has wrought this wonderful change? Inspection of boilers and competent licensed engineers. The inspectors are competent men appointed by the general government to examine every steamer's boiler, and no one can assume the position of marine engineer unless he is armed with a certificate of the government that he has been examined and found to be qualified for the position. Why should not the applicant for the position of engineer of stationary engines and boilers be subjected to a similar test? Not in a few cities, states or countries, but the service should cover the entire country.

I have a list of explosions from March 1870 to March 1888 which I do not claim comprises all the explosions. It gives 2,267 explosions with 4,068 killed and 4,710 wounded. Of these, 801 explosions where 1,476 were killed and 1,122 wounded, were of threshing machines and saw mills. By carefully looking over the records of explosions, you will find in localities where there is an inspection service, there is not to exceed one third the explosions that occur where there is no inspection service ; you will also find in localities where an insurance company is doing inspecting there is quite a reduction in the number of explosions. It cannot be expected that the insurance inspection would be as effective as state or city, as it cannot be made compulsory. I find in the city of St. Louis that the insurance inspection is a great assistance to our service.

We have much to learn, and no one should hesitate to avail himself of all knowledge that presents itself, come whence it may. We should willingly learn all we can relating to our special duties and as willingly apply all we know to the accomplishment of the good work in which we are engaged ; we are endeavoring to protect life and property of the people and there is no service that is so great a protection to life and property. I also hope that before we separate we shall have effected a permanent organization. We should meet annually that each one may receive new encouragement and strength from the experience of the previous year.

The press can be of immense benefit to us and the service we represent, by disseminating facts bearing upon the subject of boiler inspection. As to what may be done here I have no doubt that the reporters will place us in a proper light before their readers. There is no aid so desirable, none so powerful as the support of a free, fearless and unrammeled press and its mission is to give its readers unvarnished facts and such comments as may be deemed necessary to a proper understanding of the subject.

BRASS AND ITS TREATMENT.

BRASS is perhaps the best known and most useful alloy, says the Boston *Journal of Commerce*. It is formed by fusing together copper and zinc. Different proportions of these metals produce brasses possessing very marked distinctive properties. The portions of the different ingredients are seldom precisely alike ; these depend upon the requirements of various uses for which the alloys are intended. Peculiar qualities of the constituent metals also exercise considerable influence on the results.

Brass is fabled to have been first accidentally formed at the burning of Corinth, 146 B. C., but articles of brass have been discovered in the Egyptian tombs, which prove it to have had a much greater antiquity. Brass was known to the ancients as a more valuable kind of copper. The yellow color was considered a natural quality, and was not supposed to indicate an alloy. Certain mines were much valued, as they yielded this gold-colored copper, but after a time it was found that by melting copper with certain earth (calamine) the copper was changed in color. The nature of the change was still unsuspected.

Alloys of copper and zinc retain their malleability and ductility when the zinc is not above 33 to 40 per cent. of the alloy. When the zinc is in excess of this a crystalline character begins to prevail. An alloy of one copper to two zinc may be crumbled in a mortar when cold.

Yellow brass that files and turns well, may consist of copper 4, zinc 1 to 2. A greater proportion of zinc makes it harder and less tractable ; with less zinc it is more tenacious, and hangs to the file like copper. Yellow brass (copper 2, zinc 1) is hardened by the addition of two to three per cent. of tin, or made more malleable by the same proportion of lead.

There would be less diversity in the results of brass castings if what was put into a crucible came out of it. The volatility of some metals, and the varied melting points of others in the same mix, greatly interfered with the uniformity in ordinary work. Zinc sublimes (burns away) at 773 to 800 degrees, while the melting heat of the copper with which it should be intimately mixed in making brass is nearly 1750 degrees. Copper, zinc, tin, and lead in varying proportions form alloys, always in definite quantity for a given alloy. The ease with which some of the metals are burned away at comparatively low temperatures, renders it a very easy matter to make several different kinds of metal with the same mix. This very thing occurs, and the great difficulty in getting bearing brasses uniform in quality causes some engineers to babbitt all bearings as the best way to insure uniformity. One lot of castings may be soft and tough, another hard, and so on.

Zinc is added the last thing as the crucible comes out of the furnace, and the mixing of the mass is a matter of uncertainty. If the metal is too hot for the zinc a large percentage goes off in the form of a greenish cloud of vapor, and the longer the stirring goes on the more escapes. The two metals which enter into the composition of brass have an affinity for each other, but they must be brought into intimate contact before they will combine. Some brass founders use precautions to prevent volatilization of the more fusible metals, introducing them under a cover of powdered charcoal on top of the copper.

"Brass finishes" is a term many understand as applied only to those who produce highly-furnished brass works ; but it is not so ; the brass finisher's work is not the superior class of work supposed, most of it being comprised in gas fittings, ormolu mounts, etc., but the highest class of brass finishings is a totally different process. Fittings for gas work, all finished well enough for their several purposes, and as well done as the price paid for them will allow, as well as the mountings for furniture, must obviously be produced at a low rate, in order to supply the demand for cheap work of this character, most of which is simply dipping, burnishing, and lacquering.

Let us follow the process of finishing the highest class of brass work, says the *Engineer*, of Glasgow. Before commencing to polish, all marks of the file must be removed, and this is done thus : Having used a superfine Lancashire file to smooth both the edges and surfaces, take a piece of moderately fine emery paper and wrap it tightly, once only, round the file. By having many folds round the file the work becomes rounded at the edges, and so made to look like second-rate things. Some use emery sticks, made of pieces of planed wood about ⅜ inch thick and ¾ inch wide, quite flat on the surfaces. They are covered with thin glue, and the emery powdered on to them, and then allowed to dry hard. Most common work is rubbed over, not to say finished, with emery cloth. This will not do for good work. The paper folded once round the file is used in a similar manner to the file, and when the file marks disappear, and the paper is worn, a little oil is used, which makes it cut smoother. The edges and surfaces being prepared to this extent, the edges must be finished. To effect this take a piece of flat, soft wood, and apply to its surface a little fine oil-stone powder ; be sure that it is quite clean, as it is very annoying to make a deep scratch in the work just as it is finished ; perhaps so deep that it will require filling out.

THE FLOUR INDUSTRY OF SOUTH AUSTRALIA.

THE manufacture of flour has made rapid strides during the past few years, and the introduction of the roller system has given it a great impetus. The quality of our wheat enables the miller to turn out an article which commands attention in any part of the world, and it is not so surprising, therefore, that a ready sale is obtainable in places where competition is not so keen as to cause too great a difference in prices. It is only of late years that China has been drawing supplies from South Australian flour, but during the present season a large quantity has found its way to Hong Kong. New South Wales has for many years purchased in this colony, and during the last twelve months close on 20,000 tons have been sent to Sydney and some 10,000 tons to Queensland, another old customer. Some 3,000 tons have gone to S. Africa, and Ceylon, New Caledonia and Cochin China have also drawn small lots. For the twelve months ending 30th September, 75,349 tons have been exported, representing a value of £647,463. Of this 60,000 tons is credited to Port Adelaide, Port Pirie coming next with 8,628 tons. For the manufacture of flour there are 85 mills in the colony, with a total horse-power of 2,951, and employing 614 hands.—*South Australian Register.*

DUST SEPARATING MACHINE AND FURNACE FEEDER ATTACHMENT.

THE objects of the machine illustrated by Fig. 1, are to separate fine and explosive dust from shavings and other heavy material made in planing-mills, flour mills, and other factories, and to effectually dispose of the same: to relieve the exhaust-fans used for conveying the material to shaving vaults or other depositories from back-pressure; and also to have the machine so arranged and constructed as to be fire-proof.

Reference being made to Fig. 1, the form and arrangement will be comprehended. The separator is in the form of a box or casing, made of iron to render it fire-proof, although it can be constructed in any other convenient form. This box or casing contains a separate

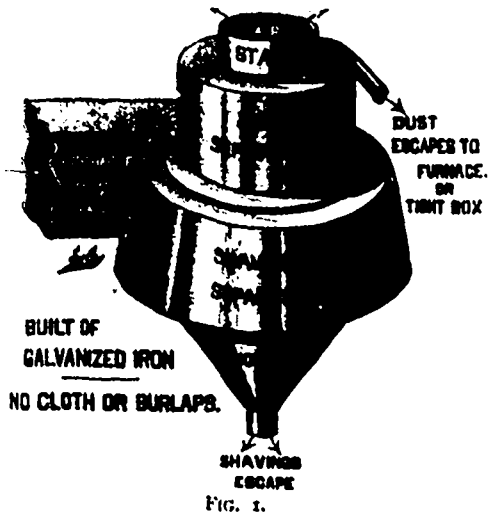


FIG. 1.

chamber, which may be circular in cross-section or in the form of a convolute pipe ending in a central portion, which is extended upward in the form of a pipe. At this point this pipe is somewhat smaller, and has a smaller pipe inserted in and extending through a cover on its top, thus forming an annular chamber. At this point another pipe is connected to convey the light but not explosive dust to the furnace or other depository.

The convolute pipe has openings on its outer side, and the central portion has an opening in its bottom end for discharging shavings and other heavy material into the hopper attached to the bottom side of the box. The bottom of the separating chamber is provided with a pipe, inserted therein, communicating with the hopper and extended a distance up into the chamber.

The hopper may be made in any convenient form. The bottom end is open, but is held normally closed by a weighted door which opens and deposits the load of shavings or other material into the vault or receptacle below, when enough has accumulated to overcome the attached weight.

The diameter of the separating chamber, consisting of a convolute pipe, is larger at the bottom than at its top, thus giving a slant to the sides, or it may be constructed with perpendicular sides. The central portion is also larger in diameter at its base than the pipe; but this may be also constructed straight, with no pitch to the sides.

The operation is as follows: The shaving or other material are blown into the separating chamber or convolute pipe at the tangentially arranged opening, and all

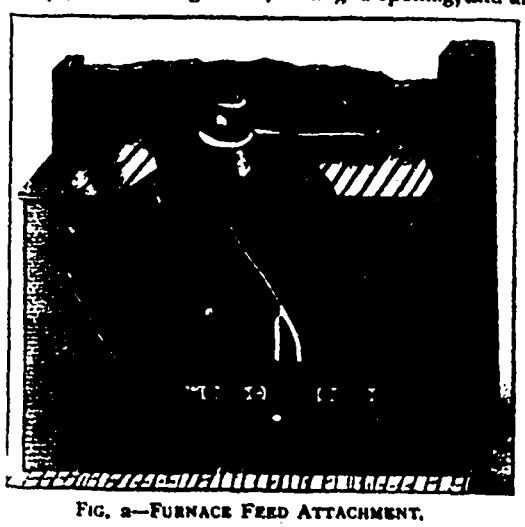


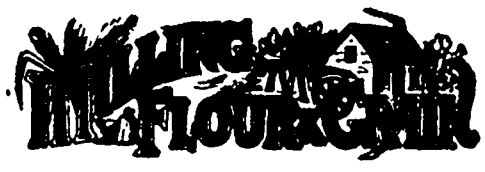
FIG. 2—FURNACE FEED ATTACHMENT.

the heavy material is carried by centrifugal force and gravitation against the outer and lower portion of the chamber, and discharged through openings into the hopper and thence into the vault or other receptacle. The finer dust or lighter material is carried on into the central portion, where the air has a circular motion. These lighter portions of the dust or other material are carried by centrifugal force against the sides of the central portion up into the pipe where the rotary or whirling motion of the air and lighter dust continues until they reach the annular chamber formed by the junction of pipes, where the dust is discharged through pipe into the furnace or other receptacle, and the air passed out through the pipe.

The good features and advantages claimed for this machine are: that the machine is shipped all ready to connect to the discharge pipe from the fan, which can can be done by any mechanic, full directions being furnished with each machine shipped; it is the only machine that can be loaded in a box car, thereby saving to the purchaser over 75 per cent. in freight; the best quality of galvanized iron is used in its construction, and all joints are riveted and soldered; it is the only machine having an extra chamber for the separation of fine dust without producing back pressure on the fan; it has a much larger outlet for the air in proportion to the inlet than any machine in the market, thus insuring relief from back pressure; it is the only machine formed and proportioned upon scientific principles, and in which there are no antagonizing air currents to produce back pressure; it is the only machine adapted to successfully feed furnaces.

Fig. 2 illustrates, by a sectional view, a furnace feeder attachment. It is a device employed in connection with planing machines, in lumber mills and similar wood working establishments, for feeding shavings, sawdust and similar solid particles to furnaces, where they are consumed as fuel for generating steam. The fuel is conveyed through feeder-pipes from the collector or separator to the furnace and storage vault, with adjustable dividing-valves for directing and controlling the flow of fuel into the furnace or vault.

Amongst other advantages claimed for this furnace feeder are: that it is highly reliable and efficient in operation; that it is perfectly safe, and an improvement in fire risk. Messrs. Douglas Bros., Toronto, the agents for Canada, will supply full information regarding the above machine.



Ogilvie's Winnipeg mill was recently shut down for repairs.

Mr. Wm. Geo. Empey, mill owner, Berwick, Ont., has assigned.

The new elevator at Fort William has a chimney 186 feet high.

J. L. & J. Cairns' grist mill, Camlachie, Ont., was burnt recently.

Messrs. McIntyre and French have resumed milling at Beaverton, Ont.

The demand for Manitoba flour on the Pacific coast is steadily increasing.

There is said to be an excellent opening at Cartwright, Man., for a roller mill.

The G. T. R. are building an elevator of 750,000 bushels capacity, at Midland, Ont.

Work will be commenced in March on a mammoth elevator annex at Port Arthur, Ont.

The mill at Sombra, Ont., has been purchased by Mr. Robert Watson, and is being fitted up.

Mr. William Knight, late of Osceola, Ont., has leased Mr. Wm. Hodgins' grist mill at Shawville.

The first car load of Manitoba wheat was stored in the new elevator at Fort William on Dec. 1 st.

Mr. W. D. Insley's elevator, at Colborne, was burned with all its contents on the night of Dec. 19th

The people of Hawkstone, Ont., want a roller mill erected there. The opening is said to be a good one.

Port Arthur will vote on a by-law to grant a bonus to W. & J. G. Greey of Toronto for the erection of a flouring mill.

The grist mill at Washago, Ont., narrowly escaped destruction by fire from a neighboring burning building a few days ago.

The citizens of Alvinston, Ont., have subscribed $1,000 to aid in rebuilding the Glenelg flour mills, recently destroyed by fire.

We learn from our Galt exchanges that Messrs. Goldie & McCulloch are getting out twenty-four pairs of rolls for a Montreal mill.

The engineer in charge of the engine in the Gladstone, Man., flour mill was caught in the machinery and fatally injured a few days ago.

Over $13,000 stock has been subscribed to form a joint stock company to run the Edison incandescent electric light system in Pembroke, Ont.

Messrs. Pearen Bros. are about to erect a large roller mill at Brampton, Ont. They are asking the town for exemption from taxation and free water for boiler use for ten years.

Mr. Rogers' elevator at Clearwater, Man., containing 13,000 bushels of grain, was destroyed by fire on Dec. 10th. Loss on the building, $7,000; grain, $8,000; insurance $8,000.

There would seem to exist two very substantial reasons why the town of Calgary, N. W. T., should have a flour mill. The first is that 200 car loads of flour were imported into the town last year; and the second, that there is no mill nearer than Regina, a distance of 400 miles.

On the 15th Dec. the large grain warehouse of Bruce Bros., at Beaverton, Ont., was destroyed by fire with its contents, 4,000 bushels. Loss about $2,000, partially covered by insurance.

A new line of railway is projected from Ottawa to Barrie and the Georgian Bay. If completed, it will provide the shortest route in existence for carrying Chicago grain to Boston and New York.

Mr. F. M. Thompson has been appointed Manager, Mr. A.M. Robinson, Mechanical Superintendent, and Mr. F. G. Simpson, Purchasing Superintendent of the re-organized Ogilvie Milling Co., of Winnipeg.

The large flour mill at Stayner, Ont., took fire on the night of Sunday, Dec. 16th, and was burned to the ground. Cause of fire unknown. Particulars as to amount of loss and insurance have not reached us

On the night of Dec. 19th, the Hallowells' mills, one and a half miles east of Picton, Ont., were burned with their contents. No insurance; loss, about $5,000. About 1,500 bushels of grain belonging to farmers were in the mill.

Milling is apparently not the most unprofitable business one can engage in. Mr. S. N. Carle, gave up his milling business at St. Ursule, Que., and went to whiskey selling in Montreal. He has just assigned, with liabilities of $9,000.

The first shipment of Manitoba wheat in bond over the Northern Pacific road, consisted of 8,000 bushels consigned to W. P. Howland & Co., of Toronto. The grain was taken to Duluth and then transferred to the steamer United Empire, which vessel carried it to Point Edward.

In consequence of the death of Mr. John Ogilvie, the Ogilvie Milling Co., Winnipeg, has been dissolved. Messrs. Hastings Bros. & McGaw, the Winnipeg members of the firm have withdrawn and are succeeded by Messrs. F. & S. Ogilvie. It is said that Hastings Bros. will build a large flour mill at Fort William next spring.

Millers and others will be interested in a case now before the courts. Mr. Samuel McGhee, a mill owner of South Durham, has entered suit against the Glasgow & London Insurance Company to recover $1,000 policy on his mill, lately destroyed by fire. The plaintiff alleges that on making his application he gave a promissory note for $80, the amount of the premium. The company refuse to pay the amount because the fire occurred within the 30 days allowed them between the application being made and the license being issued.

While the philanthropists are founding schools to educate iron-workers, wood-workers, clay-workers and other mechanics, it is singular that none of them think so far as to include flour-makers among the students of their great industrial and trade schools. If deep, thorough scientific knowledge is needed anywhere, or if it would be valuable anywhere, certainly it is in milling. If ignorance is costly and dangerous anywhere, certainly it is in milling. An American school of milling ought to be one of the achievements of the near future.—*Milling World.*

The pleasant relations subsisting between Mr. James Goldie, proprietor, and the employees of the "Peoples' Mills," Guelph, Ont., was shown in a very pleasant manner on Christmas Eve. On that evening a committee, representing the employees, waited upon Mr. Goldie at his residence, "Rosehurst," and presented him with a beautiful ebony gold-headed walking cane, and Mrs. Goldie with a handsome silver water jug and goblet. Mr. Goldie replied in feeling terms on his own behalf and that of Mrs. Goldie. He thanked them sincerely for their gifts, and hoped that the good feeling which had for the last thirty years existed between the employees of the mills and the proprietors would continue and strengthen as time rolled on.

Most people thought that the Ontario Oatmeal Millers combine was dissolved into its original elements on or about the first of September last. In view of this it was a matter of some surprise to learn that a secret meeting of the Association was held the other day in this city, at which the following gentlemen are said to have been present: Mr. Wm. Scott, Ottawa, president, in the chair; Mr. Thomas Martin, Mount Forest, vice-president; Mr. D. R. Ross, Embro, secretary; Messrs. Edmonds, Lynn Valley; Thomson, Mitchell; McDonald, Woodstock; Stewart, Ingersoll; Tillson, Tilsonburg; Wilson, Fergus; Andrews, Thornbury; McDonald, Toronto; Murton, Guelph; J. D. Moore, St. Mary's, and others. The matter of most importance which came up for consideration at the meeting, is said to have been the subject of continuing the existence of the Association for another year. With this object a committee was appointed to make such changes in the constitution of the Association as it is hoped will increase its efficiency.

It is reported from Ottawa that the customs department has made several seizures of American flour in the maritime provinces, said to be brought in on fraudulent invoices, thereby escaping duty. It is done in this way: A Boston buyer purchases from a Canadian dealer, let us say, 125 barrels or over, which he ships to the maritime provinces, asking the Canadian miller to send invoices in triplicate (one for their own office, one for the customs and one to accompany the goods.) Instead of thus using the invoices, the American purchaser keeps two of them and sends with each one 125 barrels of American flour into Canada free of duty; or, in other words, forwards 375 barrels of flour and pays duty only on the first 125, cheating the customs out of $125, the duty being 50 cents, and also the protection afforded by the duty to the Canadian millers. How to get at the American dealers who perpetrate this fraud is now troubling the customs, and the matter has been referred to the Minister of Justice to take up with the Washington authorities.

Four barges, belonging to J. B. Blanchard, of Ottawa, loaded with over 1,000,000 feet of lumber, were recently wrecked on Lake Champlain and a large portion of the lumber lost.

New works for the manufacture of steam boilers will shortly be put in operation by Messrs. Rushton & Mitchell, at Paris, Ont. It is also proposed to manufacture a boiler cleaner of which Mr. Rushton is the patentee.

THE NEW YORK TRADE SCHOOLS.

THE decay of the time-honored apprentice system, through the mediumship of which, in the days of our fathers, the ranks of the army of skilled handicraftsmen were kept filled, has been the subject of anxious consideration and regretful comment. The causes assigned for its decadence have been various. Some have sought to find it in the destructive influence of machinery, that has done away with so many of the handicrafts,

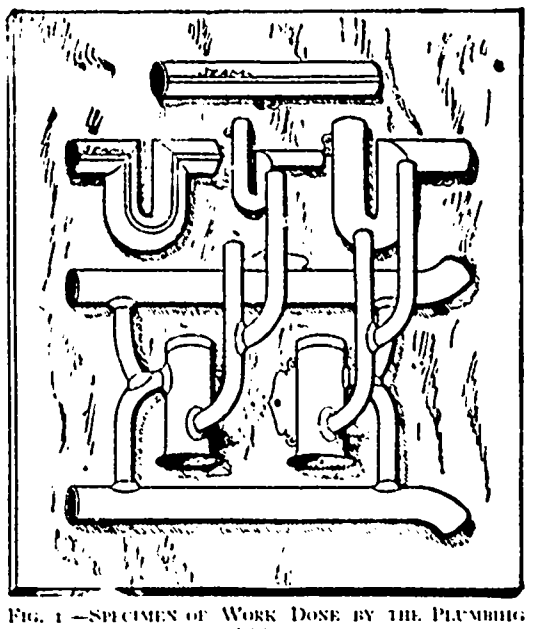


FIG. 1.—SPECIMEN OF WORK DONE BY THE PLUMBING CLASS.

and that naturally would deter many young men from devoting a number of years to the acquisition of a skill that might be rendered worthless by the next revolutionizing mechanical invention; others have thought the cause lay in the changes in the relations of employer and employed, which modern methods of conducting shop operations, and the like have brought about, by reason of which the master's time and attention must be devoted to other things than the instruction of the apprentice; others, again, have attributed the cause to the evil influence and jealous policy of the trades unions, which (as is unfortunately too generally the case) throw hindrances in the way of young men who would gladly seek the opportunity to enter the trades.

All of these things doubtless have contributed their share towards bringing about the result, and the reason why it is so generally deplored, is because until quite recently no other system had been devised that gave adequate promise of affording a substitute for it that would be better adapted than the old system to the conditions of modern industrial life.

Within the past year or two, however, the well-founded doubts that thoughtful men may have entertained on this point, have been so completely dispelled by the successful operation of the Trade Schools in New York, lately organized and maintained by the public spirit and philanthropy of Col. Richard T. Auchmuty.

For the benefit of those among our readers who may be interested in getting an insight into the plan of organization and the method of operation of these schools, and in learning something of what they have accomplished for the young men who have had the opportunity of enjoying their advantages, we have prepared the following account:

The New York Trade Schools were founded by Col. Auchmuty seven years ago, with the object in view of giving young men instruction in certain trades, and to enable young men already in these trades to improve themselves, by having the benefit of systematic instruction by skilled workmen, instead of being left to "pick up" the knowledge, as the usual experience of young men apprenticed to the manual trades. In carrying out this scheme, skilled mechanics are employed as teachers, "whose duty it is to show the pupil how the work should be done, to see that he does it correctly, and to point out the difference between good and bad work." This, it will be perceived, is a very different order of things from that which prevails in the workshops, where systematic instruction in the practice of the trade is rarely, if ever, imparted. Some approximation to the system followed in the New York Trade Schools is found in the manual training schools existing as adjuncts to a number of the well-known schools of technology in various parts of the country, and which have lately been engrafted upon the public school system in several of the States. These are admirable training schools, and are doing a vast amount of good in familiarizing young men with the use of tools; and it is no reproach to these excellent establishments to say that they only serve the wants of the limited number of young men who can afford to devote several years exclusively to the school instruction which is part of the plan on which they are conducted, combining as they do the system of trade instruction with general education. They do not, however, meet the needs of young men who must support themselves or who must contribute to the family support. For this far more numerous class, the trade schools have been established.

In the prospectus before us, the case is stated thus: "The system, therefore, which seems best adapted at present to American wants, is to leave the general education to the public schools, and confine the work of a trade school to the manual and scientific instruction necessary to make a mechanic." The schools, as will shortly appear, afford to young men the opportunity of rapidly and thoroughly perfecting themselves in all the mysteries of their trades at evening classes, without interfering with the work by which they may be earning a livelihood during the day.

The success of a plan of this kind may properly be measured by its fruits. Six years ago, two workshops sufficed to accommodate the pupils who came; at present the workshops have been increased by the addition of a number of others, and the buildings, which were specially erected for the schools, cover an area of 200 by 113 feet. The workshops are all spacious, lofty, well lighted and well ventilated. Young men have come to these schools not only from New York and its vicinity, but also from the Western, Southern and New England States, and from Canada. The progressive increase in the attendance from season to season tells the story of their usefulness better perhaps than anything else. The pupils in the first season numbered 30; second season, 98; third, 207; fourth, 198; fifth, 304; sixth, 337, and seventh, 469.

It was of much importance to the success of these schools that they should secure the cooperation and support of the masters' and journeymen's organizations of the trades embraced in the courses of instruction. At first, so long as the utility of the schools was problematical, these organizations held aloof; but at present all the master mechanics' associations of the trades represented at the schools have satisfied themselves of the value of the system. The Master Plumbers', the Master Painters' and the Merchant Tailors' associations have appointed committees to visit the schools, to make suggestions as to the course of instruction, and to aid the young men to procure work when they have completed the course of instruction. The Master Freestone Cutters' Association and the Journeymen Stone Cutter's Association also have expressed their approval of the school and its methods by allowing the young men who

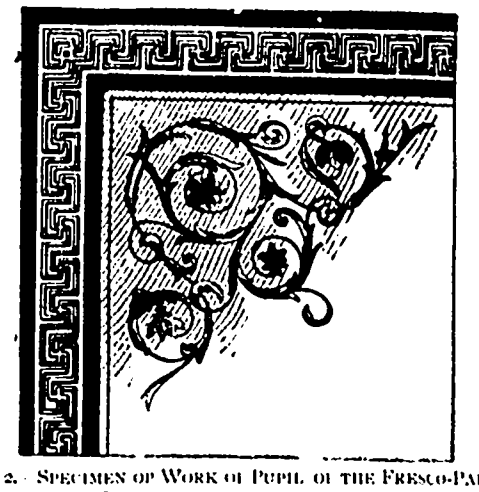


FIG. 2.—SPECIMEN OF WORK OF PUPIL OF THE FRESCO-PAINTING CLASS.

have enjoyed the benefits of the instruction, the time they have served in the school in their subsequent career as apprentices. The National Association of Builders have unqualifiedly approved the system of trade schools founded and maintained by Col. Auchmuty, as the proper substitute for the old apprentice system, and at the convention held at Cincinnati, in February of this year, recommended the adoption of the system of mechanical trade schools by all associations of builders in the United States, "to the end that mechanics may be taught on our own soil and American boys given the best opportunities possible to become proficient in the building trades."

We shall now proceed to give some account of the schools:

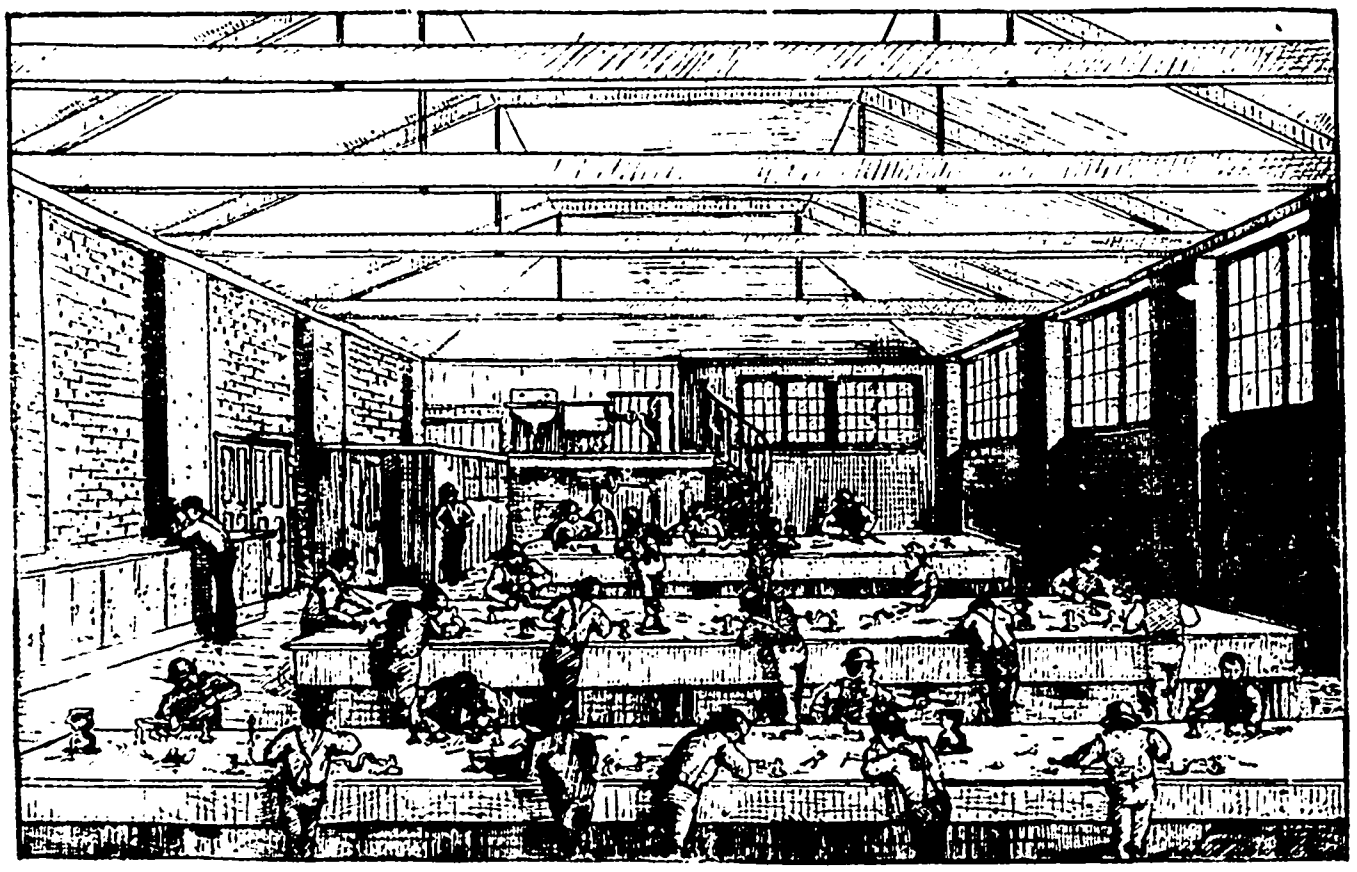


FIG. 3.—PLUMBING ROOM.

The New York Trade Schools are located at First avenue, between Sixty-seventh and Sixty-eighth streets, and are convenient of access by the East side elevated roads, by the horse cars on First, Second and Third avenues, and by the Fifty-ninth street cross-town cars. The courses taught, embrace instruction in plumbing, bricklaying, plastering, stone-cutting, house and sign painting, fresco painting, carpentery, blacksmith's work, and tailoring.

The plumbing classes are in charge of the Trade School Committee of the Master Plumbers' Association. At the close of their term of instruction, the pupils will be examined by this committee as to their manual skill and scientific knowledge, and those who are entitled will be given certificates of proficiency, which will entitle those already in the trade to a reduction of one year's service as apprentice, and will be useful to others in seeking work.

There are evening and day classes. The schedule of subjects covered in the manual and scientific instruction is elaborate, and will not be repeated here for want of space. It may suffice to say that the work turned out by the pupils is of such excellent character as to have gained the highest praise for the thoughtfulness of the instruction imparted. The *Sanitary Engineer and*

Construction Record lately gave an interesting account of this class and its work, some of which was exhibited at the American Institute Fair. We give a picture (Fig 1) of practical plumbing work done by members of this class, with our contemporary's comments thereon:

"The illustrations give an idea of the manual instruction of the plumbing class. The illustrations show work done by the day class. The work done by the evening class now on exhibition at the schools, fully equals it. About two-thirds of the evening plumbing class have been helpers. Last season, as near as could be ascertained, there were eighty helpers in the class. It is a creditable showing for the young men of this city, and it promises well for the American mechanic of the future that so large a number of lads in one trade should not only voluntarily give up their evenings, but pay nearly one thousand dollars to learn more than the shop could teach them. Until now, no inducements to attend the plumbing class have been offered by the Master Plumbers' Association, this large attendance of helpers, with a few exceptions where the fees were paid by the employers, being caused by the desire of the young men to become first-class workmen."

The painting class has the cooperation of a Trade School Committee of the Master Painters' and Decorators' Association of New York, and the certificates of the school issued to competent pupils are recognized by the association, which has endorsed the school and resolved to give preference to the young men who graduate from it.

Instruction in fresco painting is one of the earliest trades taught in the schools, and is in charge of a practical fresco painter, the pupil being put through a prescribed regular course of practical work. One specimen of the work of a pupil in this class may suffice to exhibit the proficiency which an industrious lad may acquire (see Fig. 2). Of the bricklaying, plastering, blacksmithing, stone-cutting, carpentry and tailoring classes, we might add interesting details respecting the method of instruction, and the like, but shall refer the interested reader for this information to the prospectus of the schools, in which it appears in full. We give on the accompanying plates some interior views of the school apartments. Fig. 3 is a view of the plumbing room; Fig. 4, a view of the plastering room, built by the bricklaying class of 1882-83; Fig. 5, the brick-laying room, built by the brick-laying class of 1883-84; Fig. 6, the fresco room.

Respecting the proficiency of the practical training of the pupils, we may add in addition to what has already been said, that all of the carpenter's work of the additions made to the schools in 1887, including the ornamental wood-work in the entrance hall, was done by young men who did not know the use of the tools when they joined the class in carpentry the previous autumn.

In further confirmation of this point, we call special attention to the views shown in Figs. 7 and 8, respecting which we take the liberty of quoting the following on the authority of Col. Auchmuty:

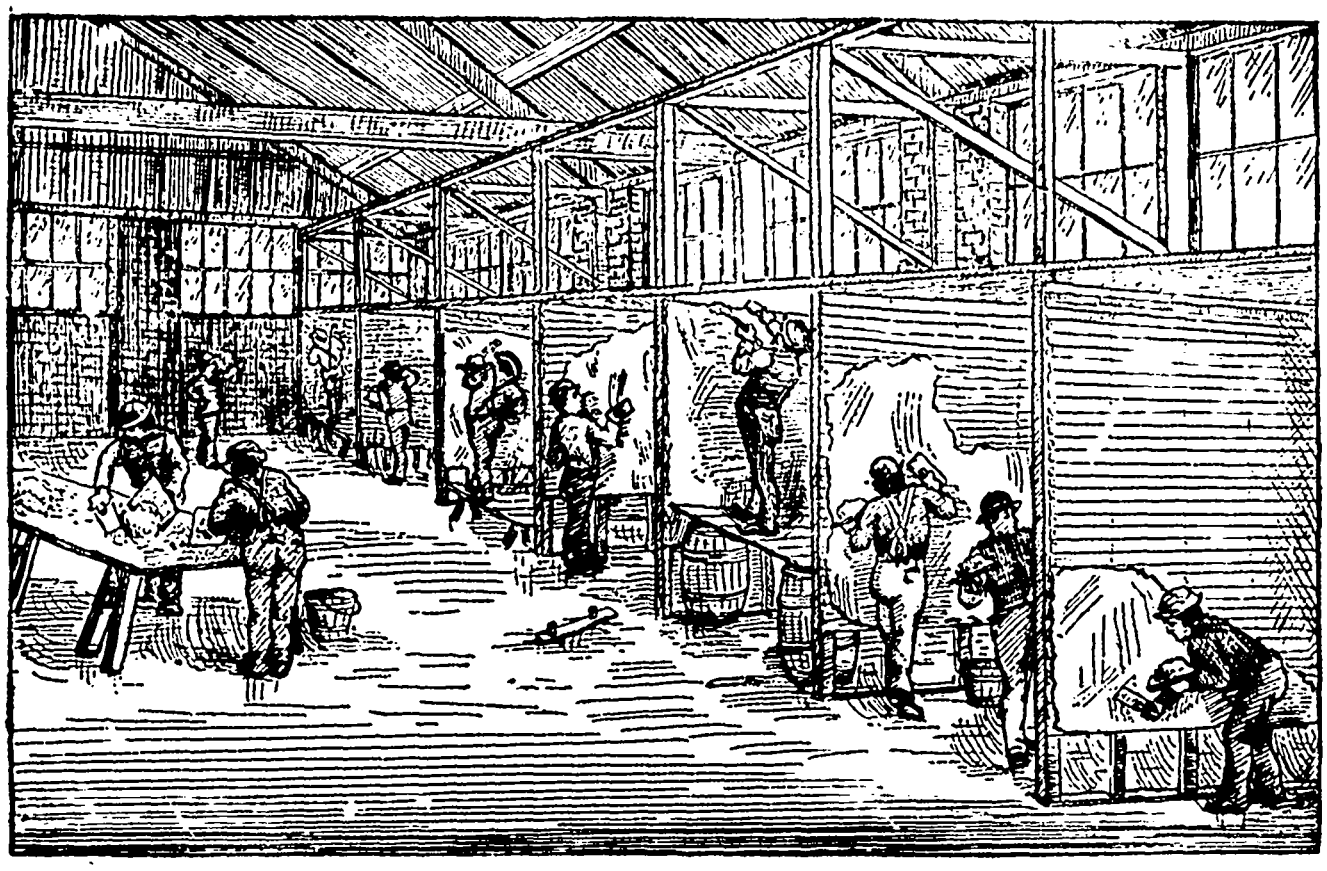


FIG. 4.—PLASTERING ROOM—BUILT BY BRICKLAYING CLASS, 1882-83.

"It is with considerable pride that the proprietor of the New York Trade Schools calls attention to the illustration Fig. 8. This is a practical country; proof is valued more than assertion. It is easy to write how much can be learned at a trade school, but those who are disposed to be distrustful might think that work can be done under the eye of the instructor which could not be done if the young man was left to his own resources. The young men from the brick-laying class were employed to lay the rough brick of this big building, to give section is now being built by the class of last season. Nearly all the brick-work of the interior and rear walls was laid by young men who could not handle a trowel when they joined the Trade Schools a few months before being set to work. The young men turned the corners, tied in the cross walls, built the flues and chimney breasts, built the arches in the walls and between the iron beams, and backed up behind the face brick. A portion of the face brick was also laid by young men who had been employed on the rough work the season before. The number of brick laid was estimated from time to time, and the young men were paid accordingly. It would be difficult to find more thorough or better work. The lines are true, each joint is straight and neatly struck. The work looks as if the the builders had 'put their hearts in it.'"

The brick-work of four dwelling houses in Sixty-eighth street, New York, was executed by members of the bricklaying class after one season's instruction; and we are informed by the founder of the schools, that five similar houses were built by members of the class of 1887 and 1888.

To these material evidences of the thoroughly efficient, practical training given by this admirably organized and conducted enterprise, it is necessary to add nothing in the way of praise. They speak for themselves. Upon the question of the readiness with which the young men from the schools may expect to obtain employment, the following may be of interest: "Experience has shown that from one-third to one-half a day's work can be done after one season's course of instruction, and that from one-third to one-half a day's wages can be obtained. Full wages have usually been obtained in from six months to two years after leaving the schools, according to the nature of the trade. Young men who were exceptionally quick at learning, have obtained full wages at once: but it is the opinion of the management that steady work at moderate wages is the more profitable in the end."

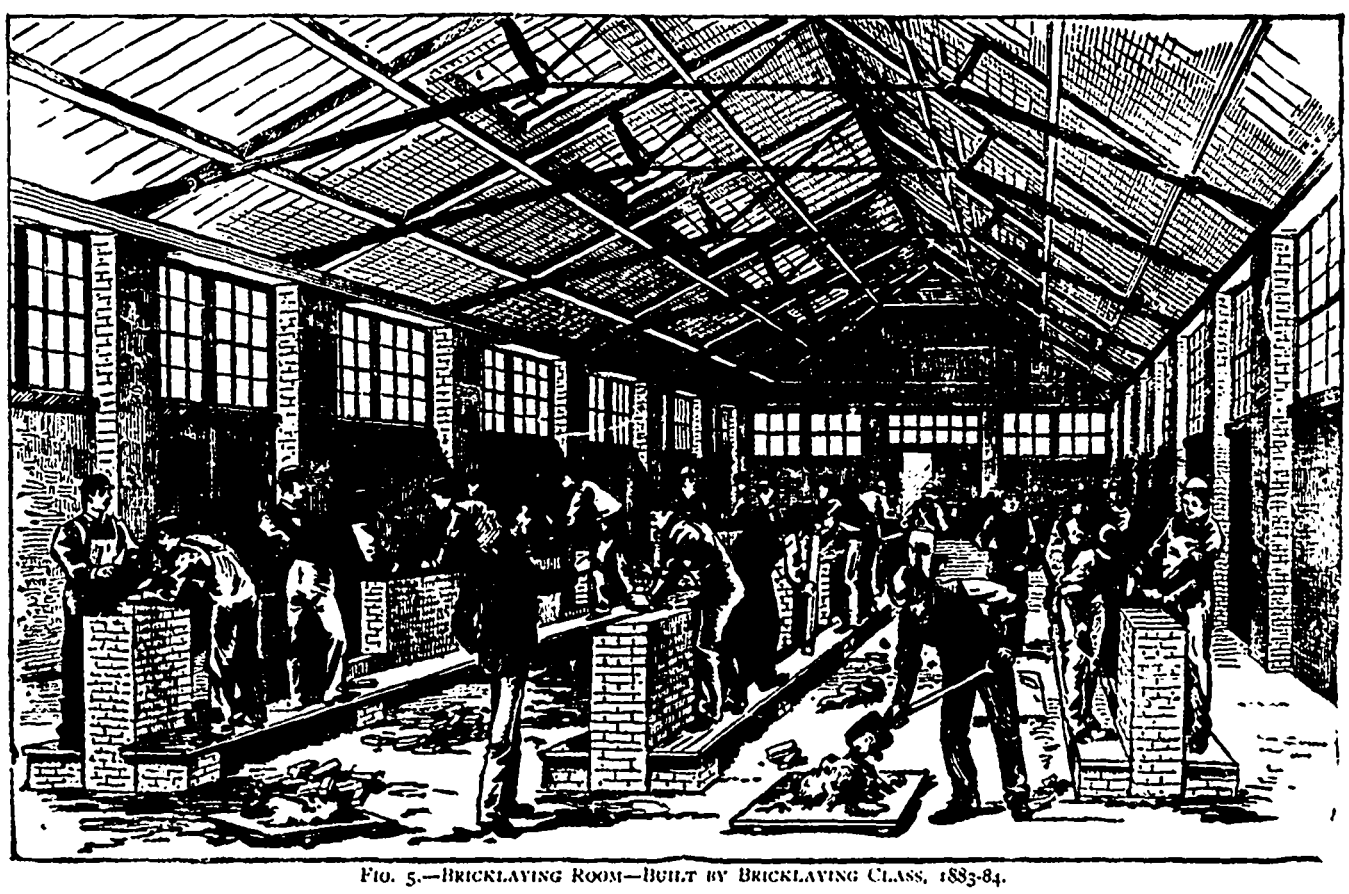


FIG. 5.—BRICKLAYING ROOM—BUILT BY BRICKLAYING CLASS, 1883-84.

The excellent work that is being accomplished by these schools, is not confined to New York, but will no doubt be widely extended, since the success being so well assured, they will serve as the model for similar schools in other cities. Their founder deserves the honors due to a public benefactor.

Mr. N. H. Stevens, of the milling firm of Campbell, Stevens & Co., Chatham, Ont., is at present, with his wife visiting San Francisco and other Pacific Coast cities. They went via the C. P. R. and British Columbia.

HON. G. W. ROSS ON TECHNICAL EDUCATION.

AT a conference with manufacturers, mechanics and others, on Dec. 19th, regarding the establishing of a course of technical instruction in connection with the School of Practical Science, Toronto, the Minister of Education spoke as follows, on the subject :—"I feel very highly honored indeed by the very general response that you have made to the invitation sent out by me some time ago desiring you to assemble for the purpose of discussing such measures as would tend to the improvement of the School of Practical Science, and particularly the cultivation of greater skill on the part of our mechanics. I have been for some time meditating some change in the School of Practical Science by which the course of instruction there given would be very much broadened and by which greater facilities would be afforded to those who are desirous of fitting themselves for trades and industries. Two years ago when on a visit to England in connection with the Colonial Exhibition I took a good deal of pains to satisfy myself as to what was being done in the great technical school of South Kensington. After considering the work carried on there I came the conclusion that something similar would be exceedingly useful in the Province of Ontario. Last summer, in order to satisfy myself, I visited five or six of the largest schools of the United States, and there I found the Americans were also giving much attention to that department of education which is closely allied with the industries of their country. Not only are they particularly active in that respect, but at the present hour and for many years this education has been going on, and as they are in many respects our greatest competitors, while their system of public education is very like ours, it occurred to me that I might get better and more applicable hints from their schools of science than from the other country. Their schools of practical science are somewhat similarly organized as our School of Practical Science, and many of them are larger. They have about ninety of these schools, attended by 10,000 students — 10,532 is the exact number according to the State report—so that you can readily perceive what effect the addition of 10,000 skilled mechanics or artisans will have on the industries of the country, especially when the same number is being added year by year. The various schools are supported by the States in which they are located, but 42 out of the 90 are endowed by land grants from the States. Yet they are very well off, as they have buildings and appliances valued at $2,004,758 and have an annual income of $698,758. I mention these facts in order that we might impress upon the country the great interest taken in schools of this kind on this continent, and in order that Canadians might see that they are not falling behind in the race. Among the schools which do most work of this kind is Cornell University. This university has lately expended nearly half a million of money on buildings and has expended $141,558 on equipment, that is, in the departments of civil engineering, mechanical engineering and applied chemistry, and pays annually in the salarie of professors and lecturers a sum of $91,500. Place that against the state of matters in Ontario, where we pay annually $7,700 for the maintenance of our School of Practical Science, including expenditure in salaries, and you will see how much we have to do in the province in order to hold our own with only one of the institutions in the neighboring State of New York. Then there is the Lehigh University, Hoboken College of Engineering and the School of Practical Science in Boston, which all have buildings running up into the hundreds of thousands and bearing annual receipts amounting to about $35,000 each, all going to indicate the deep interest taken in this subject on the other side of the line. We want to know here in what department skilled labor is most urgent. Perhaps it may be disclosed before we conclude our deliberations that there is no urgency at all. Judging from the letters I have received on the subject, it does appear to me that there is an urgent demand for skilled laborers in the various departments. Iron workers and manufacturers of engines, and others with whom urgent operations connected with the manufacture of iron and wood in its various forms, are complaining of the want of skilled labor. In fact, if you look over the industries of this country you will find many things are not done in Canada which we might do for ourselves. In looking over the trade and navigation returns for last year, I find that we imported $54,130 worth of blacking, $25,766 worth of black lead, $371,080 worth of blueing, $1,101,963 worth of manufactured drugs and chemicals, $6,988 worth of fertilizers, $546,187 worth of gutta percha, $71,643 worth of ink and writing materials, $1,226,878 worth of oils, minerals, tubes, etc., $553,549 worth of paints and colors, $97,679 worth of soap. Now, these are things that by a little assistance and the knowledge of applied chemistry ought to be manufactured in this country. I have no hesitation in saying that with skilled labor here, and any quantity of plumbago and other material which enters largely into the making of the articles named, we could manufacture by reason of applied chemistry a great many of these things. And no less so as regards manufactures. During last year we imported $404,161 worth of brass manufactures, $750,791 worth of earthenware, $248,030 worth of fancy goods, $1,269,486 worth of glass manufactures, $9,746,957 worth of iron and steel manufactures, $1,667,512 worth of leather, $1,233,691 worth of paper, and $1,149,324 worth of wood manufactures. Labor represents, according to the census of 1881, 21 per cent. of the entire cost of the manufactured article. Now, the wages paid out in the province last year amounted to $30,604,030, while the imported manufactured articles amounted in value to $157,989,870. We might obtain this work in iron, cotton and woolen goods if we had the skilled labor, and it would bring mechanics to our country. Everybody knows many of our mechanics leave us and go elsewhere, because men go where they improve their condition. By superior skill we might increase the value of our goods and in addition to supplying our own markets, get others as well. Not simply with cheap labor, but with skilled labor. Ontario manufacturers should be able to hold their own in every market of the world. In the first place I want to know is there a scarcity of skilled labor? Next, where does our skilled labor come from? Do we produce it in this country or import it from abroad? And thirdly, what, in your judgment, is the best way to secure for us the right kind of skilled labor, not what is purely theoretical, but what is most practical? I have a letter from his Worship the Mayor, who, on account of another engagement, is unable to be present. I have also letters from Messrs. Bertram & Son, Dundas; Mr. Herbert Mason, who is interested in manufactures; also from Mr. H. A. Massey. I merely mention this fact in order that these gentlemen may be recognized as being present and as being in favor of the movement.

FIG. 6.—FRESCO ROOM.

OLD TOOLS.

IT used to be quite common practice for parties starting without much capital to build up a machine-shop business to buy second-hand tools—cheap ones at that. It is extremely hard to get up to success in that way now. The difference between good and poor tools is too great at the present time, and with the worn-out relics of former days there is little hope of competing with well-equipped shops. The man who tries it is likely to grow poorer from year to year, instead of working up slowly to where he can afford to buy good tools. It is better to start more moderately; to start with fewer and better tools. This has come to be pretty generally understood and practiced.

But there are a good many old shops in the country, at one time—for the times—fairly equipped, that are slowly going to decay through using their ancient tools and appliances. There has been a great advance in machine tools during the past twenty years, not only with reference to the quality of the work that can be done with them, but, and particularly, with reference to the quantity. Then when these old, weak tools, worn-out with use, are put against modern tools in another shop, there is little hope of competing. The more modernly equipped shop would find all the profit it ought to make in the extra work that could be done on the modern tools.

Then, modern shops generally have better appliances for handling work, and this tells in their favor. Whatever in the old shop keeps the old tools in service is very likely to keep out modern cranes and other means of handling work.

It takes a constant spirit of progressiveness to keep a machine shop up to the times in the way of tools. And unless this is done the shop soon becomes "old." And the character of the tools in a shop is very likely to be reflected in the men. Good mechanics like to work with good tools, and are very likely to go where they can find them. A man who expects to spend the best part of his time in a shop will, if he is the right kind of a man, want his surroundings reasonably pleasant. Altogether, the old shop is in a bad way.—*American Machinist.*

TRADE NOTES

We have received too late for insertion in this number copy for a change of advertisement from the Hercules Mfg., Co, of Petrolia. They call the attention of millers to the superior advantages of Dobson's Patent Flour Dresser of which they are the manufacturers. Millers will do well to write them for full particulars of this machine. The Company also make the gratifying statement that their sales for the past month were more than double those of the same month last year.

Robin & Sadler, leather belting manufacturers, of Toronto and Montreal, have just completed the putting in of all the belting required in J. B. Smith & Sons' new mill on Strachan avenue, Toronto. The main driving belt is 80 feet long, 20 inches wide, double thickness, and put on by them endless at the mill. This belt contains no rivets, sewing nor any other fasteners to keep it together, except cement. By this means only being used, a much smoother running belt is insured, which will also transmit more power, owing to a closer contact with the pulley surface. This firm has put on many very large driving belts through the country in the past few years, which are giving the very best of satisfaction.

CONSTITUENTS OF A TON OF COAL.

A NEW York chemist gave a reporter of an evening paper this estimate of the constituents of a ton of coal. Besides gas, he found that a ton of ordinary gas coal will yield 1,500 pounds of coke, twenty gallons of ammonia water and 140 pounds of coal tar. He added that destructive distillation of this amount of coal tar gives about seventy pounds of pitch, seventeen pounds of creosote, fourteen pounds of heavy oils, about nine and a half pounds of naphtha yellow, six and one-third pounds of napthaline, four and three-fourth pounds of naphthol, two and a fourth pounds of alizarine, two and a fourth pounds of solvent naphtha, one and a fifth pounds of aniline, seventy-nine hundredths of a pound of toludine, forty-six hundredths of a pound of anthracine, and nine-tenths of a pound of toluches, from the last named substance being obtained the new product saccharine, said to be 230 times as sweet as the best cane sugar.

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	20 00 22 00
1 x 10 and 12 mill run	15 00 16 00
1 x 10 and 12 dressing	15 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	23 00 25 00
1 inch dressing and better	18 00 20 00
1 inch siding, mill run	13 00 15 00
1 inch siding, common	12 00 13 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 16 00
1 inch strips, common	11 00 12 00
1¼ inch flooring	15 00
1½ inch flooring	16 00
XXX shingles, sawn	$2 40@2 50
XX shingles, sawn	1 30 1 50
Eastlake painted iron shingles, per square, (10 feet)	4 50
Eastlake painted tin shingles, per square	4 50
Eastlake genuine galvanized iron shingles, per square	7 00
Imitation brick siding, per square	3 50
Special siding, per square	3 50
Lath, sawn	1 80

YARD QUOTATIONS.

Mill cull boards and scantling	10 00
Shipping cull boards, promiscuous widths	12 00
Shipping cull boards, stocks	13 00
Scantling and joist, up to 16 ft	14 00
" " 18 ft	15 00
" " 20 ft	16 00
" " 22 ft	17 00
" " 24 ft	19 00
" " 26 ft	20 00
" " 28 ft	22 00
" " 30 ft	24 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 20 00
Dressing stocks	16 00 18 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	12 00

B. M.

1½ inch flooring, pressed	25 00 30 00
1¼ inch flooring rough	14 00 15 00
1¼ " dressed	23 00 25 00
" undressed	14 00
" dressed	16 00 20 00
" undressed	12 00 14 00
Beaded sheeting, dressed	18 00 20 00
Clapboarding, dressed	12 00
XXX sawn shingles, per M	2 75 2 00
Sawn lath	2 25
Red oak	20 00 25 00
White	25 00 30 00
Basswood, No. 1 and 2	18 00 20 00
Cherry, No. 1 and 2	50 00 60 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@25 00
Birch, 1 to 4 inch, M	16 00 25 00
Basswood	13 00 18 00
Walnut, per M	55 00 95 00
Butternut, per M	25 00 40 00
Cedar, flat	00 06 00 10
Cherry, per M	65 00 90 00
Elm, Soft, 1st	15 00 17 00
Elm, Rock	25 00 30 00
Maple, hard, M	22 00 30 00
Maple, Soft	16 00 18 00
Oak, M	40 00 90 00
Pine, select, M	35 00 40 00
Pine, 2nd quality, M	21 00 23 00
Shipping Culls	13 00 15 00
Mill Culls	8 00 10 00
Lath, M	1 80 1 90
Spruce, 1 to 2 inch, M	10 00 11 00
Spruce Culls	4 50 6 00
Shingles, 1st quality	2 00 3 00
" 2nd "	1 25 2 00

Cement, etc.

Portland Cement, per barrel	$ 2 75@ 3 00
Roman " "	2 75 3 00
Fire Bricks, per M	22 00 30 00

ST. JOHN, N. B.

Lumber.

Spruce deals, Bay Fundy Mills	8 00 8 25
Spruce deals, City Mills	8 50 9 50
Aristook P. B., Nos. 1 and 2	40 00 45 00
No. 3	30 00 35 00
No. 4	15 00 20 00
Aristook P. B. shipping	15 00 16 00
Common	12 00 13 00
Spruce boards	7 00 8 00
Spruce scantling (unst'd)	7 00 8 00
Spruce, dimensions	11 00 14 00
Pine clipboards, extra	5 00 40 00
No. 1	0 00 30 00
No. 2	30 00 20 00
No. 3	11 00 12 00
Laths, spruce	1 25 1 35
Laths, pine	5 50 8 00
Palings, spruce	5 50 8 00

NEW YORK PRICES.

WHITE PINE.

Uppers	$46 00@62 00
Selects	40 00 53 00
Fine common	35 00 48 00
Cutting up	21 00 30 00
Common	17 00 25 00
Norway	19 50 26 50
Pickets	14 00 23 00
Shippers, according to quality, for different ports	17 50 52 00
Coffin boards	21 00 23 00
Box	15 50 17 00
Ceiling	24 00 42 00
Shelving	25 00 32 00
Moulding	34 00 37 00
Bevel siding	16 00 23 00
Bridge timber	38 00 50 00

EASTERN SPRUCE.

9 to 12 in	15 50 16 50
8 to 12 in	14 50 15 50
6 to 12 in	13 50 14 00
6 to 9 in	13 00 14 00
Special lengths	16 50 18 00
Lath	2 00
Piling, per lienal feet	5 06

SHINGLES.

Pine, 16 in., extra	$ 3 10@ 3 50
18 in. extra	4 35 4 25
18 in. clear butts	3 15 3 25
16 & 18 in. stocks	4 50 5 30
Cedar	8 75 19 00
Cypress	6 00 16 00
Redwood, per bunch	1 25 1 50
Various widths	1 00

HEMLOCK.

Timber	12 00 13 50
Joists	11 50 12 00
Boards	12 00 13 00
Lath	2 00

DRESSED LUMBER, CAR LOAD LOTS.

No 1 flooring, ⅞in	23 00 24 00
No 1 ceiling, ⅞in	25 00 26 00
No. 1 ceiling, ½in	18 00 19 00
Timber	14 00 15 00

ALBANY, N. Y. PRICES

SHINGLES AND LATH.

Shingles, shaved pine	6 50
2d quality	5 00
Sawed, extra	4 40 4 50
Sawed clear butts	3 50
Cedar, xxx	4 00 4 20
Shingles, cedar mixed	2 75 3 00
Hemlock	2 25
Lath, pine	2 25 2 35
Spruce	2 00 2 25
Hemlock	1 75 2 00

HEMLOCK.

Boards, 10 in., each	13
Joist, 4x6	33
Joist, 2½x4, each	12
Wall strips, 2x4	09

PINE.

2½ in. and up, good	55 00 60 00
4ths	50 00 55 00
Selects	45 00 50 00
Pickings	40 00 45 00
¼ to 2 in., go od	50 00 55 00
4ths	45 00 50 00
Selects	40 00 45 00
Pickings	35 00 40 00
1 in., good	50 00 52 00
4ths	45 00 47 00
Select	40 00 42 00
Pickings	35 00 38 00
Cutting up, 1 to 2 in	25 00 35 00
Bracket plank	30 00 35 00
Shelving boards, 12 in. and up	25 00 32 00
Dressing bds., narrow	18 00 22 00
Shipping boards	16 00 18 00
Box boards	14 00 16 00
10 in. boards and better	28 00 34 00
Common	15 00 20 00
12 in. boards dressing and better	29 00 36 00
Common	15 00 22 00
¼in. siding selected 13 ft	40 00 45 00
Common	15 00 20 00
in. siding selected	38 00 42 00
Common	14 00 18 00
Norway, selected	22 00 25 00
Common	12 00 15 00
10 in. p k. 13 ft. dressing and better, each	42 00 45 00
Culls	22 00 25 00
10 in. boards, 13 ft., dress, and better each	28 00 33 00
Culls	17 00 21 00

BUFFALO AND TONAWANDA PRICES.

NORWAY PINE—ROUGH.

No. 1, 1 and 1¼ in	20 00 22 00
No, 2, 1 and 1¼ in	15 00 15 50
No. 3, 1 and 1¼ in	11 50 12 00
Stocks No. 1, 1 and 1¼ in	22 00
No. 2, 1 and 1¼ in	17 00

WHITE PINE—ROUGH.

Uppers, 1 and 1¼ in	43 00 45 00
1¼ and 2 in	43 00 46 00
2¼, 3 and 4 in	53 00 55 00
Selects, 1 inch	37 00 39 00
1¼, 1¼ and 2 in	37 00 39 00
2¼, 3 and 4 inch	43 00 45 00
Cuts, No. 1, 1 inch	26 00 28 00
1¼, 1¼ and 2 inch	31 00 34 00
2¼, 3 and 4 inch	37 00 40 00
No. 2, 1 inch	16 00 19 00
1¼, 1¼ and 2 inch	21 00 23 00
Moulding, 1 inch	30 00 32 00

Western Letter.

THE question which is puzzling a good many here at present is the probable wheat yield. Grain dealers, millers, bankers, merchants, and in fact people in every line of business, are asking the question; "What do you think about the wheat crop?" The fact is, trade in this country depends very largely upon the wheat crop, hence the anxiety. The cause of the more than usual interest on this point at present is due to the growing feeling that crop estimates have been in excess of the real amount of grain in the country. After the frost last fall every one was on the *qui vive* for a while to learn the extent of the damage done to wheat. Reports came in from all parts of the country, and many interested parties made trips through the province with the object of summing up the situation. Hundreds of estimates were made by parties more or less competent to judge, and by some who had very little knowledge of the situation, with the result that the public were persuaded to believe that the damage was by no means as serious as it might have been, and that notwithstanding the frost, there would be a large quantity of excellent wheat to market. But the time has been passing away, and the movement of wheat to date has been very light. People are now becoming a little nervous as to the result, and many are beginning to believe that they were deceived by the earlier estimate. Of course a great many reasons are advanced why the movement of wheat has remained so small. At first and for a long time two main reasons were given, which tended to quiet the public. These were, that the harvest being very late, threshing was away behind, and farmers could not be expected to deliver their wheat before it was threshed. Then it was urged that the open fall retarded deliveries, as farmers would plow as long as they could, instead of hauling wheat to market. As soon as the frost stopped plowing, wheat would pour in at a lively rate. The frost came, plowing ceased, but instead of increasing, the movement in wheat decreased, and has remained very light up to the time of writing. Those who still believe that there is a good deal of wheat in the country, now claim that farmers are holding on account of the decline in prices, as prices to farmers here are only now ranging from 80 to 85 cents for No. 1 hard, whereas a while ago prices ranged from $1 to $1.50. There is no doubt some truth in this idea. The farmers who got a taste of high prices, do not now feel inclined to take from 20 to 30 cents per bushel less, and many of them imagine that the grain dealers have formed a combination to keep up prices, and that by holding they will compel an advance. Other farmers believe that on account of the frost there will be a good demand for wheat in the spring for seed. Undoubtedly farmers are not marketing their wheat, for the reasons stated, as freely as they have done in past years, but at the same time my belief is that this does not altogether account for the light deliveries. My opinion is, that the wheat is not in the country to the extent which many people imagined, and that even the minimum estimates of last fall are considerably over the mark. I come to this conclusion after a careful and thorough trip through the wheat growing districts of the province. The quantity of wheat fit for milling was reduced a very great deal by the frost of last harvest, but I conclude that the great mistake in estimating the wheat crop was not in making allowance for frozen grain. The fact is, the crops, where not damaged from frost, have not yielded nearly as heavy as last year, and here is where the great mistake has been made. Last year was a phenomenally large yield. This year the summer was cold, and with plenty of moisture, the crops looked very fine, and parties estimated that the yield would be nearly as great per acre as last year. Threshing is now completed, and the returns show that there has been a very considerable shortage in the average yield, as compared with last year, the crops having grown very greatly to straw, and the yield has not been in keeping with the appearance of the standing grain. The lighter yield, combined with the damage from frost, has therefore greatly reduced the wheat crop of the country, as compared with the crops of 1887.

The present year has been a very difficult one to make wheat estimates, owing to the very uneven nature of the crops. Early in the season, estimates were sent out placing the crops of Manitoba at from 17,000,000 to 20,000,000 bushels. I always regarded these estimates as absurd, and stated so in a former letter. These "boom" estimates do the country more injury than good. In my letter in your November issue, I made an estimate placing the exportable surplus of wheat at not in excess of 7,000,000 bushels. This included Manitoba and the Territories, and the estimate was lower than popular estimates at that time. Though this estimate was the lowest given up to that time, I now believe it to have been very much too large, and with the knowledge gleaned by my trip through the province, I would reduce it by 2,000,000 bushels. Up to the time of writing something over 1,600,000 bushels of wheat have been shipped eastward, of which about half a million bushels are in store at Port Arthur. This does not take flour into account, of which equal to about 1,500,000 bushels were exported from the province from the crop of 1887. It is my belief that 5,000,000 bushels will cover the exports from the crop of 1888, and the present movement would barely warrant so large an amount. Last year to this date about 3,000,000 bushels of wheat had been exported, and shipments of flour were also very much larger. Country grain dealers put the crop lower as a rule, but they are mostly holding wheat, purchased at above the market value, and allowance must therefore be made for their desire to "bear" the crop and fall wheat.

A great many dealers place the crop at about one quarter of last year. For instance, from a personal interview with about every grain dealer in southern Manitoba, the great wheat region of the west, the highest estimate given of the crop was one third as great as last year, and this only in one or two instances. Nine out of ten dealers placed the crop of Southern Manitoba, west of Morden, at one quarter of last year, while one or two estimated it at one-eighth of last year. At only two points in southern and south western Manitoba has the crop been good. These are Morden and Gretna. Both these places are large wheat markets, but it must be remembered that these places are in the Mennonite reserve, and the Mennonites always market their wheat early. The wheat contributory to those points has therefore been mostly disposed of. On the C. P. R. main line, at Brandon and most other points, the quantity of wheat so far marketed is small in comparison with last year, and the expectation is that the proportion will not be greatly increased. On the Northwestern railway there will also be a great falling off at several points, but along the Northwestern, wheat-growing is not as important a crop as in other parts of the country, and the shortage in this district is not a matter of so much importance as in the Brandon district and southern Manitoba.

The most important occurrence in the milling line is the change in the Winnipeg business of the Ogilvie Milling Co., caused by the withdrawal from the company of W. A. Hastings, manager; G. V. Hastings, mechanical superintendent, and S. A. McCaw, superintendent of the wheat buying department. The withdrawal of these gentlemen from the company has been brought about by the changes in the distribution of the stock of the company, resulting from the death of the late John Ogilvie, the senior member of the company. The three gentlemen who now withdraw from the business here, have been instrumental in building up the very successful milling enterprise of the Ogilvies in Winnipeg. They have practically had full control since the establishment of the business here. They have established a new firm, under the style of Hastings Bros. & Co., and have commenced to handle grain and flour. Next summer they will erect elevators in the province, and build a large mill, of not less than 600 barrels capacity. F. W. Thompson, who succeeds W. A. Hastings as manager of the Ogilvie business here, is a very popular young man, and the appointment is an excellent one. He has been connected with the Ogilvie company, both here and at Montreal, for some years. A. M. Robinson, of Montreal, has been appointed mechanical superintendent, and F. G. Simpson, superintendent of the purchasing department for the Ogilvie company.

I see that the Toronto *Empire*, in order to make a point against reciprocity, or increased trade intercourse with the United States, again states that Manitoba farmers are realizing more for their wheat than farmers in Dakota and Minnesota. Now, this is very absurd. I will not discuss reciprocity, but a few facts concerning the price of wheat. At the time of writing, No. 1 hard wheat is quoted at Duluth at $1.23 to $1.24 for cash. It has ranged at about these prices at Duluth for some time back. No. 1 hard, cash at Minneapolis is worth about $1.22. In Manitoba prices to farmers at provincial points range from 80 to 82 cents per bushel for No. 1 hard, which is a superior grade to Duluth and Minneapolis one hard. Manitoba prices to farmers are equal to say 83 to 86 cents on track at Winnipeg, on a basis of through freight rates to Port Arthur. The freight charges from Winnipeg to Port Arthur are a fraction over 12½ cents per bushel, which would make Manitoba wheat worth say $1.00 per bushel at Port Arthur, against $1.20 to $1.24 at Duluth and Minneapolis. This makes it plain that Manitoba wheat is selling away below Dakota and Minnesota wheat, the *Empire* to the contrary notwithstanding. The freight rates from Winnipeg to Duluth and Minneapolis would not be any higher than from Winnipeg to Port Arthur. It will therefore be seen that were the Duluth and Minneapolis markets open to Manitoba, wheat at Winnipeg would be worth fully 20 cents per bushel more than it is now quoted at.

ROPE DRIVING IN AMERICA.

AMERICAN mills have used belts exclusively for the transmission of power from the prime movers throughout the mill until the last year or so, during which time the example of English practice in rope driving has begun to have an effect. This new method of transmission, however, is still exceptional, being confined to a very few instances.

For a number of years the Roeblings, of New Jersey, the celebrated builders of suspension bridges, have made wire ropes for transmission from building to building, or from water wheels to buildings some distance away, and there have also been numerous isolated instances where various forms of rope have been used to transmit power from building to building. Such ropes for long distances have been provided with suitable sliding binder pulleys, to maintain a constant tension under variations in length, as the fibres are all affected by the humid air. In one instance, the rope was kept at such a uniform length that the binder pulley was abandoned, the method being to keep the rope constantly wet by means of a very fine stream of water, which was impinging upon it constantly during its operation. But neither of these instances has any pertinency to the use of rope driving in mills.

One of the large rope works in Massachusetts now makes great quantities of manilla cables for transmission of power, the rope being overlaid with a lubricating preparation, and also impregnated with a waterproof material.

There are two methods of transmitting power greater than the capacity of a single groove, one being by a lot of independent ropes running in corresponding grooves, and the other where a single rope passes from one groove to another, the ends being brought around and joined together, and the last loop being held by a binder pulley. This is known as the Dodge system, and is considered preferable in many instances where ropes are subject to severe usage, on account of the diminution of the number of splices.

There are three types of grooves used in various works one is the U shaped groove for binder pulleys only, where the rope rests in the bottom of a semicircle large enough to hold it; another is the V-shaped groove; and a third is where the groove is approximately in the shape of an ellipse, the radius of the bottom groove being about 60 per cent of the radius of the rope. The speed of such ropes is limited to about 5000 ft. per minute, at which velocity the centrifugal force becomes a very important element in the capacity of the system for the transmission of power. The working stress of the ropes varies very widely in practice. As high as 500 lb. or 600 lb. have been applied on a 2 in. rope, although the best practice limits the stress upon such a rope to about one-half of that amount. The following figures give the result of practice of one of the leading mill engineers in America:—

Diameter of Ropes.	Working Stress on One Rope.
in.	lb.
1½	247½
1 11/16	220
1¾	278½
1¼	330
1¼	363
2 1/16	256
2 1/16	330
2 1/16	349
2¼	205
2¾	330

The advantages claimed by some American engineers who have had experience with ropes, are the absence of slip, the ability to turn the corners and to run to any desired distance, the cheapness of cost, it being about two-thirds that of leather, and also economy of maintenance. On the other hand, it is claimed that the mechanical efficiency of rope driving is not so high as by belt driving. That the power required to press the rope into the grooves and then to pull it out as it leaves the pulley, is a large element in the problem, and also that the ropes are subject to a greater degree of wear than is estimated by their advocates. There is also a difference by reason of the fibre used, and ropes made of manilla will not give results equal to those of cotton, unless the manilla has been treated especially for the purpose.—*Engineering.*

Mr. S. Sloan, of Tillsury Centre, Ont., will enlarge his saw mill, putting in a 60 horse-power boiler and engine, and adding saw mill and other machinery for woodworking.

DOMINION MECHANICAL AND MILLING NEWS

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The DOMINION MECHANICAL AND MILLING NEWS will be mailed to subscribers in the Dominion, or in the United States, post free, for $1.00 per annum, 50 cents for six months. *Subscriptions must be paid strictly in advance*

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EDITOR'S ANNOUNCEMENTS.

Correspondence is invited upon all topics pertinent to the mechanical and milling industries.

This paper is in no manner identified with, or controlled by, any manufacturing or mill-furnishing business, nor will a bestowal or refusal of patronage influence its course in any degree. It seeks recognition and support from all who are interested in the material advancement of the Dominion as a manufacturing country, and will aim to faithfully record this advancement month by month.

Readers of the "MECHANICAL AND MILLING NEWS" will confer a favor upon the publisher and derive material benefit themselves by mentioning this paper when opening correspondence with advertisers. Drop us a postal card when you have written to an advertiser, give us his name, and then we will put you in the way of getting the benefit. Don't forget this.

A WEALTHY citizen of Philadelphia, Mr. V. Williamson, has given $5,000,000 to found a mechanical school where boys may be taught trades. If any wealthy Canadian is impressed with a sincere desire to make a bequest where it will do the most good, let him go and do likewise.

THE convention of Boiler Inspectors which met at Pittsburgh, Pa., on Nov. 20th, resulted in the formation of an organization to be known as "The Boiler Inspectors' Association, of the United States and Canada." The objects of the Association are to reduce the loss of life and property from boiler explosions, by making boiler inspection compulsory, and the substitution of competent for incompetent engineers.

AN agitation is on foot in the United States for a reduction of the letter postage rate from two cents to one cent. This would seem to indicate that the time has arrived when the rate in Canada should be reduced to two cents. We are pleased to notice that the Boards of Trade of some of our cities will memoralize the Government with that object. It will afford the business community especially a great deal of satisfaction if the Government can see its way to make the reduction.

WE call the attention of the readers of the MECHANICAL AND MILLING NEWS to the re-appearance in these columns of the advertisement of the well-known firm of Galt manufacturers, Messrs Goldie & McCulloch. The reliability of this firm and its manufactures have resulted in the building up of one of the largest manufacturing establishments on this continent. Our readers are invited to note their various lines of manufactures, and correspond with them for particulars and prices.

THERE has been a lot of money spent throughout Canada during the past year in boring for natural gas In some instances gas has been found; in probably more instances it has not. So far as we know, natural gas is fulfilling no useful economical purpose within the bounds of the Dominion to-day. This suggests the enquiry whether it would not be as well to stop spending money in trying to find more gas until we have discovered a means of putting to use the gas we have already found.

THE *Empire*, of this city, in reply to the argument that the demand in Canada for iron and steel is not sufficient to warrant its manufacture here, points out the fact, which may have escaped the notice of many, that of late iron has been substituted for other materials for many purposes. Iron is taking the place of wood and stone in bridges, and to a very considerable extent also is being used in building construction. Thus the demand is extending, and we believe the time has fully arrived when the iron used in this country should be manufactured here from native ore.

THE putting in force of the regulation prohibiting mill owners from depositing sawdust in the rivers and streams of Nova Scotia, caused most of the mills to cease operations, and struck a heavy blow at the largest manufacturing interest in the province. In 1887 the value of exports from Nova Scotia of products of the forests amounted to upwards of a million and a half of dollars. While the fishing industry is the one of most importance in Nova Scotia, it is claimed that the rivers and streams contribute but little to its value, and therefore that the balance of interest in the matter under consideration lies on the side of the mill-owners. We have every reason to believe that this is the case. Further than this, the important fact should not be lost sight of that a large number of men, dependent upon the mills for employment, are being deprived of the means of livelihood. It is generally believed that sawdust in streams is destructive of fish, and it is no doubt desirable that if possible the fish should be preserved. If it is found, however, that the effect of keeping sawdust out of the streams, must be the shutting down of the mills, and the destruction of an industry more valuable to the province than the one which it is designed to protect, then the common sense course would seem to be to remove the restrictions and let the fish take their chance.

IT will be a source of great gratification to every person interested in the welfare of our artisan classes and in the progress and prosperity of the Dominion as a manufacturing country, to observe the interest which is at present being manifested in the subject of technical education. The representative meeting of manufacturers, educationists and mechanics, which assembled to discuss the question with the Minister of Education on Dec 19th, shows clearly that the importance of providing means for placing Canadian mechanics on an equal footing, in the matter of special education, with those of Europe and the United States, is impressing itself upon the public mind.

The opinions expressed by manufacturers at the meeting referred to, tended to show that many mechanics of the present day would be much more valuable, in the sense that they would be able to perform their work more expeditiously and more accurately, if they had had the benefit of a training in mechanical theory. As we understand it, this is to be the main object of the system of technical instruction which it is proposed to establish in connection with the School of Practical Science in this city. No attempt will be made (as our friends of the Toronto Trades and Labor Council seem to fear) to turn out practical mechanics, but students will be given a course of instruction that will form an excellent foundation upon which to build the superstructure of future mechanical attainments. A youth so trained will enter the workshop with the theoretical knowledge which will enable him to bring an active intelligent mind to bear upon his duties, and to understand at the outset of his career the why and wherefore of many things which the mechanic without such preparatory training has to "pick-up" in the course of many years experience.

We regret very much that the labor unions thus far have shown no disposition to favor the movement, which is decidedly in their interests and that of their children. The only individuals who could by any possibility be injured by such a system of education, would be the professional labor agitator and the botch mechanic; neither of whom should be allowed to stand in the way of the intelligent and ambitious young mechanic. The best method of estimating what the results of a system of technical instruction are likely to be, is to acquaint ourselves with the measure of success which has attended simular efforts in other countries. In order that our readers may be enabled to do this, we publish in another part of this paper an illustrated description of the New York Trade Schools, which, though dealing more with the practical side of mechanical instruction than it is proposed to do here, will serve to show some of the advantages of the system. We trust that the Minister of Education will have the hearty co-operation of all persons interested, in carrying into effect his scheme, and that when the Legislature meets, the necessary funds for that purpose will be cheerfully voted.

THE FLOUR DUTY.

BEFORE the Government takes any action on the grinding in bond question, it should undertake to consider and deal with the more important matter of increasing the present import duty on flour. The grinding in bond privilege affects a comparatively small number of the mills; the lack of protection against United States flour manufacturers is a severe burden which is crushing the life out of the milling industry of Canada. The mills of the United States have become so numerous and their capacity so large, that the owners are at their wits' end to know how to dispose of their product. Many thousands of barrels of it they have shipped into Canada, where it has been sold if not at a loss, for a price not more than sufficient to pay the cost of manufacture, and the charges for freight and duty. The owners prefer to sacrifice their profits rather than to carry large stocks of flour, and be deprived of the use of the money which it cost them to manufacture it.

The Canadian market has been so glutted with this flour, that a considerable quantity of it remains in the country unsold at the present time. In the city of Montreal, for example, there is at present held in warehouse 96,843 barrels of flour, about 48,500 barrels of which is American. Had American imports been kept out, the 50,000 barrels of Canadian flour at present waiting a market in Montreal, would have been sold, its value would have gone into the pockets of Canadian millers, and manufacturing operations would thereby have received an impetus.

The following table shows the quantity of American flour imported into this country for the fiscal year ending 30th June, 1887:

ARTICLES AND COUNTRIES WHENCE IMPORTED.	PROVINCES INTO WHICH IMPORTED.	QUANTITY IMPORTED.	VALUE.	ENTERED FOR HOME CONSUMPTION.		
				QUANTITY.	VALUE	DUTY.
		Brls.	$	Brls.	$	$ cts.
Wheat Flour— United States	Ontario	14,718	58,571	14,718	58,571	7,359.21
	Quebec	102,044	379,019	97,817	361,935	48,908.50
	Nova Scotia	10,689	37,466	10,429	37,066	5,214.75
	New Brunswick	5,852	26,647	5,727	26,110	2,862.38
	Manitoba	973	3,900	973	3,900	487.00
	British Columbia	38,170	141,967	38,058	141,432	19,029.42
	P. E. Island	402	1,598	402	1,598	201.13
		172,848	649,168	168,124	630,592	84,062.39

We regret that the figures for the present year are not yet to hand, as we have reason to believe they would show the importations to have been largely in excess of 1887. The figures in the above table are sufficient, however, to show that the Canadian miller is to a large extent deprived of his home market owing to the lack of restrictions to prevent American millers from making this a slaughter market for their surplus production. The above table shows that in one year $649,166, less

$84,062.39 paid as duty, went out of Canada into the pockets of American millers. If this large sum of money had been distributed amongst Canadian millers, as it should have been, every miller in Canada would have had added to his income upwards of $330.

After what has been said about the overstocked condition of the American flour market, it will be readily understood that no chance exists for the Canadian miller to sell any flour there, but if a chance did exist, the American tariff steps in and effectually shuts him out. Under these circumstances, why should we deal more generously with the American flour manufacturers than with American manufacturers in other lines? On the other hand, are not our flour manufacturers justly entitled under the National Policy, to the same measure of protection as is afforded to manufacturers in other lines of industry? There can be no two answers to this question. We believe in the policy of protection to home industries. We believe that the beneficial effects of such a policy are abundantly visible throughout Canada. What we do not believe, is in leaving one industry—and that one of the most important in the country—outside the protecting wall, and exposed to unfair foreign competition.

There is another and very important reason why the duty on flour should be increased. The Canadian Pacific Railway, although constructed largely at the expense of the people of Canada, is just now engaged in discriminating against Canadian millers and grain dealers in favor of the millers of Minneapolis and the Northwestern States. Millers in Eastern Canada who get a large part of their grain supply from Manitoba are being charged nearly double the rates paid by Minneapolis millers on shipments of flour to Quebec. In fact, so far as we can learn, what little protection the present tariff does afford the Canadian miller, is offset by the discriminating freight rates given to the American millers by a so-called Canadian railroad.

We believe if the Government will give Canadian millers the protection to which they are entitled, the competition amongst them will be found to be sufficiently keen to keep prices at a fair value, which is all that the consumer should expect or demand. We cannot believe that the majority of consumers would desire to see one of our most important industries crushed out, in order that they might buy flour below its value.

We are pleased to see some of the millers speak out on this subject. We will gladly give space to the opinions of any who may feel disposed to write. The time has come when this injustice to Canadian millers must be removed, and we are not without hope that the forthcoming session of Parliament will see justice done in the matter. Messrs. Douglas Bros Toronto, have been appointed agents for the machine for the Dominion of Canada.

THE recent action of the Dominion Government in increasing the export duty on saw logs is being criticised and discussed from every point of view. The latest contribution on the subject comes from Hon. William Macdougall, who, as a constitutional authority, gives it as his opinion that section 124 of the British North America Act, expressly forbids the levying of an export duty on timber grown in any of the provinces of the Dominion except New Brunswick, in the case of which the right is conferred as a special privilege. We have yet to hear from the other great constitutional authorities on the subject. In the meantime our American friends may safely count on having to pay the export duty.

HINTS TO YOUNG MILLERS.

I REMEMBER once hearing the remark quoted of a sucessful tradesman who had raised himself from the lowest position as shop and errand-boy, through all the various stages, to be master of a flourishing business, says a writer in the London *Miller*, that in passing through the workshop he saw only one man amongst those in his employ, who exhibited any special fitness or apparent ability to follow in his the master's, successful footsteps. Whether that particular man did succeed above his fellows or fulfil his master's anticipations I know not; but I do know that I myself have often looked in vain amongst those working around me for evidence of any special ability or fitness to rise above their present level.

We are fond of quoting the saying that "the child is father to the man," especially when the child is extra precocious, or exhibits any uncommon mental development. But how often does manhood belie the promises and anticipations of childhood! As a matter of fact, childhood is too early and unsafe a period to form any reliable opinion of what the future may be. Even the boy at school gives no real indication of his talents as a workman or business man, and he, too, may belie his promises. It is only when that same boy, be he bright or dull, gets fairly to work that we can form any just estimate of his manhood or future career. This is more especially the case in a trade like modern milling, which depends so much on the mental faculties, for in this, if in any trade, the physical and mechanical play a secondary part. My desire in writing this and what follows is to assist and encourage those who have adopted milling as a trade. My wish is to point out to them, as far as possible, the true road to success the highway upon which they must travel if they have any wish or intention to succeed in their calling.

First, I would say to every young man who has just started out to learn milling or any other trade, Aim for the top.

> "If I was a cobbler, I would make it my pride
> The best of all cobblers to be;
> If I was a tinker, no tinker beside
> Should mend an old kettle like me."

Herein lies the secret of success—a success which is open to all, but which can be attained only through determination and perseverance. It is said that "everything comes to him who waits." Do not wait for success: it will never come to you; press forward, and you will then certainly overtake it. I say, Aim high. Remember that as workmen there are various grades and positions, the best of which are usually given to those best qualified to fill them, and that the reward is according to the position. Remember, too, and mark well, that there are prizes, and that these prizes are open to you. By prizes I mean the highest positions as foremen or managers of large concerns, which are rewarded with good salaries. These positions must be filled by someone, and that someone may be any one who will take the pains to qualify himself. In France it is said that every common soldier carries within his knapsack the field-marshal's baton. Even so may we say that every young English miller has the chance of obtaining the highest position in his trade. Let every young man set before himself the highest ideal, and strive to attain it. I may say that even now, when the labor market seems overstocked, real ability and special fitness will not go long unrewarded. Unfortunately, there are many men occupying good positions who are in no way fitted for them; they have only their tongues to recommend them.

A proper degree of ambition is absolutely necessary for success in life. The youth or man who has no ambition, and is content to be a mere laborer—a hewer of wood and drawer of water—never gets beyond that position, except by accident. The true key to success is a constant pressing forward, an unsatisfied feeling with present attainments, a strong, unchanging desire to excel. I once heard a master miller facetiously remark that he never knew an operative miller who had not just got a rise in wages, expected one, or was about to ask for one. Considering that a man's labor and skill are his only marketable commodity, there is nothing very surprising in his desire to sell it for the best value and at the least risk to himself. A desire to improve himself is, I think, one of the best evidences of a man's ability and intelligence, and is one which should certainly not go unrecognized.

Having set before himself the highest ideal, the young miller should always bear in mind that to attain it he must fit and prepare himself for it; and that without proper fitness his success cannot be real and permanent. A youth or man may get along very well amongst his friends, or while he is bolstered by someone always ready to take his part; but let him take his place in the world's competition, where he has to stand upon his own feet, and he will soon find out his failing, and possibly lose some of his conceit too. He will quickly discover that to hold his own in an equal position to others he must be equal to them; but to reach and maintain a higher position he must possess abilities and qualities of a higher order. This is obvious; for a man who is to fill a responsible position, and to direct others, must know more than they know, so that in times of difficulty he can act with promptness and without hesitation. A man who accepts a position without proper knowledge or fitness is often bitterly humiliated through having to follow instead of lead those under him. This will, I hope, make clear the necessity for special fitness, a quality which is not inherited, and is to be obtained only by constant application and keen attention. "Whatever thy hand findeth to do, do it with thy might," is especially applicable to those who have set out to learn the intricacies and difficulties of modern milling. A little knowledge is a useless thing in roller milling. Better to know nothing about it than to know it imperfectly. And this brings me to a matter of great importance. *There are very few men who thoroughly understand roller milling.* If asked to make a rough plan or diagram, from memory, of the mill they are working, not one in fifty average millers could do it. Nay, I will say more. Not one qualified (?) rollerman in fifty could make a correct diagram of an ordinary sized mill, in which they have worked for twelve months. I repeat there are very few men who know the mill and process thoroughly, and are able to comprehend and give reasons for the particular arrangement of machinery in gradual reduction milling. I wonder how many foremen really know? The rollerman knows his machines, whence the material comes and whither it goes. In like manner the purifierman knows his part, and no more; and so with other machine minders. There are very few men, indeed, who are quick enough to detect a difference in quantity or quality of material coming to a particular machine a difference which may, and frequently does, arise from a broken silk, or other cause, in some remote part of the system. I will not go so far as to say there are few men who properly understand grinding with smooth rolls, but will content myself with the assertion that the great majority are content to set their smooth rolls as close as possible, so as to squeeze instead of grinding; thereby not so much injuring the flour, however, as some imagine, but wasting power and causing unnecessary heat. I wonder what some of those men would say if you asked them to set a pair of stones as close as possible! And yet one seems almost as justifiable as the other.

It is astonishing how satisfied most operatives seem with their attainments. They seem perfectly happy if the machines continue to work without giving them trouble. If the stock continues to flow into and out of the various machines they are quite content (of course any great or serious disturbance can hardly be expected to escape the notice of the most obtuse: it is of the little thing I am now speaking more particularly.) Now let me impress upon all young millers that merely watching machines is not milling, and when the conduct is as above, the man merely becomes a machine himself, and is of less service than some of those machines he is appointed to watch and manage. No, no! This is not milling. What constitutes the true artist in the trade is a proper conception of the art as a whole, and the perception of the minute changes and variations in the material, and consequently in results arising from causes remote and unseen in his department. A man to be of real service should have an affection for his machines. He should seek to make himself thoroughly acquainted with all the details, and should pay particular attention to those parts wheron most depends. The machines are of secondary importance. What should engross the attention of every miller, especially the young aspirant, is the proper treatment of the material going into them. He should know the nature and the quality of the stock going into and out of every machine on his floor. Should know whence it comes and whither it goes, so as to treat it intelligently. And to know it more thoroughly he should be constantly handling and examining it. He should be able to detect the slightest alteration or variation in material, and should know the exact spot where the mischief proceeds from, which will probably be in a totally different part of the mill. This will be obvious on the slightest reflection, for, say a man is tending smooth rolls, unless he knows the quality of material he has on a particular roll, and the part it plays in the system, he cannot treat it correctly. Of course if he goes on the principle of "*squashing*" to the utmost on every roll he will get it into flour somehow and somewhere, but not as he should. Learn to do everything correctly. There is one right way, but a great many wrong ones. While on this subject of rolls I will just say that in setting a roll, make it a rule to look first at the stuff which is going in. More than this, make it a practice of placing the ground and unground material side by side; you will thus know not only exactly how to adjust your roll to your material, but will also see how much you have done to it. This may be better appreciated and understood when I say that supposing on one roll you have semolina and on another dunst, if you attempt to grind one as close as the other you will certainly have trouble; and this you might attempt to do if you did not adopt the simple precaution of comparing the ground and unground material of each machine. No doubt I shall be told that men are not such fools as to attempt to grind semolina as they would dunst. But I say they are so foolish, and many men who consider themselves clever millers are so foolish. They do this, too, regardless of slipping belts and other ominous indications. Now, my young friends, take this as a warning, and what is here pointed out as the faults of others try by all possible means to avoid yourselves. It may not be generally known or admitted, but it is a fact that there is considerably more skill required in adjusting smooth rolls than grooved.

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Operations on the Saguenay will be unusually active this winter.

Mr Jas A. Chester has just completed the erection of a new saw mill at Brandon, Man.

The Worcester planing mill has been purchased by Messrs. Smith & Malcolm, of Brussels, Ont.

McLaughlin Bros., of Arnprior, Ont., are about to erect extensive saw mills at Papineauville, P. Q.

The saw mill in the New Sweden Colony, north of Minnedosa, Man., was burned to the ground recently.

P McConnell has been appointed local Crown timber inspector for the Turtle Mountain district of Manitoba.

Mr. G. B. Pattee, the well known lumberman, will be asked to become a candidate for the Ottawa mayoralty.

The lumber dockage accomodation at Midland, Ont., will be increased by the extension of the esplanade 1,200 feet.

Messrs. Hay Bros., of Listowel, Ont., have sold the machinery of their saw mill at Henfryn, Ont., to a party in Muskoka, for $1 300.

The Keewatin lumber companies have raised the price of lumber, and all the Lake Winnipeg cut has been purchased by one dealer

It is said that the lumbermen of the Ottawa valley use 20,000 barrels of pork per annum, the most of which is imported from Chicago.

Messrs. Graham, Horne & Co.'s shingle mill at Port Arthur, has closed down for the season. The total cut is a little over 3 000 000 shingles.

The Sabaskong Mining and Lumber Company has been chartered by the Dominion Government to develop the mining and lumbering industries of the Rat Portage district.

The Halifax, N. S., *Chronicle*, estimates the output of E. D. Bunson & Sons' mill on the La Have River, for the past year, at 10,500 000 feet, and 500,000 feet cut in Queen's county.

An effort is being made to secure the operation next season of the saw mill at Birtle, Man. This mill has been idle for some years, though logs are taken through Birtle to the Assiniboine river.

Mr H P. Blair will take out about 300,000 logs at St. Etienne. Several of the Quebec mill men have disposed of their cut of deals for the coming season.

Hon. Mr. Mowat has accepted a retainer from the Ontario Lumbermen's Association and will seek to obtain redress through the courts for the alleged unfair treatment accorded to the lumbermen by the Grand Trunk Railway Co.

Messrs McCormick & Son, of Sudbury, have sold nearly the whole of their season's cut to the Canada Copper Company. They are about to move their saw mill on to their limits, in order to have easy access to the large tracts of white pine they hold in that district.

Marshall's shingle mill at Wahnapago, operated by Brady & Hartley was destroyed by fire, a few days ago. The plant was new. Brady and Hartley's loss amounts to about $800. The owner's loss will be heavy. Unfortunately there was no insurance on building or plant.

Donald McMaster, of Alexandria, Ont., recently purchased 14 square miles of timber limits, Ballantyne, at $2,750, an increase of $300 per mile over the highest bid for the same limit a year ago.

The Minister of Customs has been waited upon by a deputation of lumbermen, urging that the duty on barrel pork be not increased as recently requested by a deputation from the Pork Packer's Association.

The following is the estimate of the cut of white pine by the Ottawa mills during the past season: Bronson & Weston, 60,000,000 feet, Perley & Pattee, 50,000,000; J. R. Booth, 65,000,000; Peter & Co., 45,000,000; Jas. McLaren, 35,000,000; Gilmour & Co. 40,000,000; W. C. Edwards & Co., 50,000,000; W. & J. Conroy 30,000,000; R. Hurdman & Co., 40,000,000; E. B. Eddy & Co., 45,000,000. Total, 480,000,000.

Dowell Beckett & Co., Ottawa, have bought the Montmorency cut amounting to about 500,000 standard; the cut of spruce now at Hall's Becancour mills, and Baptiste's Calimut cut. R. N. Cox of Liverpool, has purchased Perley & Pattee's cut. The product of Baptiste's Three Rivers mills has been sold to John Burstall & Co., and J. S. Murphy & Co. have purchased from Price Bro & Co. their pine deals now at Hadlow Cove.

Mr Robertson, the builder of the famous Joggins raft, is said to be organizing a syndicate in Boston, to engage in transporting logs by that method. He expressed the belief that a company would very soon be organized and the industry be put into operation Such an industry, he thought, must prove of value to the community, inasmuch as the lowering of freight, although possibly of some injury to the carrying trade, is a benefit to the producer and consumer.

The Department of Crown Lands of Ontario, since the verdict of the Privy Council in favor of the claims of the Province to the timber in the disputed territory, has ordered the cessation of all lumbering operations in the said district during the present winter. As several large lumbering firms had bought plant, engaged men, and made every arrangement to cut a large amount of timber the present winter, this order if carried out, will result in great loss to the lumbermen and also to the business community of Rat Portage who have arranged to provide the supplies for the camps. It will also mean the shutting down next summer of two large mills, which if operated, would distribute in wages alone about $10,000 per month. The Crown Lands department has been petitioned not to put the order in force during the present season.

The *Monetary Times* commends to the sawmill owners who are wrestling with the sawdust problem the action of Maine millmen, who ship large quantities of that material for use instead of sand in mortar, as well as for the making of moulding and cornice work. If some enterprising Canadian would enter into the business of the economic disposition of the sawdust that accumulates around the mills of that province he would reap a fortune as well as insure the blessing of all concerned in the fisheries.

WATER POWER AND WATER WHEELS.

By Wm. B. Ferguson, Toronto.

To say that all the water powers and privileges in Canada are being utilized to their utmost, or even to one-fourth of their utmost, would be saying what is not true. There are more water powers unused in the Dominion of Canada—and good permanent powers, too—than there are in use of both steam and water together. A great many of the privileges now used are to a great extent "murdered," by which I mean that the wheel does not give the amount of power which a great many persons expect to get from it under a given head. The reason is, that the power of the water is destroyed either in the head race or in the tail race. Fully six-tenths of the water powers at present in use, are to a great extent destroyed either from one of these causes or the other. Then the water wheel is blamed for not giving the amount of power rated, or percentage of water used. In all my varied experience with water powers and wheels, I have usually found on making an examination in cases where people have complained to me that the wheel did not give the power rated on the manufacturer's tables, that the fault was their's and not the wheel's. They either had the head race, or the tail race, too small, or had too large a wheel for the amount of water in the stream.

The importance of having a large canal to bring the water to the wheel cannot be overestimated. Especially is this the case when the mill is crowded or using some special exertion when the full gate is used. Have it so that the wheel will not have to suck or draw its water—the water should be perfectly still in the floom, and not run in a heavy current as I have seen it do sometimes. In such cases, half the active power of both wheel and water is lost. The first thing to be observed when one is about to utilize or improve a water privilege, is to ascertain the amount of water in the stream, if it is a small one. If a river or large stream it is not necessary, but it is always necessary to ascertain the actual head, and to know the horse power you want or that can be obtained from the stream; how many cubic feet of water per minute will be required to produce the required horse power under the present head of water in the stream; and that there is a sufficient head race to the water full up to the required head without any perceptible motion in the water. Then, if the wheels are set perfectly true, as they should always be, the next important point is the wheel pit. (In speaking of water wheels I have reference to the turbine water wheel, the most approved in use at present—of which there are several manufacturers in Canada.)

The wheel pit and tail race, deserves particular attention. As a rule, I find wheel pits and tail races too much contracted. The wheel pit should be from 3 to 8 feet deep below the wheel, and from 1 foot to 2 ft. 6 in. below bed of tail race, large and roomy, and lined with plank properly secured. I know that I differ from a number of others on this point, but I speak from experience, having set and reset some 123 wheels, and I find this to be the best method. The water should stand when still about one-third of the way up the cylinder of the wheel, and the water in tail race should be on a level. The tail race should be about one-eighth larger than the head race, so as to allow of a free exit. Once it is used, let it get out of the way as readily as possible, yet not too fast, not more rapidly than 1 foot per second, but have the way large and free. It should not be so that when the water is turned on the wheel it will rise in the tail race and spread over a large area of ground, but should be in such a position as that when water is let into the wheel pit through the wheel, it will flow out of the other end of the tail race and show little or no rise of water in the tail race. I know it is very difficult to get a sufficiently large tail race, persons not caring to go to the expense, but there is no denying the fact, that they lose about one-fourth of the actual power of the wheel by having the tail race contracted so that the water rises up into the wheel when in motion. I am very often asked by letter and personally, how many horse power can be got under a given head, without being told the current of water in the stream, which is a very important matter. I certainly would advise any person or company, about to use or improve a water privilege, to secure the services of a practical hydraulic power engineer to level, lay out and rate the whole of the motive power, draw a plan of the work, and see that it is carried out according to plan. It is the best invested money about the whole job. At some future time I will give some examples in wheel setting, and also offer some remarks on the history of the water wheel.

A NEW BRAN PACKING PROCESS.

Of the various assortments of offals produced during the process of milling wheat, says the *Northwestern Miller*, the most important is undoubtedly the bran, since it forms on the average at least fifteen per cent. of the total weight of the grain. In addition to this, the fact of the bran possessing a high market value enables it to exercise a very great influence upon the success or otherwise of every milling business.

While both grain and flour constitute large and increasing articles of commerce, bran, from an international point of view, is practically excluded, owing to the difficulty and heavy cost of transporting it to any great distance, consequent upon its large bulk as compared with its weight, when packed in the ordinary manner.

In many foreign countries the profitable disposal of bran is impossible, and a natural result of this is that the producers are heavily handicapped in their business.

This state of things would be entirely reversed were the bran, in place of being as heretofore loosely packed in sacks, etc., capable of being exported in the form of hard and dry cakes and thereby bring its bulk and weight into so close a ratio that the carriage of the material to long distances could be effected at a reasonable cost.

For years past endeavors have been made to form bran into cakes, but these have hitherto proved all more or less unsuccessful, and it has been reserved for Finkle Lesshafft process to demonstrate the fact of its being possible to press bran and similar products into cakes of a hard and durable nature by the judicious application of heat and superheated steam to the material, before commencing the process of pressing.

Bran and similar materials possess within themselves the necessary properties for securing the required adhesion of the various particles when acted upon by warmth and moisture in a suitable manner, and it is upon this fact that this process has its foundation.

Nagel & Kaemp, of Hamburg, have devised a machine which embodies the Finke-Lesshafft process, and which is claimed to produce a constant stream of compact and durable bran cakes in a simple and expeditious manner. Its mode of action may be explained as follows:

A crank sets in motion one or more stamps or plungers, and each time the stamp is drawn towards the crank a measured quantity of the material (bran, etc.,) falls into a pressing cylinder. Upon the advance of the stamp this material is forced into a long and suitably formed mould, and from this the finished cakes are discharged somewhat after the manner of moist bricks.

The crank works within a link to which the stamps or plungers are attached, and the whole is driven by a belt, pulley and geared wheels. The material to be pressed enters into the separating chamber, and is thence discharged into the heating and steaming apparatus. This apparatus is furnished with a steam jacket and contains a series of plates placed one over the other in such a manner that the material falling upon them is minutely subdivided, and in this condition is subjected to the heating and steaming process already referred to, before passing into the pressing cylinder. The stamp or plunger carries the material through the pressing cylinder into the mould, from which the furnished cakes are discharged in a fit condition for storage either in single cakes or in layers.

The pressing cylinder is constructed with a view to the removal, during the pressing process, of any superfluous air or moisture which may be in the material, and the mould can be adjusted to give any required degree of compactness to the cakes.

The cakes formed by Nagel & Kaemp's bran press, average in bulk only one-fifth or one-sixth that of a similar weight of wheat bran when packed in the ordinary manner and in the case of bran from rye, the bulk is reduced one half. The capacity of the bran press is equal to about 1,200 lbs'. weight of bran per hour, and the machine can be driven by from 6 to 7 h.p.

Cakes formed by this process weigh upon the average one ton per cubic meter. They are eaten by horses in a dry state, while for other animals they are broken up. Prolonged tests have demonstrated the fact that the cakes are quite as nutritious as loose bran, and the advantage in the matter of storage and transportation will be evident to every one identified with the trade. Wm. de la Barre, the well known engineer of Minneapolis, has a supply of samples, and will be glad to furnish them to parties taking any interest in the matter.

FIRING WITH SAWDUST.

I SEE that one of your correspondents wants to know something about firing with sawdust. I will explain how I fired a saw mill boiler. I fired and run the engine for three years. The engine was 16x24, cutting off at ⅞ stroke, and the boiler was 5x18 feet, with 58 four-inch flues, engine running 100 revolutions per minute. There were two band saws, edger, trimmer and other machinery. At first I had considerable trouble with the firing, and tried everything I could think of without success, until I hit upon the method which I will now describe.

I got from a mill near by two wheelbarrowfuls of hard cinders, about the size of a hen's egg, and spread them upon the grate, putting most of them upon the sides, and in the corners, and just enough to cover the grates in the middle. I then put sawdust on about five or six inches thick evenly. I then gave the night watchman instructions how to arrange the furnace in the morning before starting the fire. I told him to scrape the cinders back and forth until the fine stuff had all fallen through, and then to put in cinders enough to keep up the same amount. After that I had no more trouble in keeping up steam, and most of the time I had to keep the bottom doors nearly closed, or the steam would be blowing off. This may seem strange to some before trying, but I found it to be the most economical way of firing a sawdust boiler. I forgot to say that five minutes before dinner I would fill up the furnace pretty well with sawdust, and shut all the doors of the furnace, and the damper about one-quarter, and open about five minutes before starting. H. B. in *Power*.

HEAT AND PRECAUTION AGAINST FIRE.

THE season is at hand, says C. R. Tompkins, in the *Woodworker*, when it will become necessary for the proprietors of mills and manufactories who consult their own interest and the comfort of their workmen to provide some plan for heating their establishments during the winter. It is not only the comfort of their workmen which the proprietors should consult, as an inducement to keep their shops and mills comfortably warm, but the liability of machinery to be broken when running in cold weather when every part of it is filled with frost, is another important item to be taken into consideration.

Unpleasant as it is for the workmen in a planing mill to commence work in the morning with the thermometer perhaps ten degrees below zero, when they are obliged to perform their work with a heavy overcoat on and with their hands encumbered with a pair of thick, clumsy mittens, it is still more unpleasant to the man and more unprofitable to the proprietor to be obliged to start up a machine covered with frost, with the liability of some of the bolts breaking and knives flying off in consequence, or the cogs in the gearing dropping out within an hour after starting. Under such conditions it is no wonder the men feel like anything else but working, and proprietors complain that there is no profit in running in cold weather no matter how pressing their business may be at the time. The rickety old stove which is found in many mills stuffed full of shavings, may in a manner contribute to the comfort of the men, but it is such a dangerous element on account of its liability to set fire to the mill, that its presence should never be tolerated.

Few proprietors seem to be aware of the fact that the intense heat generated by the fires under their boilers, and which if properly utilized would be sufficient to heat two such buildings, is nearly all wasted by being blown off into the air through the exhaust pipe. Now with comparatively a small expense that heat may be utilized by carrying it around the mill, either overhead or under the floor, enclosed in boxes so as to be entirely out of the way, yet utilized for the purpose of heating without any danger from fire.

The frequent fires which occur at this season of the year should admonish all mill owners of the necessity of providing all the necessary precautions and safeguards against this destructive element. While stoves may be one fruitful cause of fire, there are other dangerous elements found in every mill that should be guarded against. The fine dust which collects upon everything, especially in the upper part of the building, is one that is liable at any time to become ignited whenever a favorable opportunity may present itself. If the fine dust from flour which collects in a flour mill is sufficient to cause an explosion almost equal to gun-powder, how much more dangerous must the dust of a planing mill be when we consider that it is almost entirely composed of fine particles of pitch, which is thrown off from pine lumber while being planed, and is of itself a much more combustible substance than flour would be under the same conditions. Therefore the quantity of dust found in almost every part of the mills should never be permitted to accumulate, but should be frequently swept down.

It is true that the dust in a planing mill or flour mill is not liable to take fire unless brought in contact with a lighted lamp or a fire of some kind, yet there are other elements to be found in every planing mill, sash and door factory, and every other place where wood-working machinery is used, that only need favorable conditions to set fire to the mill by spontaneous combustion. There is no doubt but this is a fruitful source of many of the mysterious fires which occur in many of the mills and factories of this kind. Any fine, fibrous substance, when saturated with oil or grease, is known to be liable to become ignited spontaneously under certain conditions, and quantities of just such matter may be found around and attached to every machine in the form of fine dust well saturated with oil by the drippings from the several boxes

Unless these accumulations are frequently removed and the machines kept clean and free from them, a fire may occur when it is least expected and at times perhaps when there has been no fire in the building for several days. Such fires are usually set down as incendiary, but there is a strong probability that the majority of those mysterious fires, which are attributed to incendiarism, are the result of spontaneous combustion.

CHIMNEYS FOR BOILER PLANTS.

THE 335 foot chimney of the Clark Thread Company, at Newark, N. J., which, of late has been very widely noticed, being probably the tallest boiler chimney in the world, calls to mind the fact that a large number of chimneys now in existence are of much larger height than the requirements actually call for. There seems to be a prevailing notion that the greater the height, the greater in direct proportion, the draught-producing power of a chimney a most natural error perhaps on the part of the average power men, but, at the same time, one which has been responsible for much unnecessary outlay in chimney construction. As a matter of fact the draught-producing capacities of chimneys, having flues of the same size, are in proportion to the square roots of their heights, so that if one was to have double the power of the other it would have to be four times as high. Attention has been more than once directed to the circumstance that beauty of design, from an architectural point of view, has had much to do with the unnecessarily great heights so frequently encountered, a much favored rule being to make the height of the chimney equal to about 25 times the diameter of the flue. A little consideration will show that by rigidly adhering to this ratio some rather peculiar results will be reached, chimneys for small plants turning out to be much lower, and those for larger boiler plants becoming much higher than is necessary. The area of cross section of the chimney flues in all cases should be made to depend upon the combined area of the boiler flues, and this, with a height of stack of 100 ft., shown by extended experience to be a very satisfactory figure, will furnish ample draught to burn any of the commonly used fuels. Applying the 25 to one ratio to two plants of, say two and ten boilers, respectively, all of the same size, and proportioning the flue areas of the chimneys in the way we have just indicated, will afford a very striking illustration of the shortcomings of the rule. One hundred and fifty feet represent what has on good authority been given as the maximum height of chimney necessary in any case for producing the requisite draught, always providing, however, that the flue area has been properly proportioned. Proprietors of steam plants boasting of chimneys which must exceed this figure in height may indulge in some profitable reflections as to the money needlessly spent in having such structures raised.

George Lane, a young man employed in Wm. Hill & Co.'s flour mills, at Sarnia, had his leg broken by falling into the wheel pit and coming in contact with the fly wheel, while helping the engineer to put on the pump belt. Had the engineer not had the presence of mind to promptly stop the engine the young man must have been killed.

The annual report of the Montreal Elevating Co., shows the volume of business of the past year to have been the smallest for many years. The break in the Cornwall Canal at the conclusion of the season had something to do with the unfavorable result. The board of directors re-elected are Messrs. Andrew Allan, president, Hugh McLennan, T. A. Crane, A. T. Patterson and Alexander McDougall, managing directors.

It has been rumored that Mr. David Moore, of Neepawa, will if requested make an offer to the adjoining municipalities to build a first-class roller process merchant flour mill here, of a capacity of 100 barrels per day, costing about $21,000. If the municipalities give a bonus of say $6,000 and the town of Neepawa exemption from taxation for twenty years, he will guarantee to the farmers a return of one barrel of flour for each six bushels of milling wheat, and sixty pounds of offal.—Neepawa *Register*.

USEFUL INFORMATION

The power of a windmill has been successfully applied to the generation of electricity for domestic purposes by Professor Blyth, of the Glasgow Philosophical Society.

Acids in lubricating oils may be detected by analysis in a laboratory, or by putting the same to be tested in a clear glass bottle with a copper wire running down through the cork, air tight, stand the whole in a sunny place for two or three weeks, and then, on removal, if verdigris or green rust appear on the copper, an acid is in the oil.

An ingenious means of repairing a break in a steam pipe consists in binding the break with wood strips, laid close together, and well served around with stout cord or rope, endwise separation being prevented by more rope crossing the break diagonally and tied so as to draw the broken parts together. On the wood and the cord getting wet with steam, the joints become even tighter than before, as the wood swells and the cords shorten.

A new process for the production of steel from low grade or Southern ores, is said to have been discovered by John W. Brookwatter, of Springfield, Ohio. It is worked in a pear shaped, perforated, vibrating converter, using a very gentle blast. The furnace is said to be nothing more than an ordinary foundry cupola.

The low blast and vibrations of converter are said to be the main points, and the steel produced is claimed to be as good as that produced from high blast Bessemer pig.

TO GLUE LEATHER TO IRON. To glue leather or linoleum to iron, the iron is painted with white lead and lamp-black. When this coat is dry it is covered with a cement made as follows: The best glue is put into cold water until it becomes soft, then dissolve in vinegar at a moderate heat and add of white turpentine oil about one-third, mix it thoroughly until of a proper consistency and apply the warm cement with a brush; the leather is then stretched and quickly pressed to the place.

Experiments have recently been made on Prussian railways with axle boxes fitted with bearings of vegetable parchment in place of brass. The parchment is strongly compressed before being used, and is thoroughly dried to prevent subsequent shrinkage. An emulsion of water and oil, any of the mineral oils, is used as lubricant. The parchment soon becomes impregnated with oil, and is able to go a long time without a renewal of lubrication. It is between the body of the journal and the thin edge of the parchment segments that friction takes place.

FORCE WASTED BY NATURE.—It has been estimated that an average of five feet of water falls annually over the whole earth. Supposing that condensation takes place at an average height of 3,000 feet, the force of evaporation to supply such rainfall must equal the lifting of 322,000,000,000 horse-power constantly exerted. Of the great energy a very small part is transferred to the waters that run back through rivers to the sea, and a still smaller fraction is utilized by man; the remainder is dissipated in space.

R. N. P. Richardson, of Pittsburgh, has invented a new process for coating iron or any metallic surface with lead. The following description is given of the process. The pure lead in pig form is first put into the melting pot and brought to a standing temperature of high degree. The various solutions and mixtures are then heated, tested and the machinery started. The sheets, after being pickled, are put into a washing vat, as is usual in cleaning the surface of iron in the tin plating process. Afterwards the sheets are immersed in pure water to prevent oxidation by contact with the atmosphere, until they are placed in the solution vat containing various chemicals in dilute hydrochloric acid. The sheets are then passed through the molten lead, and, after being passed through the first time, come out with a clean, bright, even and pure coating of lead.

At a recent meeting of the Canadian Society of Civil Engineers, at McGill College, F. N. Gisborne, F. R. S. C., of Ottawa, read an interesting paper upon the "Inception of Electrical Science and the Evolution of Telegraphy." He concluded his paper by stating that, in his opinion, the most successful and profitable telegraph companies of the future will abandon the present system of a multiplicity of wires for the transmission of intelligence, and at business centres and important stations will employ female labor for perforating and comparing with the original manuscript dispatches to be forwarded by automatic transmitters, an additional wire or two being operated by Morse sounders for the correction, when needed, of automatically transmitted messages, and also for the requirements of intermediate local business. Such additional wire or wires would be available for duplex, quadruplex or multiplex instruments.

PREVENTING CORROSION OF STEAM BOILERS BY ELECTRICITY.—The object is to prevent the formation of incrustation and remove it if already formed, and also to prevent pitting of internal surfaces. The terminal of an electric generator corresponding with the zinc plate of a battery is electrically connected in any convenient way and either directly or indirectly with the shell of the boiler, while the terminal corresponding with the carbon or iron of the battery is connected to the conductor, which latter is passed through the shell into the water space, but is electrically insulated from the shell. This method will, therefore, make the internal surfaces negative and the insulated conductor positive. It is stated to be a matter of fact, that if the current flows in a direction the reverse of the one above described local action on or corrosion of the inner surfaces of the shell will be increased, but if the electricity be properly applied corrosion does not take place. The inventor says, "as it is generally believed that any method of applying an electrical current to a boiler will not prevent incrustation, I wish it to be distinctly understood that experience with my invention proves that incrustation already formed will be removed by it and its readherence effectually prevented."

GENERAL CONDITIONS WHICH SECURE ECONOMY IN STEAM BOILERS.

WE condense from Mr. Barrus' report of 150 boiler tests the following: It appears that in general the highest results are produced when the temperature of the escaping gases is the least. A good examination of this question may be made by selecting those tests in which the temperature exceeds the average, that is, 375 degrees, and comparing with those in which the temperature is less than 375 degrees, taking first those boilers which are of the horizontal tubular type, anthracite coal being used. The average flue temperatures in the tables given are 444 degrees and 343 degrees, respectively, and the difference is 101 degrees. The average evaporations are 10.40 pounds and 11.10 pounds, respectively. From these tests it appears, therefore, that a reduction of 101 degrees in the temperature of the waste gases secured an increase in the evaporation of 6.7 per cent. This result corresponds quite closely to the effect of lowering the temperature of the gases by means of a flue heater, where a reduction of 107 degrees was attended by an increase of 7 per cent. in the evaporation per pound of coal. A table is given in which tests Cumberland coal was used. Here the average flue temperature was 415 degrees. Four of the boilers showed temperatures exceeding 415 degrees. The average of these was 450 degrees and the average evaporation 11.34 pounds. The remaining boilers had an average flue temperature of 383 degrees, and these gave an average evaporation of 11.75 pounds. With 67 degrees less temperature of the escaping gases the evaporation was higher by 4 per cent. The difference here is less marked than in the anthracite tests, both in range of temperature and in economy, but it is in the same direction; that is, the higher evaporation is produced where the waste at the flue is the least.

The wasteful effect of a high flue temperature is exhibited by other boilers than those of the horizontal tubular class. This source of waste was shown to be the main cause of the low economy produced in those vertical boilers which were deficient in heating surface. Examples of the same effect are numerous in the case of nearly every type of boiler. Two cast iron, sectional boilers tested, had flue temperatures of 575 degrees and 462 degrees respectively, and evaporated at the low rate of 9.79 pounds and 9.61 pounds of water. Six water-tube boilers were also tested, and were likewise wasteful on account of the high temperature of the escaping gases. The temperatures in these boilers ranged from 452 degrees and 540 degrees, and the evaporations between 9.68 pounds and 10.36 pounds for anthracite coal and between 10.79 pounds and 10.98 pounds for bituminous coal, all of which are low for the respective grades of coal. This is not to be found in the boiler itself but in the setting. Thus, a test of a Babcock & Wilcox boiler is given in which the evaporation was 13.01 pounds, the temperature of the escaping gases being 402 degrees. Other cases are given, all tending in the same direction, and with this accumulation of examples, no other conclusion can be drawn than that one of the vital principles underlying the attainment of economy in the generation of steam, is a low temperature of the escaping gases. What the temperature should be to secure the the best results, is to some extent uncertain. In the examples of horizontal tubular boilers cited, the best average results where anthracite coal is used are secured with an average temperature of 343 degrees, and when Cumberland coal is used where the average is 383 degrees. It will not be far out of the way if we consider 375 degrees as the proper limit for anthracite coal, and 415 degrees for Cumberland coal. These are named for the general case. Individual boilers may, in rare instances, give excellent economy where the waste temperature exceeds these figures, and there are two or three examples furnished in the paper where this is true. There are so many instances referred to where a boiler secures a low grade of economy with more than 375 degrees in the flue where anthracite coal is used, and more than 415 degrees when Cumberland coal is used, not only among boilers of the horizontal tubular type, but among those of all other types, that it seems reasonable to lay down these temperatures for a limit.

Let us consider now what other conditions are necessary to secure economy. It cannot be denied that the relation between the heating surface and grate surface is important, and the question arises as to what that relation should be to obtain the highest efficiency. A proper settlement of this question cannot be made on the basis of the data given by the tests, as an insufficient number of examples is furnished for a full examination. Much may be learned, however, from the few cases given. Keeping to the common horizontal boiler, we will select from the anthracite coal tests, the boilers in which the ratio is below 40 to 1, taking, however, only those cases where the temperature of the gases is low and the rate of combustion is above nine pounds per square foot of grate per hour.

This shows that with the ratio of heating to grate surface 36.4 to 1 the water evaporated per pound of combustible is 11.16 and with the ratio of heating to grate surface 48 to 1 the water evaporated is 11.05 pounds. There is a difference here of 11.6 in the ratio of heating to grate surface, and only a slight difference in the character of the results. Nothing seems to have been gained by increasing the surface above a ratio of 36.4 to 1, although this increase amounts to one-third. There is in reality a loss. Carrying the inquiry further we will take the tests of the so-called double-deck boilers, of which four instances are given. The average ratio is 65.3 to 1 and the average evaporation is 10.88 pounds. Here also a loss of even greater amount is produced, although the surface is increased to the enormous extent of 80 per cent. These comparisons are made with different kinds of anthracite coals of large sizes, and some allowance must be made for the possible effect which a variation of quality of fuel may have on the results. The evidence given shows that a ratio of 36 to 1 provides a sufficient heating surface to secure the full efficiency of anthracite coal where the rate of combustion is not more than 12 pounds per square foot of grate per hour. Bituminous coal evidently needs a larger ratio In two cases given an increase in the ratio from 36.8 to 42.8 secured a small improvement in the evaporation per pound of coal, and a high temperature of the escaping gases indicates that a still further increase would be beneficial. Among the high results produced on common horizontal tubular boilers using bituminous coal, the highest occurs in a boiler where the ratio is 53 to 1. This boiler gave an evaporation of 12.47 pounds. A double deck boiler using bituminous coal furnishes another example of high performance, an evaporation of 12.42 pounds having been obtained with a ratio of 65 to 1. The examples given, indicate that a much larger amount of heating surface is required for obtaining the full efficiency of bituminous coal than for boilers using anthracite coal. There is sufficient reason for this requirement in the fact that bituminous coal is of a gaseous nature, and the heat generated in its combustion is spread through a larger space. The temperature of the escaping gases in the same boiler is invariably higher when bituminous coal is used, than when anthracite coal is used, and this points to the same characteristic. In practice, the deposit of soot on the surfaces when bituminous coal is used interferes with the full efficiency of the surface, and an increased area is demanded as an offset to the loss which this deposit occasions.

It would seem, then, that if a ratio of 36 to 1 is sufficient for anthracite coal, from 45 to 50 should be provided when bituminous coal is burned, especially in cases like those referred to, when the rate of combustion is above 10 or 12 pounds per square foot of grate per hour.

The tests furnish some light upon the question as to the best manner of arranging the heating surface. This subject has special bearing upon the horizontal tubular type of boilers. In studying these boilers the question comes, what is the most efficient size of shell, and what number, length and diameter of tubes gives the highest result.

The size of shell does not appear to have much effect on the economy. The best result obtained with anthracite coal viz., 11.53 pounds of water from and at 212 degrees per pound of combustible, is a case where the diameter of the shell is 48 inches, and this result is all that can be expected or desired from any size of boiler.

The number of tubes control the ratio between the area of grate surface and area of tube opening. Boilers having a very large number of tubes consequently have a small ratio of grate to tube opening. In two cases given the ratio is 5.2 to 1, and these boilers also have the very large area of heating surface represented by ratios of 65 and 60 to 1. Notwithstanding the ample provision of surface and other favorable conditions, the evaporation with anthracite coal is no higher than boilers give which have surface of much less extent, though of such character that the tube opening bears a smaller proportion to the grate surface. The conclusion which is well warranted by this fact is, that a certain minimum amount of tube opening is required for efficient work. This conclusion is borne out by the results of a test of a boiler using anthracite coal, where the products make two circuits through the shell and the ratio of grate surface to tube opening is 11.60 to 1. The ratio of heating to grate surface in this boiler is 42 to 1, and the average evaporation is 11.6 pounds. The best results obtained with anthracite coal in the common horizontal tubular boiler are in cases where the ratio is larger than 9 to 1. From these facts the conclusion is drawn that the highest efficiency with anthracite coal is obtained when the tube opening is from one-ninth to one-tenth of the grate surface.

When bituminous coal is burned the requirements appear to be different. The effect of a large tube opening does not seem to make the extra tubes so inefficient when bituminous coal is used. The highest result on any boilers of the horizontal tubular class, fired with bituminous coal, is obtained when the tube opening is largest. In this boiler, which gives an evaporation of 12.47 pounds, the ratio of grate surface to tube opening is 5.4 to 1. Another high result is given in which the ratio was only 4.1 to 1 and the evaporation 12.01 pounds. These instances are sufficient to exhibit the need of a larger area of tube opening when bituminous coal is used than when anthracite is used, and this might be expected in view of the gaseous nature of the products of combustion. Without going to extremes, the ratio evidently most to be desired when bituminous coal is used is that which gives a tube opening having an area of from one-sixth to one-seventh of the grate surface.

As to the effect which size of tubes has upon economy, there is little direct information. Only one set of tests bears on the question, those made on two boilers, in one of which 140 3-inch tubes are used, and in the other 100 3½-inch. The boiler with the smaller tubes gave the best result, but the improved performance was evidently due to the increased heating surface, of which there was an addition of one-sixth, rather than to any difference in the diameter of the tubes. It may be inferred from the fact that bituminous coal requires a larger collective area of tubes for best results than anthracite coal, that it may also require a larger individual area, and therefore larger diameter of tubes. This inference is not borne out by a comparison of the tests on two boilers, one of which had 3-inch tubes and one 3½-inch, though the two boilers are of somewhat different type. A practical objection to the use of too small tubes must be kept in mind in those cases where a very smoky grade of bituminous coal is used, and frequent opportunity cannot be had to clean the tubes, so as to prevent a serious accumulation of soot.

The proper arrangement of tubes in the matter of length is settled when the relations of heating surface to grate and of grate to tube area are once fixed upon.

The best proportions of vertical tubular boilers are not established. There does not appear any reason why the relations of heating surface to grate and of grate to tube area, found desirable in the horizontal boiler, should not apply with equal force to the vertical boiler.

This discussion of the general conditions which secure economy applies to medium rate of combustion of say 10 to 12 pounds per square foot of grate per hour, such as will secure the rated capacity of the boiler when the power is based on 12 square feet of water heating surface per horse power.—Boston *Journal of Commerce.*

New machinery is being put into the Pheonix Foundry, Beaverton, Ont.

Incorporation is wanted by the Manufacturers' Bank, with headquarters in Toronto.

Messrs. Day Bros., founders, of St. Johns, P. Q., are building an addition to their factory.

Free power and other inducements are offered to the person who will establish a foundry at Thornbury, Ont.

A lubricating oil factory is to be started at Stellarton, N. S. All the stock required has been subscribed for.

Steam and other improvements are being added to Mr. Parkin's Galt File Works, with the view of increasing their capacity.

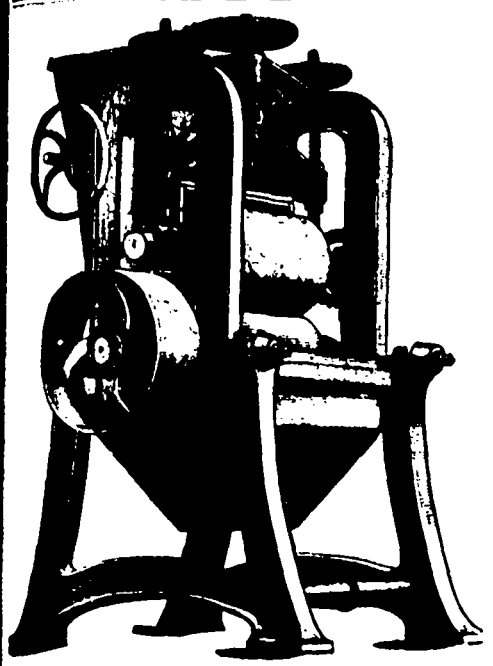
Pending the erection of their new shops, the Osborne Killey Mfg. Co., of Hamilton, are occupying temporarily the Victor Engine Works, in that city.

The town of Trenton has passed a by-law pledging itself to pay $28,000 towards the cost of the fine water privilege constructed recently by Messrs. Gilmour & Co.

We are pleased to learn from our Western exchanges that Mr. Knechter, of the Machine Screw Works, St. Thomas, Ont., is likely to recover from his recent mental affliction.

A by-law has been carried in Owen Sound, granting $15,000 as a bonus to the Polson Iron Works Company for purchasing, enlarging and carrying on a dry dock in the Sound, and other works to be undertaken by them.

A new electric company with a capital stock of $150,000 in 1,500 shares of $100 each, is being formed at St. John, N. B., for the manufacture of electric lighting plant, and the producing and distributing of electric currents for lighting. The directors are Jeremiah Calkin, Geo. F. Calkin, Geo. F. Baird, J. H. Grant, F. S. Pearson, and W. K. Kendall, N. C. Buck, of Boston, and B. F. Pearson, of Halifax.



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After several years experimenting on the best mill for custom milling, we have lately brought out

OUR MODEL CUSTOM ROLLER MILL,

Which is the Simplest, Cheapest and Best Custom Mill ever offered.

We guarantee to produce as good results as can be produced from the wheat used. Parties desiring to change from the long system to the short system, or change from stones to rolls, or build new mills, will find it to their interest to consult us before placing their order. For further particulars, apply to

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UNEXCELLED! UNEQUALED! UNRIVALED!

THE HERCULES Automatic Wheat Scourer and Separator

THE ONLY WHEAT SCOURER EVER AWARDED A GOLD MEDAL.

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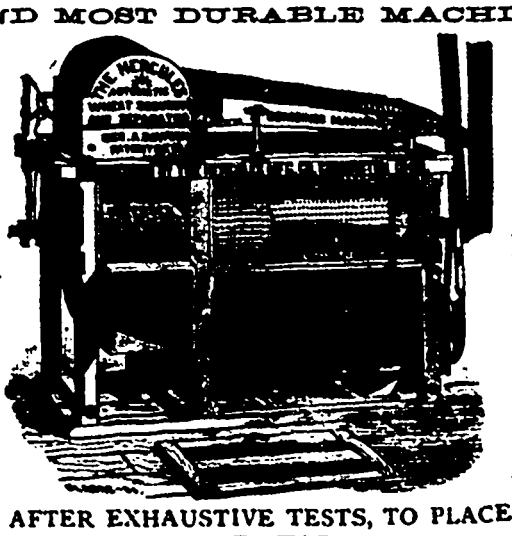

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"Aug Heine" Silver Creek Centrifugal.
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"Morse" Cyclone Dust Collector, for all purposes.

We caution millers and others to look out for infringements on the above class of machinery, as we are fully protected by broad patents on all these machines.

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MILL FURNISHINGS OF ALL DESCRIPTIONS,
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WHEAT CLEANERS AND SEPARATORS.

Sole Agents for the RICHMOND MFG. CO., of Lockport, N. Y., for their

Grain Cleaners and Elevator Separators,

Mill Irons of all descriptions, Corliss Engines, Boilers, Marine Engines and Boilers, Compound, Condensing and High Pressure.

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Correspondence solicited. *ROLLS GROUND AND CORRUGATED.*

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No. 6 Strachan Avenue, TORONTO.

Bloomfield, Nov. 20, 1888.

Messrs. **RUNCIMAN BROS.**

Gentlemen,—In reply to your enquiry as to how I like the Hurford Bolts which you put in the new mill you built for me. I have much pleasure in letting you know that they are giving perfect satisfaction, and are without doubt the best bolts I have ever seen.

The Cochrane Roll is also doing her work just as you guaranteed to me that it would, and with the Hurford Bolts and Cochrane Rolls combined, I think you have given me one of the best 75 bbl. mills in Canada, and I will also take much pleasure in showing any parties who may call on us, just what we are doing.

Yours truly,

M. B. BURR.

I can fully endorse the above.

H. S. BULL,
Head Miller.

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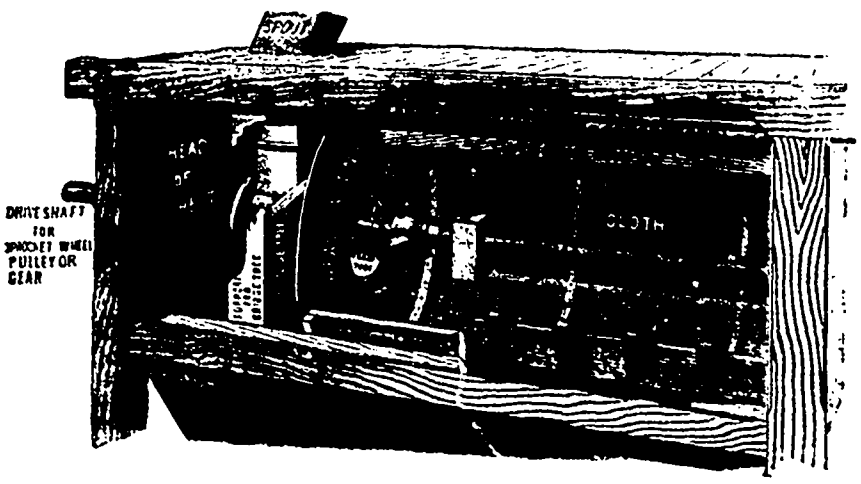
The only Round Reel with inside brush, and no Round Reel will do satisfactory work without it.



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THE "COCHRANE" ONE BELT DRIVE CONTINUOUS TRAIN OF ROLLS

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NO SLIPPING BELTS •• STOCK IS MORE GRANULAR •• LESS EXPENSIVE TO KEEP UP

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TRIAL

PETERBOROUGH MILLS. ROLLER PROCESS.
—OFFICE OF—
Meldrum, Davidson & Co.,
Merchant Millers.

VALANCEY E. FULLER, ESQ.,
President COCHRANE MANUFACTURING CO.
HAMILTON, ONT.

PETERBOROUGH, Sept. 20th, 1888.

Dear Sir,—In reply to yours asking a report of how we were satisfied with the Cochrane Rolls placed in our mill by your firm, we would say that, after fifteen months' trial, running night and day, we feel that we cannot speak too highly of them, either for light driving or in their operating on the grain in such a way as to get the very best results, financially or otherwise.

As you are aware, we have same roll surface and number of rolls as our former belted mill. Saving in power in Cochrane Mill, fully ONE-THIRD, or an INCREASE IN OUTPUT, using same power, of FROM FORTY TO FIFTY BARRELS PER DAY. This has been clearly substantiated. Its advantage does not stop here, but through the uniformity in speed of both grinding rolls and feed rolls, together with the fact that there are no belts or anything else to put the rolls out of train, the WHOLE STOCK IS MORE GRANULAR and a much LARGER PERCENTAGE OF "MIDDS" is the result, which means a LARGER PERCENTAGE OF FIRST PATENT FLOUR. Any practical miller cannot help but be satisfied of this by examining into the merits of the two mills.

It is a MUCH LESS EXPENSIVE mill to keep up, from the fact that there are neither belts nor gears to keep up and repair, except the main driving belt and a pair of gears at the head end.

We are satisfied the mill HAS ADDED LARGELY TO OUR PROFITS since putting it in—which is the best recommendation we can offer—and consider that Mr. W. F. Cochrane deserves the thanks of the milling public for giving a new idea of such practical value to millers. Hoping you may be as successful as you deserve,

We are, yours truly, MELDRUM, DAVIDSON & CO.

READ what one of the most successful millers of Western Ontario repeats:

The W. F. COCHRANE ROLLER MILL SUPPLY CO. [Limited].
DUNDAS ONT.

INGERSOLL, Ont., 30th Sept., 1888.

Dear Sirs,—Yours to hand and noted. You ask what I think of my W. F. Cochrane Mill. I beg to say I know it is a grand success as to power, and also to uniformity of grind, fully all you claim for it. My millers think they have a mill about fifty years ahead of the best. I cannot see how it could be any better. You can invite any one to come here and see a seven inch belt driving four-teen pairs of 9 x 24 inch Rolls, and as loose as a belt can be and stay on the pulleys. I am satisfied I could drive it with a four-inch belt and make two hundred barrels of flour in twenty-four hours. We will take great pleasure in showing any one the mill that would like to see it at any time.

Yours respectfully, WM. PARTLO.

Their verdict is supported by that of* V. Denne, Newmarket, *as it will be by all Millers who keep up with the times and* order a Train of Cochrane Rolls *from the sole licensees and manufacturers,

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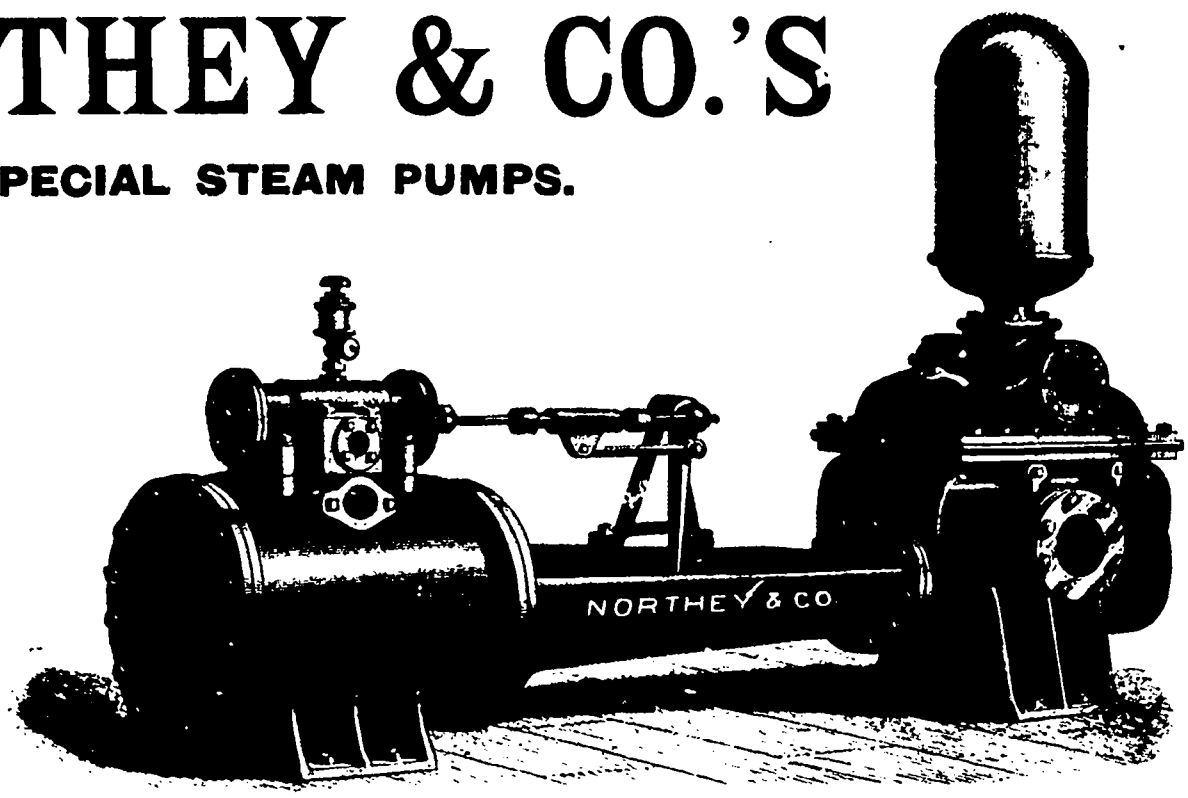

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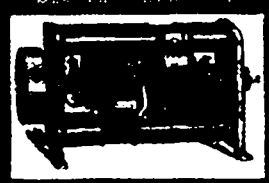
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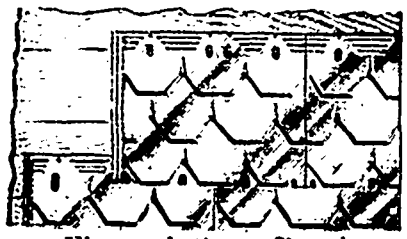

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