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CANADIAN MILLER

GRAIN TRADE REVIEW

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Old Series, Vol. XI } NUMBER 5
New Series, Vol. IV }

TORONTO, ONT., MAY, 1894

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(SINGLE COPIES, 10 CENTS)

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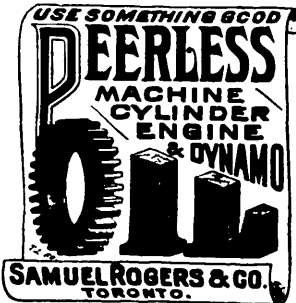
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OLD SERIES, VOL. XI. } NUMBER 5.
NEW SERIES, VOL. IV.

TORONTO, ONT., MAY, 1894

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ROPE TRANSMISSION.

ROPE drives were very seldom used in flour mills in this country prior to the introduction of the horizontal water wheel, writes A. E. Baxter in the *Northwestern Miller*, and this change in the use of water wheels has had more influence in bringing about the use of ropes for the transmission of power in milling plants than all other causes combined, and has been more effectual in removing existing prejudices than the most silvery-tongued orator that ever took the roid in behalf of a cordage company.

By the use of the horizontal wheel, a road was opened to dispense with the much-abused upright shaft and its connecting gearing. Let them rest in peace. They served their day and generation well when properly erected. The change, however, brought along its attending evils, making it necessary to place the driving shafts down in the wheel pits and close to the tail water, where there is always moisture. That made belting of all kinds short-lived, and in cold, freezing weather great trouble was experienced in preventing slipping of belts, as the majority of locations did not admit of using pulleys of more than six or seven feet diameter, and the great width of belt necessary, over such small pulleys, was a persuasive argument in favor of rope transmission. The readiest remedy for this evil was in the rope, as it presented two great essential qualities—small amount of room and not being affected by the attending moisture in such locations. To-day there is rarely any other form of drive used to transmit the power from the turbine to the main line shaft, and it is also seldom that ropes have been used further in mill construction. There are, however, several mills which have used the rope throughout on their main drives, but have found no decided advantage, if any at all, over the use of belts where there was no moisture to contend with and where pulleys of suitable diameter could be used.

That there have been numerous failures of rope transmissions, is not greatly to be wondered at, when we consider that it is but a few years since the rope came into common use, and the manner in which some of these transmissions have been erected. There are two causes that have contributed more to the unsuccessful

of the drive. One drive is well remembered where six idlers and one tightener are used in transmitting power from a line to a counter line, where not a single idler was necessary. The designer no doubt thought the more crooks the better the drive.

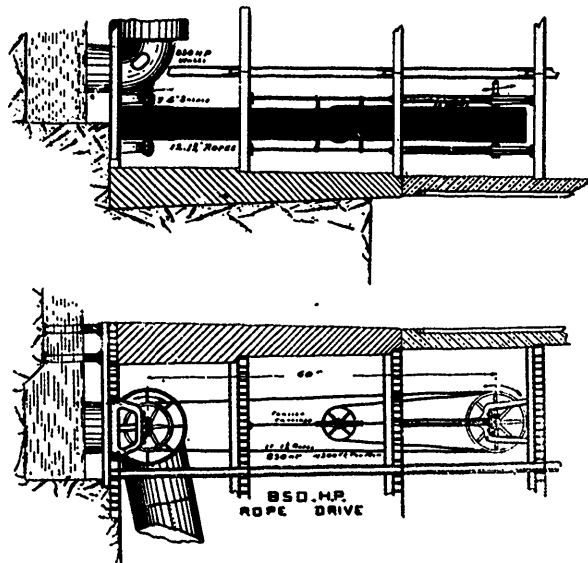
Rope transmission has made possible the utilization of numerous heretofore worthless mill sites, as the power can be readily transmitted to available points where it was impossible to run a line of shafting without an expenditure of capital that made the power worthless. Rope transmission can be used without covering, as the action of the weather has but little effect on the durability of the rope, if properly made, and if properly erected it will

same sized pulleys would be 76 inches), economy in first cost, decreased expense in maintenance and operation and absolute absence of slipping and liability to injury through dampness. The form of groove used for this drive is illustrated in Fig. 2, and is the most successful form of groove in use for sheaves of less than 12 feet in diameter. The form of groove in Fig. 3 has many advocates, but it has failed in practice to come up to the high standard of excellence that has been attained by the former, and should never be used on sheaves of less than 12 feet in diameter. There is fully as much loss due to friction as in form No 2.

One great point in rope transmission, is to use as large sheaves as possible and a large diameter of rope. Never use a rope of less than 1½ inches diameter where it can be helped, always giving preference to larger rope and fewer strands, as the power does not increase in direct proportion to increased diameter of ropes. The larger rope, properly proportioned, will last longer and consume less power by loss of friction. One great advantage in the use of larger ropes is, they are made of more strands and nearer approach a true circle. They are also made with a hemp core, which adds to their durability, and run over sheaves with less jar than the three-strand ropes. Idlers and tightener sheaves should always be round bottomed and have more width between flanges than on the driving sheaves. The alignment, while not so much a necessity as where belting is used, should be as true as possible, to avoid chafing of ropes. Rope for out-of-door service is generally laid in plumbago and is not effected by the weather.

The grooves for out-of-door transmission should be further apart than for inside work, and, to prevent injurious chafing of ropes, due to swaying caused by the wind, idlers should be used as far apart as possible and as light as it is possible for them to be made. The illustration shows what is probably the most noted rope transmission at present in operation in America, and it was put in for the Boston Montana Consolidated Copper & Silver Mining Co., of Great Falls, Mont., and transmits 1,500 hp, which is supplied by Black Eagle Falls on the Missouri river, and furnishes power to the smelters and concentrators.

The loss of power due to the transmission by rope is



cause no inconvenience from shrinkage. The question of superiority of the continuous wrap or single rope with a take-up, over a number of single ropes, seems fairly settled, as one now scarcely ever sees the latter in use. The great number of splices in the latter has, however, had more to do in influencing this decision than any other cause. By the use of one rope, wrapped continuously around both sheaves, with one extra groove in one sheave and a tightener, a perfectly uniform load can be had on all driving strands. The tightener, being automatic in action, can be weighed so as to drive the load required without undue strain to the ropes, and readily adjusts itself to the varying conditions of the weather, and, there being but one splice, trouble from this cause is reduced to a minimum. Cordage men will tell you it is not necessary to have a difference in diameter where a splice occurs; but in practice you will always see it, and they are all advertising "experienced splicers can be sent on short notice," thereby acknowledging that the matter of making a splice is not so simple as it looks.

The pictures herewith shown will serve to illustrate a rope drive of this kind, transmitting 850 h. p., using 12 1/4 inch ropes, working under a load of 500 lbs per rope. The advantages of this drive are clear, viz., the amount of power transmitted over moderate sized sheaves, economy of space occupied by ropes (the face of sheaves being only 31 inches wide, while the width of belt necessary to transmit this amount of power over the

a question that, as yet, has never been successfully settled. Some claim from actual experience as great a loss as 40 per cent has occurred, owing to defective and improper construction of sheaves and unnecessary idlers and tighteners, while some engineers claim to have reduced the loss to something less than 4 per cent. This is certainly much below the average, and what have been

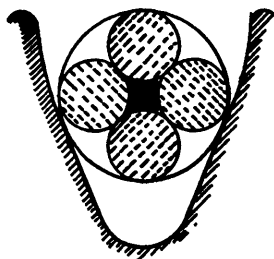


FIG. 2.

workings of these transmissions than all others combined. They are improperly turned and badly shaped sheaves and improper erection. Another and third cause that is almost as fatal, and is exerting a great influence, is that the majority of persons planning their transmissions are evidently interested more in the sale of "idlers and tighteners" than in the economic working

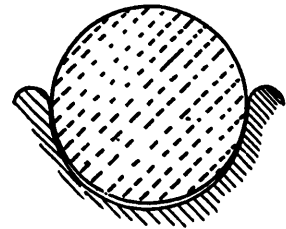


FIG. 3.

the result of extremely favorable circumstances, while the former was, no doubt, due to imperfect construction and sheaves with grooves of different diameters, which would rapidly consume power. Perhaps an average of 6 per cent would be a safe basis to work on for fairly-constructed plants. Some engineers claim that the centrifugal force of the rope is enough to free it from the grooves and that no power is consumed there. This, however, has not been my observation. Any person visiting two cable power plants, one driven by spur gearing and one by rope gearing, can not fail to be impressed by the quiet, smooth manner in which the rope performs its labor, while the gearing causes such a racket and jar as to cause the whole earth to tremble, or to believe that the rope consumes a great deal less power in such instances in the performance of its work.

Experience has so far failed to show that rope transmission has any advantage over belting, except about on the line herein specified; nor do I believe there is any saving of power over a good leather belt, but I willingly admit that there are places and circumstances where the rope is preferable, and I also believe rope has been put in places where belting would have given better service and been more satisfactory in operation. In speaking of rope transmission, reference is made only to manilla rope, as wire rope is no longer "in it" for driving purposes, and may be safely laid to rest with the upright shaft and bevel gearing.

SUCCESS IN MILLING.

BY JOHN METHERELL.

A BEAUTIFUL picture presents itself to me daily as I peer into the face of a boy, who, upon persuasion, undertook the toilsome task of working up percentages, yields and expense accounts of the three large mills over which I have supervision, and in which labor he has to produce twelve and twenty-four hour reports, and copy the same, to eventually furnish weekly, monthly and yearly statements. To him, as would be the case with many others, the work was exceedingly irksome and harassing at first, but by daily application and continued industry it became a pleasure in due time to see him master the fatigue of close calculations, and rise from his labors with a bright, glowing smile of pride and satisfaction in having overcome the task which at first appeared overpowering. The boy was taken from a position which offered him no opportunity of advancement, pecuniarily, and was asked to grapple with the present problems with which he has to deal, daily, for the same recompense. Certainly no cheer seemed in view for him, when so much more arduous work was to be accomplished. What, then, induced him to leave the easy for the hard duty? 'Twas this: He mentally divined, by becoming victor over his environments, he would impose his merit to those in authority, by his work, not words, and eventually earn the recompense his due. In other words, the boy meant to succeed, and the ambition of his mind was to produce happiness, first to himself in the accomplishment of his duty, and peaceful joy to dependent but loving parents to whom he is dutiful, tender and obedient, cheering their hearts at present by his virtues and scanty means, and hoping in future to care for their necessities through the reward of his exertions, which he is sure to attain at no distant period. The impelling force urging him was love for mother, primarily. Successes are products of impetus, which is not the possession of a laggard.

Even to be a successful head miller qualities must exist in his make-up of sufficient quantity and kind to render him equal to the occasion, and the quality must be genuine. He need not be a great scholar and fluently speak a half dozen languages, but of necessity he must possess a pretty sound knowledge of the English language and mathematics, together with the principles and uses of the draughting board. The day of large margins is passed, and exactness becomes an expedient; the guess business is supplanted by perfect knowledge of, first, what is required, and in the next place how to produce. Capacity, yield and percentage are the mile stones along his daily route, pointing their fingers before and behind, lucidly guiding onward to full attainment, or lamentably distancing the required goal. Education is a requisite in such a position, or some one has to do the figuring

and oftentimes chagrin takes the place of confidence, and morbidity is its companion. Guessing at results is one thing, but figures never lie when naturally applied, and old Davy Crockett used to say: "If you want a thing well done do it yourself."

Force cuts quite a figure with such an individual, though he may be very far removed from a tyrant, nevertheless he has it to get as as persistently used, to accomplish his aims, or rather, to achieve what is expected of him. Problems are not self-unraveling; government is not contained in the yielding mind the sleepy eye, and in tired, slipshod feet, neither, usually, in boisterous attitudes, but to command respectfully the bearing of nobleness is always present, and the gentlemanly demeanor is pronounced. Nero of old Rome terrorized and vanquished by tyranny, but Washington lives in the hearts of his countrymen, though long removed, his accomplishments being promptings of loyalty and love. Both had power, but what a different picture does history present. Force is the tireless accompanist urging ever onward the restless, energetic and observant aspirant, whether chastened by caution and good judgment, or pursuing the untrammelled road to obloquy and desolation.

Adaptation cannot be overlooked in the construction of the head miller. Naturalness produces ease of accomplishment without fatigue. It becomes a pleasure for our prima donnas to execute their charming vocabulary of music, bearing their hearers beyond themselves far into the mystic arena of song and forgetfulness of surroundings, but they would make very ordinary actors if placed on the grinding floors of some of our American mills. Howbeit, were it not for adaptability, seclusion, not fame, would bear them company. An old adage says very pointedly: "You can't make a silk purse from an old sow's ear." Neither can successful millers be made of gas and buncomb. Progression without pretense, individuality far removed from copyism, perseverance, observation, aptness for position, firmness, penetration and the like accompanying virtues, are essentials requisite for an ideal composition of a head miller, and when unaccompanied by the natural vices of bad, dissipating and desolating habits, the individual goes from success to success, naturally, as the limpid and clear streamlet finds its way to its final home, the ocean of rest, because qualified. Successes are as naturally produced as are the fruits growing upon the tree set in position by selection, with the soil adapted to its growth to produce the stimulus necessary to bring forth the business fruit. So, naturally, to render millers successful, the intuition must be present, just as the sap within the gnarled bark of the tree, to distinguish the avenues of economy through which success arrives at the miller's persuasion.

Primarily in this particular is the selection of grain. Good flour was never produced by the use of poor wheat; still, cupidity in many instances, induces the buyer, and when such is the case, the miller has a hard time in trying to work out an impossibility, and, if he is not familiar with the nature of given varieties of wheat, he himself will always be in hot water and keep it streaming, to affect all others who come under his command, and what is worse, he himself subject to insult from his superiors and still be powerless to controvert the attack. No spring wheat miller who expects a heavy percentage of middlings from which to produce his patent flour would enter the grainaries of soft wheat for purchase. If he did so and expected his head miller to produce his requirements he would be either a fool or a knave; a fool in not possessing the necessary knowledge for purchase, or a knave in trampling on the credulity of an honest miller, though void of information. The same mill operated on various kinds of grain, produces results as varied as the grain submitted to operation. No miller, however great his egotism, can counteract the effect of the natural composition of the grain submitted to his use.

Yellow wheat will produce yellow flour in spite of every attempt to remedy, and white wheat, of many varieties, will produce something far removed from white flour. Suitable for the grades required must be the attendant wheat supply, and the knowledge of purchase must essentially govern, by possession, the purchase of the buyer. The qualities of flour produced from Lost Nation wheat, raised in the Northwest, compared with

its sister varieties of hard Fife, etc., will present quite a contrast in comparison, percentage, dollars and cents. Likewise, is found a disagreement between the results effected in winter wheat mills, where an interchange exists between Mediterranean and sister varieties, compared with Fultz and its class. Even if the required wheats are not to be procured, the knowledge of attendant results must be known to render a composed mind and a courteous disposition. "Knowledge is power," and "a little learning is a dangerous thing," but in order for a miller to mill with economy he certainly has to possess full knowledge of the effects of his wheat supply, and when his requirements are met in this direction his battle is half won, and it is left for his mill and his knowledge of milling to produce just what his office expects of him.

Following the wheat supply, the question insinuates itself with reference to the requirements a given management may expect of the mill and the miller in charge. A limit of responsibility must be formulated, and the formula dare not traverse beyond the boundary of practicability. Usually the base of production is governed first, by the practicability of the wheat to produce, and second, according to the requirements of the immediate markets becoming its patrons. Percentage, yield and grade are factors in the deal with margin, which, when mutually agreed upon and all the foregoing necessities complied with by the office, the duty of the miller is rendered plain, and it is with him whether success or failure attend the subsequent effort.

The positive knowledge of the effects of separation in stocks through previous research engages the attention of the miller at this stage of the game, and according to his possession and not to his guess, proportionately, are the best results obtained. Milling, scientific, presents a broad, wide and deep expanse of territory, and the miller who will succeed must be at home in any plant, of any capacity, to which he may be introduced, equally comprehensive and liberal. Superficial observation and slochly developments never yet produced the necessary qualifications to enter the broad field of universal milling, and the day has come when if millers would occupy through profound research; it means application, observation, development and a life given over to the love of the profession. Very little time for pleasure is allowed for such an aspirant, but in due time, if opportunity permits itself, the knowledge attained receives reward.

As accurately as a physician diagnoses cases coming under his care, so the miller, in turn, piles up his knowledge to be used in an emergency, and with equal correctness. The day of cut and try is gone, and milling is to be treated just as effectually as a fracture is in a disabled member. By the necessary study the achievement becomes easy enough, but whoever reaches the peak can view with pleasure the valley beneath. There is no excuse for bad diagramming and consequent expenses, as mentality and application can, and has, and will continue to produce the necessities for the emergency. So the miller's duty here again is to fully grapple with the case in hand and prepare his mill to produce, not only a spasmodic effort at yield and percentage, but a continuity of production in keeping with the grades of wheat with which he has to deal. The life of his mill and personal reputation, together with financial success depends upon it, and, as the day dawns to a close, so the live, educated miller seeks to inform himself as to his production, which, if all's well, produces content, harmony and grace in the miller's rays and greetings of kindness and respect from the office, and the day's ending if all is well done, dissipates the clouds which under the guess regime may shroud in gloom, because of the lack of information on which the work is formulated.

Perfect flour, evenness of grade, continued percentages with yield, are the effects of profit diagramming, and while this makes the greater part of the whole wherein is located the economies of the mill, the cleaning room, and the adaptation of suitable machinery for necessary production is not a mere sideshow; it is necessary; it is eminently important to scrutinize. Coupled with this, while last but not least, is the item of labor and labor saving devices. All this, and more might be added, are essential qualities of a successful head miller, and

through which he observes, locates and executes the economies as depicted in his plant.

I have seen failures where yields on winter wheat were produced at four and thirteen-sixteenths bushels of wheat per barrel of flour, but it was due to indistinctness, and while true economy exists in perfect yields there is a boundary in the constituency of the wheat product where it is seriously hazardous and dangerous to commingle, and some I know have learned to their sorrow, while possibly not detecting the real cause of disaster. Economy means prudent management, with discernment, but false economy usually leads to distress and ignominy.

After all this has been said there is still a point which should receive a passing glance, and that is the proper relation of the practical miller toward his employer's interests. The true economist in the mill views with becoming pride his surroundings of success, which are the offshoots of his practicability. It will be remembered, however, that when the practical man has transacted his part successfully, as far as his administration extends, he cannot be made responsible for any defects in buying and selling of products, through which many disasters come; his record is as clear as the noonday sun, whatever may happen to an institution. The interests of the employer are identical with himself and are discernible in his everyday act, and should as frequently receive the daily encomiums due his responsibility.

The man who produces the foregoing is not a Saturday night man, but indefatigable. He consults his requirements, and produces as dictated, and the usual result is the cementing of true friendship which is a link hardly broken. For years, personally, I have never sought rest until a full knowledge of my daily transactions had been made manifest, until it has become habitual to me, and it is surprising how inaccuracies in running can be detected by this observance, even, without personal attendance, and how quickly the remedy can be applied to the part or location affected be it yield, percentage or capacity, with grade. A head miller worthy the name, as developed in this article, is a pretty good type of a man, and the country affords many such instances, and such and everyone, I sincerely believe, has earned his laurels by hard, interesting, tireless labor, with a full determination to succeed.

FORWARD SELLING BY BRITISH MILLERS.

OF late there have been fewer complaints in the flour trade regarding "throwing up," says The Miller of London, to use a term which has the double advantage of being well understood and milder than repudiation, but it may be that in these days of ever sinking prices, millers have grown accustomed to sell flour forward only to have it thrown back on their hands.

If there could be any real comfort in the knowledge that our misfortunes are shared by others, it might be a consolation to British and Irish millers to learn that in some parts of Germany forward selling has attained proportions which here as yet are happily unknown. It is currently reported that in some of the northern districts of that Empire, millers are to be found ready not only to sell flour eight months in advance, but to guarantee to the buyer the price current on the day of delivery, if the market should have weakened subsequently to the booking of the order. On the other hand, the seller takes no benefit from a rise.

Competition is, no doubt, keen enough among British millers, but happily matters are not yet at such a pass that a baker can say to his miller, "Heads I win, tails you lose," at least, not everywhere. In Liverpool and its district the flour trade appears to be on a sound basis in this respect, and doubtless it will be of interest to many of the visitors to Birmingham to know how far the millers of the South have been able to follow in the firm footsteps of their Lancashire brethren.

Probably no great center has suffered more than the metropolis. Quite recently a flour factor whose experience of London is both long and wide, mournfully shook his head and observed that a falling market must try the virtue of any flour buyer, adding, "Is it then surprising that the downward rush of the past eighteen months should have swept away the scruples of so many? Men who a couple of years back would not

have thought of throwing up what was booked to them, now do it without a blush." It is to be hoped that this factor was one of the confirmed pessimists who are never happy unless they can crowd the darkest colors on the canvas.

TURBINE EFFICIENCY.

By C. R. FORDKISS.

THERE is no question but the various manufacturers of turbine water wheels have experimented upon various curves and forms of buckets and chutes until it would seem that as great a percentage of useful effect from a full column of water has been obtained as is possible. Still the loss in power at a partial supply is yet a serious detriment to the best turbine and affords a strong argument to those who still advocate the use of the overshot wheel for streams that are variable at certain seasons of the year. But few streams are inexhaustible and even some of the rivers that were formerly considered as such have dwindled down so that in the summer season in many places less than one-half the former supply is furnished, so that the mills and other manufacturing establishments located upon them, which heretofore had an abundant supply at all seasons of the year, are now obliged to economize severely. Experience has proved that to obtain the best results with any turbine wheel, the supply must be equal to the capacity of the wheel. For example, a wheel of good modern construction that has the capacity for using one thousand cubic feet of water per minute under a given head will return in useful effect from 80 to 85 per cent. But if the supply to the same wheel were cut down to one-half quantity, or five hundred cubic feet under the same head, it is very doubtful whether more than from 40 to 45 per cent. of usual effect would be realized. There is also another important point to be taken into consideration by those who are about to purchase a new wheel, that those wheels which have been tested and show a high percentage of power in the testing flume whether it be at Holyoke or any other place, are always tested at their best and under the most favorable conditions and with full water. But this is not always a safe criterion, for how many wheels are there in daily use that are ever run strictly with full water. These must always be a surplus to regulate the speed by, otherwise the speed could never be uniform or depended upon for regularity and the probabilities are that a large majority of wheels are running most of the time upon from three-quarters to seven-eighths water.

The term water instead of gate is used for the reason that the term half-gate or three-quarters gate does not always convey a correct idea of the amount of water used by the average turbine. Therefore the amount of gate opening is no safe criterion in estimating the quantity of water used, for most of the wheels at the present time are so constructed that the combined gate-openings represent an area nearly, if not quite, double that of the combined openings in the wheel, so that half-gate may really mean three-quarters, seven-eighths or nearly full water. Now in order to show that this is not exaggerated, take the following, which is quoted from the catalogue of one of the prominent manufacturers of turbine wheels who claim great proficiency for their wheels at partial gate and this may be taken as a fair sample for most others. The catalogue says: "With full gate, using 2,751.80 cubic feet of water, .867 per cent. of useful effect was obtained. With half-gate, using 1,996 cubic feet of water, the percentage of useful effect was .654 per cent. With three-eighths gate, using 1,621 cubic feet of water, .581 per cent. was returned." Now it requires but little figuring to show that in this case one-half gate discharges within less than sixty-eight cubic feet of three-quarters the capacity of the wheel at full gate, so that in this case half-gate really means three-quarters water. Again, at three-eighths gate, the quantity of water discharged being 1,621 cubic feet, does not by any means represent three-eighths of the full supply for $1/2 \times 2751.87 = 1031.95$ cubic feet, which is 590 cubic feet in excess of that amount, for if the gate openings had been in proportion to those of the wheel, that is to say, only sufficiently larger to compensate for the friction of the water in passing through them, then at three-eighths gate it should have used 1,375.95 cubic feet instead of 1,996. Again, if we take the same average percentage of power from the quantity of water used

and apply it to the quantity of water that should have been used provided the gate openings were in proper proportion to the wheel, the percentage of power at half gate would have been 40 per cent. instead of 66, and three eighths gate would have fallen off in the same proportion, and probably less than 30 per cent. of useful effect would have been realized. In another wheel of different manufacture, the published test showed the greatest efficiency at a point about half way between three-quarters and seven-eighths gate, and from seven-eighths to full gate the percentage of useful effect fell off about 10 per cent. Now there must certainly be something wrong in the construction of that wheel, otherwise if the gate openings were in proper proportion to the wheel the efficiency should gradually increase as the gate openings increased and the greatest efficiency should be at full gate. Now the probabilities are that the relative size of the gate openings were such that when it arrived at seven-eighths gate the wheel had all the water it could discharge and a further supply acted as a detriment rather than an advantage and in this case seven-eighths gate really was full gate or full water. If any one can explain this upon any other hypothesis we should be glad to hear it. The makers of this wheel, however, claim that as one of the peculiar advantages possessed by their wheel, viz, its greater efficiency at part gate, but the probabilities are if they should stop at seven eighths of the gate opening and call it full water and then figure back upon the same principle, or, in other words, drop the gate opening entirely and figure strictly upon the actual amount of water discharged, that is to say, call one-half the water discharged one half gate, three-quarters water three-quarters gate, and so on, the chances are that those same wheels as well as many others that have shown such remarkably high tests in the testing flume based upon the gate opening, when tested strictly upon the quantity of water discharged under those conditions, those remarkable results that are claimed upon half-gate tests would fall off materially and they would fall into line with many others that make no such pretensions or have never seen the inside of a testing flume, either at Holyoke or any other locality, aside from the mills where they are in use.

CANADA'S CANALS.

THE total amount expended by Canada for constructing and enlarging canals was \$52,210,121. In addition to the above there has been expended for renewals, repairs, staff and maintenance the further sum of \$1,310,803, making a grand total of \$53,520,924. The total expenditure for the year ending June 30, 1893, on construction account was \$2,069,573; for renewals, \$199,185; for repairs, \$204,750; for staff and maintenance, \$291,588. The net canal revenue for the official year was \$375,089, as against \$324,475 for the previous year, an increase of \$52,614. The amount of refunds and tolls on grain and other food products was \$40,032, as compared with \$52,270 in the previous year. The number of tons of freight moved on the Welland canal was 555,554, of which 528,569 tons were agricultural products.

On the St. Lawrence canals the quantity moved was 966,755 tons, of which 464,672 tons were agricultural products.

On the Ottawa canals the total quantity of tons moved was 647,011, of which all but 20 tons was the produce of the forest. There passed to Montreal by way of the Welland and St. Lawrence canals 261,244 tons of grain, and of this quantity 195,244 tons were reported. During the season a total of 268,830 tons of grain arrived at Kingston. Of this quantity Canadian vessels carried 159 cargoes, aggregating 150,000 tons, and United States vessels carried 89 cargoes, aggregating 109,000 tons. Only 4,341 tons were taken to Ogdensburg and transhipped to Montreal.

The "Soo" canal, which is in course of construction, is, by agreement with the contractors, to be completed by the 1st of July, 1894, and to admit vessels drawing 20 feet of water. The expenditure on this work during the past year amounted to \$590,000. For the first half of the current fiscal year there has been expended a further sum of \$768,546. The Minister states that there is every prospect of the completion of the canal during the coming winter.

CORRESPONDENCE

Letters are invited from our readers on matters of practical and timely interest to the milling and grain trades. To secure insertion all communications must be accompanied with name and address of writer, not necessarily for publication. The publisher will not hold himself responsible for opinions of correspondents.

A CRITICISM OF MR. J. B. CAMPBELL'S VIEWS.

To the Editor of the CANADIAN MILLER:

Sir:—Reading between the lines the theories of Mr. J. B. Campbell, of Montreal, touching Manitoba wheat prices and Canadian methods of transportation one can readily see that what Mr. Campbell is anxious for as much as anything else is a removal of trade barriers between this country and the United States. I quite recognize this that the MILLER is not a paper to be given up to a discussion of political questions and the question of free trade vs. protection is largely a political one after all. But as a miller there is this important business phase of the problem, that if trade barriers are to be removed to the extent that there shall be free flour between these two countries, then to the miller at least the cost will be too high. Our mills are finding it a hard fight to-day to get rid of their product when brought into competition with the extensive milling facilities of the United States, and where would we be if free trade generally prevailed?

Yours truly,

CANADIAN.

ENACT THE LAW AGAINST THE RAILWAYS.

To the Editor of the CANADIAN MILLER:

Sir, I read with a good deal of indignation the report in the April MILLER of the position assumed by the railways against Canadian millers in drawing an unfair distinction between the freight rates of flour and wheat. If the case is, as you state, that the law knows no distinction between these commodities then why should we be mealey-mouthed in dealing with the railways? There is too much consideration given these corporations in the present day. The Dominion Millers' Association have started a bold fight against the railways, but in it I believe they will have the united assistance of every miller. If forced to call in the law they should, it seems to me, marshal the united strength of the whole trade. I believe nothing will be wanting from millers, small and large, in this respect.

Yours truly,

JUSTICE.

MAKING SCRUB MILLERS.

To the Editor of the CANADIAN MILLER:

Sir,—On general principles the position taken by your correspondent "Industry" in the April MILLER, on scrub millers, is correct. But who helps to make scrub millers? Sometimes the very men who most resolutely set their faces against the scrub miller. I refer to the head miller. If he is a broad minded man there will be no scrub millers under his control, but if he is one of those narrow, 6 x 9 fellows, who is afraid if the second miller knows too much he himself will become a head miller some day, and perhaps, displace Mr. Head Miller, then expect to see a growth of scrub millers. I have seen these men and their whole plan has been to keep their assistants from learning too much. If the second miller is a strong minded, plucky fellow he will overcome his jealous senior somehow, but where one will grow up successful ten will become discouraged, grow careless and eventually become slipshod workmen—scrub millers.

Yours etc.,

FAIR PLAY.

WHEAT AT 36c. PER BUSHEL.

To the Editor of the CANADIAN MILLER:

Sir,—The lot of the Canadian farmer, as wheat prices have prevailed for a year past, is perhaps not the best one in the world, though it is unfair to talk of low priced wheat unless, as Mr. Watts remarked in the MILLER last month, some consideration be given to changed conditions generally and the lower prices of living and of production of wheat to-day. I am just philosopher enough, however, to believe that no matter how bad we may think our lot that it will usually be found that somewhere somebody else is worse off than we are. Manitoba farmers are, I suppose, getting less for their wheat

than the farmers anywhere else in Canada, an average, probably, of 45c a bushel, and yet a paper has come into my hands which shows the strongest quotations for wheat in Nebraska are 35c. This is at a point the same distance from Chicago as Manitoba is from Fort William so that the freight rate to Chicago should be, if anything, lower than the Manitoba rate. The strongest quotations for oats at the Nebraska point was 23c and corn 22c. This may be considered as rather cold solace to the Manitoba farmer, but there is something in it after all.

Yours truly,

GRAIN DEALER.

MEMORIES OF AN OLD MILL.

J. L. HARRISON.

THERE comes to me to-night, like the sound of a far-away melody, the soft, rumbling of the mill-stones in my grandfather's old mill. It is a year since I saw the old mill, and the mill-stones have long been silent and fallen into disuse. But there are times, like the present, when I seem to hear their murmur with startling distinctness, and if I close my eyes I can see old Ben, the miller, going about, floury and white, with his miller's cap on his head. Like most millers, old Ben was thoroughly good natured, but there were limitations to this pleasing characteristic. He drew the line at any meddling with the wheat after it had once gone into the hopper, we children, who were wont to frequent the mill might extract all the wheat we wanted to chew into "gum" from bags and bins before Ben's eyes, but woe betide us if we "went to felling" with the wheat in the hopper. And just because it was forbidden us we felt that this particular wheat was the only wheat in the mill that would make good "gum," and we ran the risk of having old Ben "break our necks," as he daily threatened, by slyly climbing up and "hooking" the hopper wheat. I remember that there was a curious belief or superstition prevalent in the rural neighborhood surrounding the little town in which my grandfather's mill was located. It was popularly believed that any one afflicted with the whooping cough would be greatly benefitted if brought to the mill and shaken in the hopper, and I have a very distinct recollection of babies and even large boys and girls being brought to the mill for this purpose.

Old Ben used to call this "the biggest Tom fool performance on earth," but he had instructions from my grandfather not to refuse to allow children thus afflicted to be shaken in the hopper. We children used to witness this performance with awe because we supposed that there was more or less danger of the patient being drawn down between the millstones and instantly reduced to pulp. The patients themselves may have felt that this danger was imminent, for they always screeched lustily while in the hopper, to the disgust of old Ben, to whom that institution was, in some sense, a sacred receptacle.

What delightful hiding places and romping places there were in and around that mill! There was nothing but grain bins and old rubbish up on the fourth floor, and some of the happiest of my boyhood days were spent up there. We could play "hide and seek" for hours without hiding twice in the same place, and I remember that we used to play some kind of a marching game in which we all sang:

"Oh happy is the miller who lives by himself,
As the wheel goes round he gathers in his wealth;
One hand in the hopper and the other in the bag,
As the wheel goes around he cries out grab!"

There was always one odd boy in this game, and at the word "grab" every boy had to change partners, which gave this odd boy a chance to "grab" some other boy's partner.

Then we played another old game called "the weevily wheat," in which I remember there was this doggerel rhyme:

"I won't have any of your weevily wheat,
I won't have any of your barley,
But I will have the best of wheat
To make a cake for Charley;
For Charley he's a nice young lad,
And Charley he's a dandy,
And Charley he's the very lad
Who drank his daddy's brandy."

This mill was in the center of a magnificent wheat producing district, and it was the largest mill in the

country. Farmers came from such long distances to have their wheat ground that they could not return the same day, and sometimes there would be a half dozen wagons and their occupants camped for the night around the mill. Grandfather would always, on such occasions, send out hot coffee from his own house to these patrons of his, so there was general good feeling all around.

Very often the mill would run all night, and I would go to sleep with the pleasant sounds of its wheels and millstones in my ears. Often in "the dead of night" I would awaken and lie in my bed listening to that soft, low, rumbling sound, and wondering just what old Ben was doing.

There was a cooper's shop in connection with the mill, and here three or four elderly coopers planed and hammered and shaved barrel staves and set up barrels all day, and sang songs and told amazing yarns. The cooper's shop was a pleasant place on rainy days, and we used to tumble about in the shavings, or hide in the barrels.

Modern methods of milling are very unlike those in vogue in those days, but I am quite sure that I have never tasted sweeter or better bread than that made from the flour ground between the stones of that old mill. I am equally sure that life has never seemed any pleasanter or sweeter to me than in those old days in my grandfather's mill.

NOTES FOR ENGINEERS.

A CHAIN is no stronger than its weakest link, and a steam boiler may have some one spot weaker than other parts, and in estimating the safe pressure, the strength of this weaker part should be taken into account.

Factors of safety, as they are called by mathematicians, are used as a means of making allowance for unseen or suspected or possible weaknesses. For example, a boiler shell is made of plates the strength of which is known, but the riveted joint is weaker than the plate, and the fit of the rivets in the holes may not be perfect, hence some allowance must be made for unknown imperfections.

It is common to make a calculation of the amount of metal left after the rivet holes are cut, and of the metal in the rivets, and determine the supposed amount necessary to break the plate. A well designed, double riveted joint should, however, give 70% or nearly three fourths the strength of the plate.

Stays, and especially screwed stays, may corrode and soon become much weaker.

It is common to calculate the strength of the riveted joint and divide by five as a factor of safety, so that the working pressure is only one-fifth that required to rupture the joint. The factor of safety used for stays and parts liable to be corroded is larger, often as high as ten, so that when new these parts are much stronger than the plate joint.

In connection with steam boilers there is another way of looking at the need for using a factor of safety. The rates still in use were adopted years ago when the quality of the metal was much more uncertain than it is now, and when the methods of working the metal were more likely to injure its strength than is the case with those now used by first-class makers. We have now a better guarantee that the finished boiler will really be of the strength intended. If this be so, then that part of the factor of safety which was used to allow for uncertainty of the strength and workmanship is not now so necessary.

Boilers made of steel by makers having good appliances are now in use with a pressure where the factor of safety is four, and possibly even this may in time be reduced.

We are not arguing in favor of engineers taking greater risks in using steam boilers, but we are arguing that boilers which have been made in the most skillful way and of the best material should not be rated as being only equal to those made of poorer material and in a less skillful manner.

Mr. Alex. Dobson, of Beaverton, is installing in his mill an incandescent electric light plant, and will furnish light to the citizens who may desire it.



PUBLISHED ON THE FIFTEENTH OF EACH MONTH

—BY—
C. H. MORTIMER

CONFEDERATION LIFE BUILDING, TORONTO

BRANCH OFFICE:

NEW YORK LIFE INSURANCE BUILDING, MONTREAL.

TERMS OF SUBSCRIPTION:

One Copy One Year, in advance \$1.00
 One Copy Six Months, in advance 50
 Foreign Subscriptions, \$1.50 a Year

ADVERTISING RATES FURNISHED ON APPLICATION

The CANADIAN MILLER and GRAIN TRADE REVIEW caters to the Miller and all his associations, and to the Grain Dealer with all his allied interests.

The only paper of the kind in Canada, containing full and reliable information on all topics touching our patrons, and unconnected as an organ with any manufacturing company, we will always be found honestly and earnestly endeavouring to promote the interests of our subscribers. Correspondence is invited from millers and millwrights on any subject pertaining to any branch of milling or the grain and flour trade.

NOTICE OF REMOVAL.

SUBSCRIBERS, advertisers, and others concerned are particularly requested to note that the offices of THE CANADIAN MILLER have been removed from the Canada Life Building to the CONFEDERATION LIFE BUILDING, Richmond and Yonge Streets. All communications should in future be addressed to C. H. MORTIMER, publisher CANADIAN MILLER, Confederation Life Building, Toronto.

CANADIAN WATERWAYS.

THE important question of Canadian waterways, to which reference was made in these columns last month, when discussing Mr. Campbell's paper on transportation matters, has been receiving increased attention within the past month. In the House of Commons the subject came up for consideration on resolution of Col. Denison, asking that the canal now in course of construction by the Government at Sault Ste. Marie, the Soulanges canal now being constructed, together with the other St. Lawrence canals and the channel of the river, where necessary, should be deepened to a uniform depth of 20 ft. The member for West Toronto, in a speech that showed careful preparation, entered quite fully into the advantages that this measure would give to the commerce of the country. He took vigorous ground against the old method of constructing the waterways only 14 feet in depth. The conditions of navigation had so changed of recent years that there were more than 150 vessels on the upper lakes, drawing more than that depth of water. One great gain that would come to the country in the deepening of the St. Lawrence and Welland canals, as Mr. Denison stated, would be to bring Winnipeg within 400 miles of the sea. In this effort to improve our waterways support was given to the contention in a speech from Mr. McKay, of Hamilton, who argued, that through improved transportation facilities, trade with the Maritime provinces would be encouraged and the question of canal toll rebates would be solved. Dr. Sproule, member for East Grey, in favoring the motion, pointed out the benefit that the deepening of the canals would prove, particularly to the farmers, by giving them competition in freight rates. The saving of expenses of transhipment would of itself be a great consideration to exporters. Mr. Coatsworth, representing East Toronto, joined in supporting the resolution of his colleague from the western section of the city. He considered that freight rates would be cheapened by this proposed improvement of our waterways. If the government were not likely to take hold of this work, he thought a private corporation might at least construct a canal from Lake Ontario to Georgian Bay. Sir James Grant considered the Ottawa ship canal to connect Lake Huron and Montreal, one of the very first projects that ought to receive consideration. The views of Manitoba and the Northwest were voiced in speeches from Mr. Davin and Mr. Martin. The former considered it most important to the interests of these newer provinces

that the cost of transportation be cheapened. Mr. Martin said that nothing would tend to cheapen the cost of carrying the products of the Northwest to the British markets more than the deepening of the canals, so as to allow ocean vessels to load at Port Arthur for Liverpool. Unless the cost of transportation could be reduced very considerably there would be no money in Northwest farmers raising wheat. Mr. Martin expressed the view that the Northwestern states were interested in this question and he thought that an arrangement might be made by which the United States would share the expenditures.

That the government will take any action in the matter at the present time is hardly likely. As suggested in our comments on the question a month ago the expenditure on public works has reached a point that makes the government timid, especially at a time when commerce, generally, is depressed, to take any active steps in the direction indicated by Col. Denison's resolution. When the matter was discussed at another time the Minister of Canals stated that the project would cost from \$80,000,000 to \$100,000,000, but Col. Denison in his address quoted the estimate of Engineer Cortel, of Chicago, that the work can be done for \$67,000,000 and it is claimed that the St. Lawrence canals can be deepened to a minimum depth of 20 ft. for \$27,000,000.

After all, these are not enormous figures when the incalculable advantages in the development of the country are placed as an offset against the sum. We do not know, in fact, but that our position, is much like that of a business man, who may have reached a point in the history of his business where things must stand still, or more likely go back, unless he is prepared to make a forward movement. In the Northwest Territories, we have undoubtedly the greatest grain growing country on this continent and every year its value must become greater to us. But if the prices to be obtained for this golden grain are not to run better than they have for the past year or two development in this direction must come to a standstill. And if the Northwest is not to be developed as a grain growing country, then where is its hope of development?

Some of the likely advantages of deepening our canals are given in these terms in an article in the News: "The cost of shipping butter, cheese, cattle and food products generally from this Province to Great Britain would be reduced; the profitable interchange of Ontario flour for Nova Scotia coal would be made possible; and grain from the Northwest, instead of being sent via Buffalo and New York to Europe would be shipped by way of Port Arthur, Collingwood and Toronto, thereby giving business to our transportation companies, population to our cities and improving the home market of the farmers of this Province."

The value of Canadian waterways is appreciated by those who have studied the question outside of our own country. Captain McDougall, who has made his name somewhat famous as inventor of the Lake Superior whalebacks, has always contended that the most feasible route for the shipment of grain and flour from Duluth to Great Britain is through Canadian waters. The suggestion of a canal through New York finds little faith with him. The Captain's idea is taking some root in Congress, and it is understood that a resolution is being prepared, proposing an international commission between the United States and Canada with a view to co-operation in a system of canals and waterways between the great lakes and the ocean. Commenting on this matter the United States Miller remarks: "Unless means are soon invented for transportation other than by car or vessel, a waterway by some route is only a question of time."

As a contribution to this subject the government figures that we give elsewhere in this issue of the MILLER on Canadian canals will be found useful.

THE following story is told as illustrating the dullness in the flour trade. Recently a buyer came up to a well-known receiver and asked, "Have you a choice and really strong winter straight?" "Yes" answered the receiver, "I have." "Well then," said the other, "mix me up a dough, I want to throw it." To say that the would-be seller was not greatly amused goes without saying.

EDITORIAL NOTES.

A Campbellford miller is credited with having purchased, recently, spring wheat in Chicago as an experiment. The cost laid down in his mill, duty paid, figured out about the same as Manitoba wheat, but the yield in flour making fell short. A Chicago milling journal, commenting on the transaction, says: "The decreased cost of transportation compensated for the duty; but someone must have lost on that wheat, for it must have come nearly as far from its place of production as the Manitoba wheat."

A SUGGESTION comes from a correspondent of the Northwestern Miller that the present is a propitious time to commence a campaign of education among the farmers, to induce them to use low grade flour for feeding purposes. It is thought that this plan would relieve the market of much of the stuff that is really now causing so much depression in the flour market, and as a result it might be expected that wheat prices would improve. The American Miller remarks on this point that the use of any great quantity of low grade flour for feed purposes would bring it into disrepute with those who now eat it and strengthen the demand for wheat.

THE view expressed in the MILLER last month, which was to be credited to Mr. J. R. Dodge, that India is not likely in the future to cut so important a figure as a wheat competitor in the British markets, is confirmed in the view of the Liverpool Corn Trade News. This journal tells us that every year the use of wheat in the East is spreading and that it will not be many seasons before India will cease to export wheat. In all recent calculations of the wheat outlook, India has been viewed as an important element. It must be admitted there is lots of competition outside of that country, but it will be that much of a gain for wheat growers and millers in this section of the world for India to count out.

SOME late reports from Manitoba are not at all encouraging to a large wheat crop the coming season. The weather in the early spring opened out favorably, but this was followed later by a spell of winter weather and cold rains with less or more frost. The effect has been to make the season late for seeding. In some sections, of course, where light rolling soil is to be found the ground soon comes into shape for seeding, but looking over the field generally, conditions are rather blue. Late seeding means late harvesting, and in the Northwest this is risky to any crop. So it looks, as far as the present is concerned, as though Manitoba might have a short wheat crop. Perhaps this will not be considered an unmixed evil.

THE ingenuity of the business man is tested when hard times strike him. If he is tied up in one direction, he is compelled to exercise his wits to get free at some other point. We referred last month to the fact that it might be that wheat and flour losses at present prices could be leveled up in some measure by the transforming of bran into coffee. At least some ingenious millers were experimenting with success, it has been said, in this line. It is a common practice in all sections of the country to feed wheat with a profit to hogs. And the suggestion comes now from another source that there is money for the miller in our large centres at any rate by creating an adjunct to his milling business in the shape of a paste factory. The making of paste for marketing is not a new scheme in certain European districts. Paste is in constant use by wall-paper houses, paper box makers, carriage trimmers, printers, bookbinders, trunk makers, picture frame concerns, cigar makers, bill posters, and many other concerns. In the large metropolitan cities people make a business of manufacturing paste and supplying it to these people, but in the smaller cities the practice is hardly known. The suggestion is that millers in our cities of from 50,000 to 100,000 population, and even in smaller districts, go into the business. One who has looked into the matter says it is quite surprising the very large quantity of flour that is consumed a year in the making of paste. So much for paste making as a side line, and it is in the side lines, in the present day of keen competition, the most money is being made.



SPEAKING of the proposed scheme for a twenty-foot waterway from Lake Superior to the seaboard, said William Craig, of Owen Sound: "Quite a number of schemes have been proposed, but many of them are utterly impracticable. In my opinion the only sensible and practicable plan for accomplishing the end in view is by using the St. Lawrence river itself for that purpose, by sinking concrete caissons at the different falls in the river and locking around them, and I question very much if there has not been more money spent on our present canal system than would have completed the above scheme, which would give any depth of water and would be good for all time. I would also suggest the use of the Niagara river on the same principle, as the proper route of entering the upper lakes. This improvement of the St. Lawrence and Niagara rivers would, I should suppose, have to be undertaken by the Governments of the United States and Canada paying the cost in proportion to the number of citizens of each country who would be benefited by the work."

"MANY men of many minds" is an apothegm one hears frequently quoted, and illustration of this I am constantly finding as I move around among the men engaged in the grain and milling trades of the country. Even on questions where one would suppose that perfect unanimity of opinion would exist we discover widely different ways of viewing the same question, thus proving the correctness of another frequently quoted axiom that there are two sides to every story. It is to be expected that in meeting with millers I would find the question of freight rates, as between wheat and flour, and which is now being actively dealt with by the Dominion Millers' Association, a subject of conversation. Every miller out of his experience can show you the disadvantages under which he labors in being compelled to pay a higher rate of freight for wheat as flour than if the wheat alone were being shipped. "But," said one of the best known millers in the country, and whose experience has been extensive, "it is one thing to know that an evil exists and another to adopt a really practicable way of removing it. This question of distinction between rates of wheat and flour has been a grievance of the trade for a great many years. The present is not the first time that our railway managers have been pressed to make a change. I have no love for the spirit of greed that too often influences railway corporations, but so far as this immediate question is concerned one answer comes from the railway people. During the winter term the Grand Trunk find it necessary to keep Portland open as a port of shipment, but to do so they must charter vessels to arrive at that point, otherwise they say they would have no guarantee of a regular service. This being the case they must have freight sufficient to payingly load these vessels. The time of sailing draws near and nothing is more natural than that the railway should commence to dicker for the carrying of a certain amount of merchandise to ensure a paying trip. This can be done with wheat or other grains as cannot be done with other classes of merchandise. For one thing a measurable quantity of grain is required to place in the hold of the ship. No other merchandise will fill in so readily in the same manner. Then wheat differs from almost every other commodity in being an article of speculation. Dealers are always to be found ready to buy wheat on speculation, if some little inducement can be held out, and this inducement comes from the railways in the shape of the offer of special freight rates. A cargo of grain, besides, can be assured the company on very short call. As a miller I am sure I would not like to agree to send any large quantity of flour just whenever it might be wanted, on speculation, in the same way. So it comes to be the old story, what are you going to do about it?" With a merry twinkle in his eye, said my milling friend: "If I

were disposed to enter into reminiscences of the grain and flour trade of the province, going back perhaps into the early eighties, as I might do, I could let the men of the present day into the secret of some rich deals between grain firms and the railways, and where the grain men by no means came off second best either, but I must withhold myself just here."

"TRADE conditions," said Mr. J. L. Spink, the well-known miller, and treasurer of the Toronto Board of Trade, with whom I chatted the other day, "are more peculiar than at any commercial period I can recall in my business experience, and I can go back quite a few years in the commerce of the country. Whilst I am, probably, the antithesis of a pessimist, it does look to me sometimes as though the world was sadly out of joint. Here we have a greater amount of distress in all parts of the world than has been the case in many a long year and at the same time the market is fairly glutted with wheat and flour, the very articles that go to make the staff of life. What is to be the outcome of the grain and milling business it is most difficult to say. Every business man expects and he gets it whether he expects it or not—periods of unusual dullness. When these times come he quietly rests on his oars, knowing that a turn in the tide will come. This is the way we have all been feeling in regard to wheat and flour, but no turn in the tide comes. It looks as though wheat prices might drop to 50 cents after the next crop is harvested and then there will be a greater quantity of wheat on the market than buyers for it. We are likely to carry over into the new cereal year nearly, if not fully, as large a surplus as was placed on record in July, 1893. If on top of this there is to be a crop anything approaching as heavy as the past few years, see what an amount of stuff there will be for sale; and all this looks quite likely. Even if the crop is short here there is going to be a large increase in supplies in wheat from the Argentina, India and other foreign points where wheat growing is being prosecuted with a great deal of vigor. And yet after all I do not know that conditions in wheat and flour are much worse than in other lines of trade. It is only the other day I was talking with one of the largest wholesale grocers in the city, and he said it was remarkable how low down in price everything was at the present time in his line of trade. The iron trade is just about as depressed. We know that owing to unfortunate circumstances, if from no other cause, there is no encouragement to the cattle dealers. Perhaps we have conditions here that do not help to improve wheat prices. We can feed our grain to cattle if there is a large demand for cattle, but when this avenue of business is at a standstill it reacts on the grain trade to a measurable extent. So it is that one line of trade rests upon another, a very good object lesson to people who are disposed to be saucy and independent. We are, all of us, dependent in a considerable measure on others and our positions are certainly influenced largely by environment. But I guess we will live through it all," cheerfully closed this bright and active member of the Canadian milling trades.

Though the fight may not be an easy one, I find that Canadian millers are very determined on pushing their case against the railways in the matter of a difference in freight rates as between wheat and flour. The section of the Railway Act on which they depend for strength reads thus: "No company shall make or give any special toll, rebate, drawback or concession to any person; and any company shall, on the demand of any person, make known to him any special rate, rebate, drawback or concession given to any one." As Mr. McLaughlin has said: "The matter is one in which every miller is interested. They may not be directly interested as exporters, but indirectly they are affected as millers; for the success of milling in Canada depends on an export outlet for our products. Millers who formerly exported and are now not able to do so, on account of the freights, are to-day catering for Canadian trade, the increased competition resulting in the cutting of prices. If the railroads could only see it they would themselves be at an advantage if they would stop giving these terribly low rates, which they from time to time give on wheat." The invidious character of these rates is illustrated by the Millers' secretary, Mr. C. B. Watts,

who tells of a miller from the West, who found that the rate on flour from his point was 23¢ per 100 lbs., while at the same time it was only 14¢ per 100 lbs. on wheat to Liverpool. Another way in which I learned these distinctions in freight rates operated against the miller is, in enabling British millers to buy wheat at so low a figure that it pays them better to import the wheat and grind it in their own mills than for British flour handlers to buy wheat on this side of the water. For example, Bell, Sons & Co., of Glasgow say that transactions have been reported in No. 2 red winter wheat for shipment from New York at equal to about 60¢ per bushel, which is a figure that distinguishes conspicuously against Canadian millers.

QUALIFICATIONS AND TESTS OF ENGINEERS.

EVERY engineer and fireman ought to know perfectly well, without the necessity of any elaborate calculating or theorizing, what results will ensue should he overload his steam engine, his boiler, or any of the machinery under his charge, and he would not be compelled to call in the services of most expert engineer to tell him clearly and concisely what would occur under such conditions. He would know that in the vast majority of cases he would be subjecting himself to the possibility, in fact, high probability of a speedy breakdown, and before that event actually transpired, to endless trouble of every description, all the results of poor judgment, or unfortunate necessity, which led him to work his boiler, engine, or machinery up to double, or perhaps treble what it was intended for.

Every applicant of an engineer's license should be prepared to answer all questions that will show that he is mentally well equipped to provide against possible disaster. He should be well skilled in the construction, care, and manipulation of pumps, injectors, inspirators, all the devices by which the boiler is supplied with water. He should be familiar with the use of the gages in use for determining pressure of steam, or the quantity of water in the boiler. The safety-valve should be under his care, always ready to perform its functions. Then he should have some idea of the difference between fibrous and crystallized iron; should be able to tell when a boiler had become weak and needed repairs, and have the courage to say so, and refuse to fire it. He should have skill sufficient to enable him to frequently inspect the boiler, and determine if the factor of safety is enough to insure absolute safety. He should be able to take such care of the boiler, that large or dangerous deposits of scale and mud are not possible; also, should know what to do when "priming" or "foaming" is evident. He should inform himself as to the effects of corrosion, internal scale and deposits, improper setting, impeded circulation, and improper steam and water.

FAVORS CANADIAN BARLEY.

WITHIN the past few days it looks as though the barley men of New York state might be able to carry their point in the Senate and once more have the door opened for Canadian barley. Various conferences have been held between the brewing interests of the Empire state and the representatives in the House from there. The New York brewers depend on Canada for their supplies of barley, and with a nominal duty, they feel confident of securing the big end of the brewing trade of the country. Western brewers draw their supplies mainly from their own farmers and can get along without Canadian barley. It is here the fight in the Senate rests, the Eastern men at the present time feeling hopeful of the issue closing with the barley schedule satisfactory to them.

Clean wheat need not be closely scoured when Thoroughly scoured wheat, passed over a machine separator, should clean wheat in so far as it is then free from loose impurities of greater or lesser size, or greater or lesser density than itself. We depend upon the scourer to free and get rid of adhering impurities, and these impurities may consist of dust, fuzz, smut, bran scales. These removed, we have clean milling wheat, but their removal is the rub. We scour too closely, or we do not scour enough. If too closely, the treatment is quite apt to show evidence of unevenness in an excess of break flour; if not closely enough we are quite likely to have a specky flour.—Milling.

CLEANING WHEAT IN LIVERPOOL.

THERE is no doubt that we could continue "cleaning" wheat until it was perfectly skinned, writes a contributor to *Milling of Liverpool*. A great deal of dust which comes from both brush machines and scourer is bran dust pure and simple. By constant rubbing we make the bran thinner, and this rubbed-off bran constitutes much of the impurity we get in the latter part of our cleaning processes. This can be easily seen when the dust from the various machines is blown into separate catchers. That from the separator and aspirator will be dark and practically loose, extraneous matter, and so easily blown out; from the scourer it will be finer and better color; and from the brush machine best of all. But still, after the wheat has left the brush machine and has passed up elevators and along a worm, it yields up a further quantity of still finer dust, showing clearly that so long as there is friction there will be dust, or what we call impurities, although it is simply powdered bran. A knowledge of this fact may help in some way to amend our cleaning methods. It has, in fact, already, for many millers find that a good washing beats all the scrubbing, and yet this washing is not a new thing. We practiced it here in Liverpool, and we knew all its virtues before the advent of roller milling, and here to-day it is carried to the greatest perfection.

In some good mills the wheat which requires washing goes through a system of cleaning similar to the foregoing, the reason chiefly being that the impurities absorb water so freely that they are very difficult to deal with in the wet state; besides, they clog up the machines and cause endless trouble, so that it is best always to precede washing with a separator and aspirator. The larley is taken out before working, because it is considered that the rough friction of the whizzer, or centrifugal drier, breaks off the ends, and thus renders it more difficult to separate on the cylinders. There is, however, not much in this theory; still in the case of wheat which has a large quantity of larley mixed with it, like Kurracher, a double cleaning with cylinders is none too much. We may, in straining after one effect, unconsciously attain another of which we had no notion.

The newest methods of washing and conditioning overcome in some respects the objections relating to frictional cleaning, for now it is the practice in some mills to wash all wheats, with, perhaps the exception of the English. This is a continuous process, beginning with the washer, thence through the drier or conditioner, and following that a single scourer right into the grinding garner or direct on to the mill. It is claimed for this that the wheat is thoroughly cleaned; then it is properly conditioned or tempered, after which the scourer removes any outside discoloring matter without materially abrading the bran. This is all very well, but one drawback to general washing is the difficulty of always getting the wheat in good working condition again. Nobody questions or doubts the value of water in cleaning wheat, but it requires great care in doing; and one thing which will contribute toward success is rapidity of treatment in the wet state—that is, not to allow it to absorb too freely, or it will be found that most of the so-called "driers" belie their destination. The fact is, wheat which is thoroughly wet can only be dried very slowly, the kiln floor and twelve hours' exposure being the only effective means. I have had wheat, which had been under water in a ship, on an automatic drier for a couple of days without getting it anything like dry. But, of course, in the case of wheat for grinding, it is in the water only long enough to get rid of the dirt, and has no time to soak. What water has got into the skin is the very thing required to condition or temper it. This tempering process can be greatly improved by allowing the wheat to remain a few hours—say about twelve—before grinding. If left too long, it is likely to give up damp and also turn sour; hence the necessity for great discretion and carefulness.

Conditioners—or driers, as they are sometimes called—are of various makes and shapes. In some, steam pipes are used, over which the wheat travels in a downward course. These are by no means new. In others the wheat travels over plates heated with steam, either being propelled or falling by gravity. Others are heated with a furnace, having a fan to draw the hot air through the wheat, which travels through a revolving cylinder, the wheat being constantly lifted up to the bottom through the current of heated air. In others, again, the air is heated by contact with steam pipes; and still in others cold air simply is driven through the wheat. In all of them the wheat is cooled, after being heated, by having a current of cold air sent or drawn through it. The reason for cooling is that the heat having opened the pores, and by withdrawing the moisture made the wheat damper, the cold air has the effect of closing them and also hardening the tissues. It is said, however, that there is no passage for moisture between the endosperm and the outer skin—no sweat glands, in fact—but yet we know that by simply heating wheat we can draw moisture to the outside; and this is the very thing the American millers

do, preferring that method to water. It is a fact also that wheat after it has been wetted, becomes actually wetter after being heated; so the moisture must come from some part of the interior, even though it may not be actually from the center.

THE PROPER LOAD UPON BELTS.

SOME considerable interest has been excited among engineers by a report of a series of tests of belting in a machine shop, and the conclusions drawn from these tests are the subject of some controversy. The great difficulty in drawing conclusions from tests of this character is to apply the results to places outside of the place they are made, says the *Journal of Commerce*. In the case mentioned, the tests cover a period of nine years, and were made in a large machine shop, and from the observations made the experimenter has sought to draw conclusions applicable to all classes of belts.

The observations were made upon shifting belts and belts driving the cones of lathes, both of which are regarded as very hard on belting of any kind. To take the results of these tests and apply them to ordinary driving would certainly result in providing a belt large enough for all purposes, but engineers will question the advisability of putting in a very large belt for a certain work when that work could as well be done by a smaller one. The conclusions drawn are that the speed of the belt should not exceed 4,500 feet per minute, and that the pull should not exceed 54 pounds per inch in width for double belts.

So far as ordinary belting problems are concerned, this is both a much lower speed and load than engineers have been willing to put on belts, and must add considerably to the cost of installation of the plant. In practice, however, the ordinary run of belting is not submitted to such severe strains or at all liable to injury, as shifting or cone belts are. It is always safe to add to the estimated size of a belt a certain amount of any unforeseen happening. Many engineers are willing to do that; to figure out what they consider the proper size of a belt and its proper speed, and then to make the belt somewhat larger than their figures call for, and thus be sure and be on the safe side, so that the belt shall give no trouble. But it is questionable if this is a proper way of establishing a rule for belting, however much might be said for it on the ground of preventing trouble with belts in actual operation.

To apply to ordinary belting the rules governing the severe service of shafting and cone belts is undoubtedly to make the belts larger than there is any need, and we can see no justification in it, or in any scheme that proposes to use an excess of material simply to be sure and have enough. The experiments noted are interesting as a record of the life of certain belts in a machine shop, but the conclusion cannot be applied very satisfactorily to any other kind of service.

The whole matter of the strength of belting is wrapped up in some uncertainty. No tests of belting can ever be made that can be universally applied, for there are so many different conditions in the problem, and these conditions appear from the manufacture of the belt, and the degree of care and quality of material, clear through to the use to which the belt is put. Experiments are difficult to make, for they must cover a long term of years, and any conclusions drawn from a short observation must be very little better than surmise. But it is necessary to establish a direct set of experiments to obtain some data on the matter, for engineers can watch the performance of different belts from time to time, and where a belt is giving excellent service an effort can be made to put in a new belt that will do service as the old one has done. This has been the general practice, and from it engineers have established different rules, but nearly all of them call for a smaller belt than is proposed by the late experiments we have noted. And no trouble has resulted, either in the case of the belt or in lessening its life, to use this higher load to the inch width of belt.

Our regular mill practice will be found to average a pull of 65 to 70 pounds for each inch width of double belting, and while it is always safe to say that a lower strain will be easier on the belt, yet no difficulty has been experienced from this practice. Where belts give trouble we believe that the difficulty will be found, not in fact that they have too much strain upon them, but in carelessly made and laced belts, and a lack of care in putting up and using them.

LEGAL DECISIONS.

ARTHUR V. GRAND TRUNK RAILWAY CO.—By the Railway Act of Canada a railway company has power to divert any water course, subject to the provisions of the Act; but in order to entitle themselves to insist upon the arbitration clauses of the Act, the company must, according to the Court of Queen's Bench, show upon their registered plans their intention to do so. Every proprietor on the banks of a national stream has the right to use the water, provided he uses it as not to work any material injury to the rights of other riparian proprietors; but so soon as he uses it in such a way as to diminish

the quantity or quality of the water going on to the lower proprietors, or to retard or to stop its flow, he exceeds his own rights, and infringes upon their's, and for such infringement an action lies. The defendants built an enlargement which entirely cut off the plaintiff's access to the water or stream by diverting it from his farm. Held, that it was the fact of the defendants having diverted the watercourse, not the fact of the plaintiff having sustained damage from their doing so, that gave him his cause of action; and the proper mode of estimating the damages was to treat the diversion as permanent, and to consider the effect upon the value of the farm that the permanent abstraction of the water should have.

CURRENT COMMENT.

THERE are eighty-seven flour mills in the district of Castellamone di Stabia, Italy, and 213 paste manufactories at Cragnano and Torre Annunziata, which turn out on an average 65,726,760 pounds per year, worth \$2,368,716, of which nearly 20 per cent. is exported to the United States. Italian exporters of macaroni receive a drawback on that made from foreign grain by presenting their statements at the custom house.

IN Germany anything in the shape of food adulteration is sharply punished. To sell wheat flour containing a particle of rye, or the reverse operation, is a great offence in the eyes of the law. Not so long ago a baker in a large way of business, was sent to prison for selling a 10 per cent. admixture of bean flour. A sensation has been caused by the recent proceedings taken against a baker at Halle on the Saale. Some rye bread seized by the police on his premises was submitted to the town analyst. The latter reported that some loaves, although ostensibly pure rye bread, were baked simply and solely from wheat flour.

WILL wheat growing pay in Australia? Discussing this question, a writer in the *Australian Miller* observes that the wheat lands in Australasia are not, as a rule, rented by occupiers, but are freehold, being purchased from the State by deferred payments. They are worth from £2 to £5 per acre. Real estate loans can be obtained at 5 to 7 per cent. The average rental is from 2s. to 5s. per acre per annum. The farm laborers get from 15s. to 20s. a week, with board, and work ten hours a day. There is little manure used; its cost is about £6 per ton. The same writer goes on to say, wheat-growing in Australia pays; its production is decreasing in old districts, but increasing in new districts.

AMERICAN millers who export to China, and other countries of the far East, are beginning to feel the competition of the large modern roller mills which British enterprise has built at Bombay and Calcutta, in India. That country has an exportable wheat surplus of many millions of bushels annually, and finds that it is more profitable to export wheat in the concentrated form of flour than in the grain.

Some have been disposed to question, says the *American Miller*, the statement, which we made some time since, to the effect that hard times affected the consumption of flour but little, and individual instances have been cited to show that less flour was being used than in good times. It is doubtless true that there is less waste of bread and flour in hard times than when people are prosperous; but we still insist that the aggregate consumption is affected but little. In Great Britain, where it is easier to keep track of such things than in a domain like our own, the consumption of bread is remarkably uniform. The consumption there for the last year is placed at 5.7-8 bushels per capita. Beerbohm estimates the consumption at 17,600,000 bushels per month in May, June, July and August; 18,800,000 bushels in September, October, March and April, and 20,000,000 bushels in November, December, January and February. Hard times in England always noticeably affect the consumption of meat and beer; actual figures are obtainable from the government on this last article, but the consumption of bread seems to be affected but little, if at all.

Six barges loaded with 129,000 bushels of wheat for W. W. Ogilvie, have reached Montreal, the first consignment of grain to arrive there this season.



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THE GENERAL SURVEY.

IT must be admitted that an analysis of the size of wheat stocks on hand for the month just closed, contrasted with 1893, and four or five years previous, does not afford much encouragement to a fulfillment of President Van Home's two dollar wheat prophecy. Allowing the pendulum to swing, perhaps, to the other extreme, there would seem to be more reason to rest results on the prediction of a local grain dealer and miller, who, within the past few days, stated that if the new crop should nearly reach the figures of last year, that with the enormous surplus of stocks now on hand, it would be as difficult to sell wheat at 50 cents the coming season as it is to-day to find buyers around 60 cents.

Bradstreet's has gone quite fully into this question in a late issue. The fact is recalled that total stocks of available wheat in the United States and Canada, both coasts, on April 1 last amounted to 98,367,000 bushels, fully 10,000,000 bushels less than was reported available on April 1, 1893, one year before. "The significance of recalling these totals," says this authority, "lies in their being compared with the corresponding totals for May 1 this year and 1893." It is shown that United States and Canadian available wheat stocks on May 1, 1894, while smaller than those held at corresponding points a year ago, are not as much smaller as those held April 1, 1894, were smaller than those of a year previous. Go back two years, to May, 1892, and it is learned that these stocks are 40,000,000 bushels in excess of the stock of that period, 53,000 bushels larger than in 1890, more than 55,000,000 larger than those in 1889, and 44,000,000 bushels larger than on May 1, 1888. Of the ability of the country, therefore, to meet all calls between now and the harvesting of the next crop, there is nothing to cause worry.

If a comparison is made of supplies in and afloat for Europe on May 1, 1894, with corresponding dates of previous years, the situation rather than showing signs of relief becomes exaggerated. The figures for May 1, 1894, show 79,250,000 bushels, as compared with 77,592,000 bushels on April 1, 1894, showing, as Bradstreet's remarks, that Europe is continuing to moderately increase supplies of this staple food product. Compared with total European supplies afloat and on shore May 1, 1893, the increase is 6,430,000 bushels, about 11 per cent. The extraordinary character of the situation is made more apparent when the excess of supply here, on the high seas, and Europe, is contrasted with the aggregate on like dates two, three, four and five years ago. Bradstreet's figures are as follows: Increase compared with 1892, more than 44,000,000, more than one-third; 1891, more than 75,000,000 bushels, about 80 per cent.; 1890, 94,000,000 bushels, an increase of 125 per cent.; and as compared with the total in the United States and Canada, afloat for and in Europe on May 1, 1889, the increase is 84,900,000 bushels, nearly 100 per cent.

Allowing that the same decrease will take place in stocks on this continent and Europe during June and July, as may be indicated from an average of the past few years, and this will be carried over, according to the figures here produced, on July 1, 1894, into the new crop year just about as large a surplus as was reported available at that date in 1893, when the total was 152,308,000 bushels, 50 per cent more than was held in July 1, 1892, nearly twice as much as on July, 1891, and more than twice as much as on the like dates 1890, or in 1889.

What the new crop will be cannot with certainty be stated so early in the season. It is thought that the acreage of wheat in the United States will be less than that of a year ago, by perhaps 20 per cent, but this will not necessarily mean any marked diminution in the size of the crop, as compared with last year.

The provincial government report, issued on 16th April, and which is published elsewhere in these

columns, does not give the most favorable account of fall wheat, but those who have been over the ground since that date, tell us that a great improvement has taken place, and that in many places the outlook for a good crop could hardly be brighter.

In Manitoba seeding has been rather later than usual, and the drawback of excessive moisture is still being met, there having been more water on the prairie than in any year since the spring of 1882. These are conditions that will not be so encouraging to a large growth of wheat in the Northwest.

Crop reports from abroad tell generally of favorable conditions, and a large yield.

Prices continue as depressed as ever, and in actual trading little is being done.

CURRENT PRICES OF BREADSTUFFS.

WHEAT—Toronto—White and red 58c, middlefreights; spring 60 to 61c; Manitoba, 72c. for No. 1; 71c. for No. 2. Trade Bulletin of Dominion Millers' Association, says: "Car wheat worth 63 to 64c. on track, Toronto, for fall wheat, street prices: fall 62c., red 61c. goose 58½c. Manitoba wheat: Have been buying No. 1 hard 72c. west, and 74c. east; No. 2 hard 71c., and 73½c. east; prices nominally, 78c. for No. 1 hard, and 76c. for No. 2 hard, via North Bay, and grinding-in transit, via Sarnia, 79c. per bushel asked for No. 1 hard. Hardly anything offering all rail." Montreal: No. 1 hard, Manitoba 78 to 80c.; No. 2, 73 to 75c. Chicago; No. 2 spring, 57c.; No. 2 red, 57c.; Duluth: No. 1 hard 61½c. for May; 61½c. for July; No. 1 northern, 59½c. bid for May; 60½c. bid for July. Toledo: 56½c. cash and May; 58½c. for July; 59½c. for August. St. Louis: 53½c. for cash and May; 54½c. for July; 55½c. for August.

BARLEY—Toronto—In anticipation of favorable legislation from the United States affecting the market for barley, it is reported that in some districts, noticeably the Midland district, an increased acreage is being sown in barley. Locally the market is quiet. Little demand for malting grades, and feed is quoted at 39 and 40c. Oswego: market for Canada barley is dull and prices nominal.

OATS—Toronto—Demand steady. Mixed selling at 33½c. and white at 34c. Cars of white on track are quoted at 37c. Montreal: 40 to 41c. Buffalo: oats stronger; No. 1 white, 40½c.; No. 2 white, 40½c.; No. 3 white, 39½c.; No. 2, mixed 38½c. Oswego No. 1 white, 37c.

PEAS—Toronto—Sales are slow, though prices remain firm. Prices are ruling at 54c.; white 55 and 56c. is being paid. Montreal 70 to 72c.

RYE—Toronto—Very quiet. 45c. is current price. Montreal 52 to 55c.

HUCKWHEAT—Toronto—Car lots quoted at 40c. to 41c. Montreal: 45c. to 48c.

THE FLOUR MARKET.

A TOUR among the mills and persons interested in flour milling indicates no change for the better. The sales are small, so far as local consumption is concerned, while export trade is about at a standstill. Said a leading exporter and miller to the writer a day or two ago: "My mill is closed down altogether. There is too much flour on the market. Of course I have a good supply of stock in shape to transform quickly into flour if an improvement in trade comes, but nothing points in that direction now." Our shipments to Quebec, Maritime Provinces, the Indies and Newfoundland are all of the lightest kind. Prices rule at same unprofitable figures. Trouble among the employes of several of the larger mills of Minneapolis was a means of closing down for a time these mills, and reducing the output as a consequence. Reports from this milling center are on a par with those from less ambitious points. Orders are small and in some cases quotations are being shaded in order to secure business. Last week Minneapolis mills ground 160,000 lbs. of flour against 206,030 week before and 139,160 in 1893. Bakers' are in main demand with exporters. Export shipments were 40,090 bbls. against 48,900 the previous week. As little in the way of encouragement is to be said of the British flour market as has been written for some time.

PRICES OF FLOUR AND MEALS.

Toronto.—Flour: (Toronto freights) Manitoba patent \$3.70 to \$3.75; Manitoba strong bakers' \$3.45 to \$3.50; Ontario patent \$2.90 to \$3.00; straight rollers \$2.60 to \$2.95; extras \$2.40 to \$2.50; low grades, per bag \$1.85 to \$1.00. Bran \$16.00 to \$16.50. Shorts \$16.50 to \$16.75. The Trade Bulletin of the Dominion Millers' Association says of Ontario flour: Sales of straight roller \$2.80 and \$2.90 and 85% patent \$2.85, and 80% patent's \$3.00 f. o. b. for Lower Provinces. Bran \$14.75 and \$15.00 west and \$16.00 east; shorts \$16.00 f. o. b. Export markets some sales reported of straight grade at \$2.70 west and \$2.80 east per bbl.

Montreal.—Market very quiet. Patent winter \$3.50 to \$3.70; straight roller \$3.00; extra \$2.70 to \$2.80; superfine \$2.50 to \$2.75; strong bakers, Manitoba \$3.40 to \$3.50; spring patent \$3.60. Meals: granulated in bbls. \$4.40; in bags \$2.20 to \$2.30; standard in bbls. \$4.40; in bags \$2 to \$2.10. Bran \$19; shorts \$19.50; mouille \$22

Halifax.—Hungarian patent Manitoba, \$4.35 to \$4.50; Manitoba strong bakers \$4 to \$4.20; Canadian pastry \$3.90 to \$4; 75 per cent. do., \$3.45 to \$3.60; straight roller, patent \$3.10 to \$3.20; superior extra patent \$2.75 to \$2.85; extra \$2.50 to \$2.65.

THE WORLD'S CONSUMPTION OF COAL.

A STATISTICIAN has attempted to determine approximately the world's consumption of coal. He estimates that in generating steam for engines aggregating 10,000,000 horse-power (some authors rate the world's engines as high as 20,000,000 horse-power) coal is burned to the amount of 12,000 tons per hour. For gas for lighting the consumption is not less than 10,000 tons per hour, and for gas for heating and motive power, probably 4,500 tons. In metallurgy the use of coal reaches about 9,000 tons per hour, and in workshops and factories, 5,000 tons. It is difficult to calculate the quantity employed for domestic purposes, but 55,000 tons per hour, or 1,300,000 tons per day of twenty-four hours seems to be an under-estimate. Placing the actual daily consumption for the entire world as low as 1,600,000 tons, we find that a solid cube of coal more than one hundred yards on a side is burned up every day.

ABOUT STEAM BOILERS.

DURING my twenty years' experience with steam boilers, says a writer in Power, I have taken note of the following points, which may be of interest to readers. A boiler should never be blown out while hot. Portable tubular boilers should stand at least twelve hours after the fire is out before letting out the water. Stationary boilers should stand long enough to allow the brick walls to cool. I usually let my boilers stand from 18 to 24 hours, and by so doing I keep the dirt in solution and can wash out without any trouble. In case there is any scale I use a boiler pick and a good scraper. When there is any lime in the water, the latter should pass through a good purifier before being pumped into the boiler. Water should never be pumped into a boiler cold, as it makes hard firing and allows all the impurities in it to enter the boiler. In case the scale is hard, and cannot be easily removed, saturate it with coal oil before filling the boiler with water. This will loosen the scale without harm to the boiler. A good skimmer properly attended to will do much toward keeping a boiler clean, but cannot be relied upon. All boilers should be once in two weeks, as they are often broken by relying on some automatic device for keeping them clean that fails to do its work.

Mr. J. D. Saunby, of London, Ont., the well-known miller and member of the executive of the Dominion Millers' Association, is named as a likely candidate in the Liberal interests for the Local Legislature.

The next meeting of the executive of the Dominion Millers' Association will be held in the Board of Trade Building, on Tuesday June 12. Millers having matters they desire to bring before that body are requested to send their communications to the Secretary, Mr. C. B. Watts.

VIEWS AND INTERVIEWS.

Speculative Flour Buying.

Flour-buying, despite all that may be said to the contrary, says the Practical Baker, London, Eng., is largely speculative as to quality and resembles very much the process of buying a pig in a poke. Some clever people profess to be able to judge flour from samples, but our opinion is that the only reliable test is a baking one. Laying regard, therefore, to the fact that the only tested by nineteen bakers out of twenty, is that of the batch, there is considerable difficulty in apportioning blame or praise where two or three marks are used.

No Longer True.

Some of the proverbial sayings, which have come to be looked upon with the greatest reverence and to be quoted almost with awe, are, as a matter of pure fact, the greatest possible untruths. Take the following:

"The mill will never grind
With the water that has passed."

stuff! We once knew an old miller whose mill was run by the water of a stream which could not be depended upon the year around. The reservoir, or supply source, emptied its water at a greater rate than that at which it was replenished in the dry seasons. The old man had a little steam pump rigged up and a line of pipe laid which conducted the spent water back into the reservoir and so used it over again and is using it yet. He never sings the song in which the above lines occur; he has no poetry in his soul, but he knows how to make some of the poets look very silly.

No Going Backward.

I can conceive of no good excuse for a miller who allows his mill to go backward, writes "Jasper" in Roller Miller. He should keep it up to a certain level of performance anyway. It is better, though, to be constantly bent on improving. But in seeking ways to improve he should not go impulsively into anything new, but proceed cautiously, never taking any step that he cannot immediately retrace should the result fail to meet his expectations. Some, less wise, would never in such a case think of returning to the condition just abandoned, but go right on from one experiment to another, until the system is impaired in a number of parts and the starting-point wholly lost sight of. A miller hears of a change made in a neighboring mill which produced greatly improved results. Upon making a like alteration in his own mill he finds, to his surprise and disgust, that it proves a failure. He knows, however, that it was a success in the other mill, and so, without stopping to reflect on the differing conditions of the two mills and their influence on results, he persists in vain efforts to duplicate the work of his neighbor. Such a miller calls to mind the true saying that "one man's meat is another man's poison."

What is Success?

It is a truism to say that we all aim at being successful. Yet I may say, says Mr. Albert E. Humphries, an English writer, Who is a successful miller? Is it the man who, year in and year out, makes a thoroughly good sack of flour? It is hard to believe that a successful miller would turn out an indifferent, or, what is worse still, an irregular article. Yet it certainly does not follow that that quality constitutes success, for many a firm has made the best of flour and failed miserably. Nor does a long percentage of necessity imply successful milling. I have myself, for six months together, been able before now to turn out 74 to 75 per cent. of good flour from uncleaned wheat, whilst for another half year I have only obtained less than 70, and yet beyond question the low per centage represented much better, because more successful, milling than the high, all attendant circumstances considered. Nor does it of necessity follow that low working expenses indicate successful management. All of us would aim at keeping them down, but most of us would gladly part with a spat to catch a mackerel. In short, the only true test of successful milling is furnished by the complete balance sheet and the profit it shows. It would not at all times be fair to judge a miller's capacity by the profits he

makes. Circumstances over which he has no control may be too much for him, but the fact remains that profit is the only true index of successful milling.

Scientific Milling.

Whether or not milling is to be considered an exact science may be an open question. But this much in the opinion of a writer in the Milling World is clear. "There is no point at which the miller can really afford to be anything else than exact. His building and programming must be exact. His grain-buying must be exact. His cleaning, his breaking, his reductions and his purifications must be exact. The need for exactness does not end with the purely mechanical part of milling. The miller must market, advertise, sell, hold, deal and collect on exact lines, or he will fail in business. The mechanical part of the business is sufficiently exacting, but it is, after all, only a preliminary to the important work of getting rid of the product for more money than it cost to produce it. Does any miller object to this view of his business? What basis of objection can he offer? There have been times when certain millers claimed to grind for high art principally. The history of those times and the record of what followed them prove that milling is after all, done for the purpose of making money. The Hungarian millers were the "old masters" in the "high art of milling." So long as profit margins were comfortably large, the Hungarians could and did maintain that they ground, not alone to make money, but to "produce the highest grades of flour known on earth." What happened? Competition cut down the margins of profit. Then the Hungarians dropped from the "non paying "artistic plane" to the paying utilitarian plane of operation. Finding their great canvases unprofitable, they came down a peg and have gone into the business of turning out the more profitable, or at least the less unprofitable, chromos. The notable reduction made several years ago proved the intimate relations that exist between the so-called "artistic side" and the acknowledged "money side" of milling. The pressure of the flood of American flour on European markets taught consumers that only a certain degree of fineness in flour is desirable, and that to pay more for a greater degree of fineness is not economy. At the same time that pressure forced the Hungarians to do what they never would have done willingly. To-day it is not easy, if it be at all possible, to find many millers "milling for art." The consumers have assumed the role of critics, and their dollars measure the situation for millers.

KIND WORDS FOR "THE MILLER."

OUR esteemed Canadian contemporary, the Toronto, Ontario, CANADIAN MILLER, has passed from the possession of Mr. A. G. Mortimer into the hands of its former owner, Mr. C. H. Mortimer. The change was made with the March issue of the journal. We welcome Editor C. H. Mortimer back into the milling-journal ranks and wish him success. The CANADIAN MILLER is a good journal, and it should have the support of every miller and manufacturer in the Dominion. Milling World.

WE notice from the last issue of the CANADIAN MILLER that the same has changed hands and wish the new firm continued success and prosperity. The CANADIAN MILLER is a publication that millers of the Province can well be proud of. The new firm assures its readers that they will do all they can to improve this already bright and useful journal and should have the patronage of every miller in the Province. United States Miller.

PERSONAL.

Mr. Andrew McFall, miller and grain merchant, of Bolton, Ont., died at his home on the 28th ult. Deceased had been sick for some time back, and, after a visit to a New York physician, it was hoped he would mend, but he gradually grew worse, and finally passed away. Mr. McFall will be greatly missed in Carlwell, where he has been a prominent and successful grain merchant and miller for years. Deceased was a man of kindly disposition, and a firm friend of the poor, who will miss his many kind acts. In religious matters he took a deep interest, being a member of the Presbyterian lady. Politically Mr. McFall was a Liberal Conservative.

A WORD OR SO ABOUT REELS.

CIRCUMSTANCES alter cases. Many of us quote this from time to time without full appreciation not merely of how true it is but of how often it is true. Circumstances are constantly greatly altering cases in nearly everything in our lives and work. One of the thousands of instances in the mechanical world, in which the same thing will produce different results under very slightly different circumstances, is the clothing of flour-dressing reels, and in fact of all kinds of rotating cylindrical or prism shaped screens. The diameter of the reel or screen, as well as the height at which the feed strikes the cloth, modifies its action so as to produce variations in the diameter of the particles which pass through.

We all know that it is desirable to have the particles of flour or of middlings in a given cut-off of the same diameter, as well as sharp and free flowing. I do not think that millers have given sufficient attention to the fact that if they have two reels of different diameters clothed with the same silk, or two of the same diameter running at different speeds, the product will not be of the same degree of fineness; nor that they have thought that if there are two of the same diameters and speeds but having the feed strike them in different places, the product will not be the same. Neither do they pay much attention to the fact that the same piece of silk will let several grades of fineness pass through it at the same point in its length, by reason of some of the particles passing through it at a point higher up than others. Of course where there is a cylindrical reel of any kind it will pass a larger particle in a radial direction than in one oblique to the radius; and where there is a prism, the side that is steepest will not let as large particles pass through as the side that is on the bottom or that has any other less inclination from the horizontal. Also, when a reel is running, slowly it will let larger particles pass through than at a higher speed. This being the case we must expect to find in the same cut-off, particles of very differing fineness; this we often do; and we must also expect to find the angle at which the materials presented to the silk make a difference in the capacity of machine. This is also the case. Mechanical News.

UNITED STATES WHEAT CROP.

THE following despatch from Washington, D. C., was published in the daily papers a few days ago: "The people of Ontario who are interested in the outlook for the wheat crop in the United States will be interested in a statement made by a gentleman whose business is to gather information for one of the largest buyers of wheat in this country. He said that returns had been received at his office from the entire wheat producing country of the west, and that the season had now so far advanced that it is most unlikely that any climatic conditions could seriously affect the wheat crop. So he said, speaking with a good deal of seriousness of manner, that he feared there was little comfort for the farmers, because the indications now are that the wheat crop would be enormous, perhaps phenomenal, while on the other hand there seem to be little ground for hope that the price of wheat would increase. To use his own words: "Unless some sudden emergency arises somewhere else in the world causing a shortage in the crops, and an unusual American demand, this great crop of wheat is likely still further to depress the price. To be sure we are exporting flour. It is even going to South America, because American flour is of such quality that Chilean mills cannot compete with it. We shall maintain our pre-eminence as flour-makers, because the American flour mill plants are as near perfect as possible for machinery to be, and the product of them, so far as the best qualities are concerned, cannot be equalled anywhere in the world." Yet this man points out that such is the business stagnation, so far reaching is the tendency to economize, and so low are the prices for wheat that to day the very best, the superlative quality of flour, is put upon the market at \$3 a barrel. Notwithstanding that low price it has been found that thousands of American families are buying flour of a little cheaper grade.

Eight Canadian vessels are being loaded with corn at Toledo, Ohio, for direct shipment to Europe, via the St. Lawrence route.

Mr. W. W. Ogilvie, of the Ogilvie Milling Company, Montreal, and president of the Montreal Board of Trade, recently interviewed the Comptroller of Customs at Ottawa regarding the reduction of the duty on mill-lags.

ROLL SUCTION.

By WILLIAM G. CLARK in "ROLLER MILLER."

THE benefits derivable from a properly constructed and well-working roll suction are many and can be almost demonstrated in practice ; indeed, it would be almost impossible to secure the highest results in a mill without suction on the rolls. I speak from tolerably thorough experience, having built and operated a number of different suction devices of my own invention.

My first was made of heavy galvanized iron main trunks, with the tributary trunks and the spouts from rolls of the same metal in lighter weight. I prefer to run the trunks above the rolls and connect to these by smaller spouts, because the hot air tends to rise and therefore a lighter current is required to draw it upward from the rolls than in any other direction, while at the same time less flour is thus carried away. This is the proof of a good suction, that it takes off all the hot air and the minimum of flour dust.

I find, however, one serious objection to the galvanized iron : it scales up and finally rusts out under the

into the openings without binding. This arrangement does away with the necessity of fastening the spouts up by screws, and leaves them free to be slipped in and out when they have to be cleaned. A slide inserted in the spout will regulate the opening to accord with the amount of suction required to keep the rolls cool.

A trunk built of wood as I have described has also this advantage over one of galvanized iron, that it cleans itself, while the latter has to be cleaned out by hand at least once a week.

The speed of the fan should not be greater than is actually necessary to draw off the hot air. On 20 stands of rolls I run my fan at about 900 a minute, with 12-inch blades. Avoid abrupt turns in the air spouts from main trunk to fan. Make the trunk quite as long as the line of rolls. If two lines of rolls are to be drawn from, place the trunk overhead between the rolls and run the spouts up on each side of it ; if three lines, put in tributary air trunks and spout to them from the rolls, thus avoiding long spouts.

Suction on the rolls, besides making possible a cleaner

ignorantly advised owner as to the working pressure was blamed. Owner to pay 20 shillings and the black smith £20, costs.

We commend this to all parties interested in steam boilers. The acts have been in force a number of years, and have given good satisfaction. A similar act in Canada would do much to improve the steam applications, and would make owners careful as to what kind of a man they employed.

The investigations refer not merely to what are usually called boiler explosions, but cover accidents to any connection of the boiler which is under steam pressure. The breaking of a steam pipe, the rupture of a tube or the bursting of a blow-off pipe must be reported, hence owners are much more careful.

Some of the accidents investigated were of boilers which were insured. The report says : "As regards the Boiler Insurance Companies, no cause has arisen in connection with the working of the Acts which shows any serious neglect on the part of their inspectors, nor has any blame been attached to them by the Court in any formal inspection which has been held during the year."

ENGLISH STOCKS.

BY the end of April the English wheat crop will be practically exhausted. So writes a responsible and influential miller in the west of England, says the Corn Trade News, using a phrase that should become historical, if the situation is half as bad as the cloud of witnesses, whose evidence follows hereafter, certainly testifies. With but two exceptions, viz., in Devonshire and in the East Riding of Yorkshire, where our correspondents estimate supplies are relatively large, there appears to be no district in England but where reserves are almost perilously small. Taking an average of the reports, it is fair to assume that the deficiency in farmers' hands, as compared with the corresponding date last year, exceeds 30 per cent., and that the percentage of the whole crop used for cattle food amounts to 20 per cent., in comparison with about 10 per cent., as is usually the case.

On account of the high price of straw, it is asserted in more than one district that a larger proportion of the crop has been already delivered than would have otherwise been the case.

To ascertain approximately the actual quantity of English wheat that may be depended upon between now and the end of the current year during 19 weeks, we will inquire what was delivered last season and deduct the percentage of 30 as aforesaid. Last season the quantity delivered between the 18th of March and 29th of July was 2,000,000 qrs., so that not more than 1,400,000 qrs. are likely to be delivered, at an average weight of 73,000 qrs. per week during the remainder of the season. As it is apparent that millers' invisible stocks have been drawn upon considerably during the last few months, there is every likelihood that for the remainder of this season there will be experienced a large and constant demand for imported grain. Taking the requirements in the aggregate they amount to 10,000,000 qrs. for the ensuing 19 weeks, towards which British farmers may be expected to contribute 1,400,000 qrs.; leaving the net demand for foreign at 9,200,000 qrs. or 484,000 per week. To help in meeting this demand there are merchants' stocks at the ports amounting to 2,146,000 qrs., which probably however, cannot be drawn upon to any great extent without affecting prices unduly. Of the quantity on passage, large as it is in the aggregate, only 1,345,000 qrs. of it is on the way direct to the U. K., so that at present there is no plethora of breadstuffs in sight for this country.

AN ARGENTINE WHEAT KING.

THE "wheat king" of the world belongs to Argentina. He is an Italian immigrant named Guano. and his broad acres are situated in the south of the province of Buenos Ayres. His crop of this season, which he has just finished harvesting occupied an area of 66,730 acres, which is a trifle in excess of 100 square miles, and does not fall far short of the area of the Welch county of Flint, or of the Scottish county of Linlithgow. He numbers his workmen by the thousand, and he loads 3,500 railway trucks with wheat grain, all of which he grows on the share principle with his men.

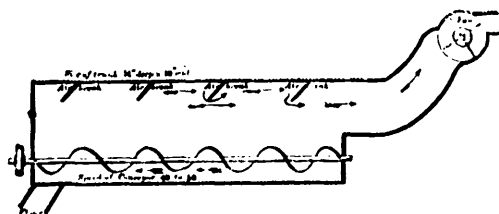


FIG. 1.—End elevation, showing trunk, conveyor and fan. Speed of fan depends on its size. Too much speed will lift an unnecessary amount of flour.

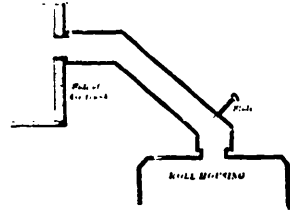


FIG. 2.—Showing how to cut removable screwless spouts. Shoulders in 7/16 inch spout to be 7/16 inch.

action of the moisture which is condensed on its inner surface from the hot air by reason of the cold air which passes over its outer surface. I therefore built a wooden trunk with a conveyor under it and had all the spouts heavily shellacked inside and out. Besides, I covered the trunks with paper, which is well known to be a non-conductor of heat and cold. The results have since been very satisfactory : the spouts free of sweaty or pasty flour.

The accompanying sketches will make clear the construction of my device and be a guide to any readers who may wish to arrange for themselves an efficient and economical roll suction. The main trunk (see Figure 1) is 14 inches deep and 10 inches wide, not including the height of the conveyor box, which should be determined by the size of the conveyor shaft. The flour that settles in the conveyor should, if possible, be carried to the end opposite that in which the fan is placed, as the weaker suction is less likely to lift the settled flour dust. The air brakes should be 5 inches deep and fastened to the top of the air trunk two or three feet apart ; this arrangement causing a great deal of flour dust to settle in the conveyor and relieving the dust collector that works in connection with the fan.

I find the tubular dust collector the best thus far for this sort of work ; it is not affected by hot air as are those collectors that contain exposed metal surfaces.

The opening in the trunk that leads to the fan may be in either the top or the end of the trunk, according to the position of the fan in the mill.

Fig 2 shows the end elevation and the manner of running. The spout from roll housing to air trunk should enter the trunk about four inches from the top.

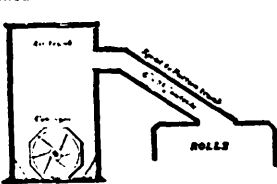


FIG. 3.—End elevation, showing how spout is run from rolls to air trunk.

The roll may be tapped at either the side or the top of the housing, preferably at a point higher than the center of the rolls. The spouts should be about 6 x 3 1/2 inches, outside measure, and be made of well-seasoned 7/16-inch stuff. Two or three coats of shellac should be applied inside and out. Top and bottom should be screwed on. The end of the spout can then be shouldered about 7/16 inch deep and for a length equal to the thickness of the boards on the housing, and cut so that they will slip

mill, ensures by cooling the meal from the rolls an increase of capacity in the bolting of all products. Besides the rolls themselves will do more and better work through being kept from getting too hot for uniform grinding, and the roll housings and feeds will not have reason to sweat and warp.

Altogether, I regard roll suction as indispensable where really good milling is wanted. Its cost is trifling compared with its benefits, and it makes the operative miller's life better worth living.

THE BRITISH BOILER EXPLOSIONS ACT.

IN Britain there are acts of Parliament relating to the use of steam boilers known as The Boiler Explosions Acts, 1882 and 1890. Under these Acts the owners of steam boilers must report every accident of the nature of an explosion within 24 hours of its occurrence. From the last report to the Secretary of the Board of Trade by the Solicitor having charge of the workings of these Acts, we learn that the year ending June 30th, 1893, there were 71 investigations held. Some of these were merely preliminary inquiries, but 26 were formal investigations. Of the 71 accidents, 32 were from deterioration, or corrosion or some part of the apparatus having become defective. 23 were from ignorance or carelessness on the part of the attendant, 8 were from defects in design or workmanship, and in 9 cases the causes could not be definitely placed under any of these divisions.

It is interesting to note that the English law does not compel a boiler owner to place his boiler under the charge of a man holding any kind of a certificate, but the law holds the owner responsible, and in event of an accident he must prove that he employed a "competent" man. It goes further, and if at any of these formal investigations, it is proved that the accident was due to negligence on the part of anyone, whether attendant or owner, maker or seller of the boiler or its attachments, the law is strong enough to reach him, and inflict some form of punishment.

Here are samples from the report before us. No. 582. Manufacturing engineers blamed for reckless conduct, and to pay £20 costs; No. 590.—Managing director blamed for neglect and ordered to pay £40, costs; No. 608. Owner blamed for not employing a competent person and ordered to pay £85, costs; No. 623. Owner blamed for want of proper supervision, and attendant blamed for neglect. Owner to pay £20, and attendant £5, costs; No. 651.—Owner held responsible for negligence of his engineer, and a blacksmith who

NOTES ON BELTING.

THE best location for the idler pulley on high speed belts, says F. W. Taylor in the American Machinist, is on the slack side of the belt, and about one quarter of the way from the driving pulley. In this position it wears the belt far less than if placed close to the driven pulley, as is customary; and the tendency of the idler to guide the belt off the pulley, in case it is slightly misplaced or the belt stretches unevenly, is far less. The writer is aware that this is contrary to the accepted theories on the subject, and he has only arrived at this conclusion after repeated trials.

Belts drive satisfactorily when their shafts are 20 to 25 feet from center to center. If they are farther apart than this, the slack side is apt to flop about too much; and if the distance between centers is much less than 20 feet, they require tightening oftener than is profitable.

With main driving belts it is often desirable to use a longer distance from center to center than the above, so as to secure a greater arc of contact on the small pulley.

The faces of pulleys should, where practicable, be made about one-quarter wider than the belts which run on them, to allow for possible uneven stretch or running of belt, and a certain amount of chasing.

In establishments in which the shafting is run night and day by a single motor, it is frequently desirable to stop one or more sections during the night without stopping the rest of the shafting. In such cases it has been customary to use a friction cut-off coupling, or a friction clutch pulley, which is thrown in or out, as the case requires. These appliances are, however, owing to the number of their parts, more or less complicated, and are certain, sooner or later, to get out of adjustment and cause more or less trouble and repairs. The writer has found a far more elementary and satisfactory contrivance for this purpose to be a pair of tight and loose pulleys, to either of which the driving belt can be readily shifted while it is running at full speed, and he has had, during the past two years, lines of shafting transmitting as high as 300-h. p., successfully thrown off and on the main line each night and morning.

The two elements in this apparatus which are likely to cause trouble are, first, the loose pulley, and, second, the belt shifter. The loose pulley which I find most successful for this purpose has a loose bronze bushing in its hub, which is perforated with holes, and is automatically deluged with oil each time the pulley is stopped.

The writer used successfully, for shifting large belts at high speeds, two styles of belt shifters, both of which are old in principle, but which—so far as he knows—have heretofore been but little used. These belt shifters are, as usual, applied to the belt on the slack side, and as close as practicable to the driven pulley. The first consists of a pair of rollers mounted on a movable frame, and having their axes inclined one toward another, forming an angle of about 20 degrees. This frame is then placed so that the plane of the axis of the rollers is at right angles to the center line of the belt, and the belt passes between the rollers without touching either. Belts up from 20 to 24 inches in width are readily shifted by pressing one or the other roller against the edge of the belt, the action being similar to that of an ordinary forked belt shifter, except that the edge of the belt curves downward, owing to the inclination of the rollers, until the body of the belt touches the roller, and in this way the edge is prevented from burning and fraying out.

The second style will readily shift any width of belt whatever, and for wide belts, where space permits, is to be preferred to any other style of shifter. Two rollers, the length of each of which is rather more than twice the width of the belt, are placed with their axes parallel to the plane of the belt, each forming an angle of about 75 degrees with the center line of the belt. They are inclined, however, in different directions to the center line of the belt. When one of these rollers is pressed even with moderate force against the surface of the belt, it will move slowly and uniformly to the right until the other roller is removed. If the other roller is used, it moves in the same manner, but in the opposite direction. The action of this belt shifter, in starting a line of shafting into motion, is much to be preferred to that of any friction clutch, it being exceedingly uniform, smooth and free from jar.

It is undesirable to run a loose pulley for any length of time, however, under heavy belt pressure. Each head shaft, on which the tight and loose pulleys are mounted, should be coupled to the line which it drives with a flange coupling having a plate about $\frac{1}{2}$ -inch thick between the two flanges. When it is desired to stop the line of shafting for several hours in succession, the belt should be temporarily shifted to the loose pulley, the flange coupling should be opened and the distance plate removed, and the belt shifted back to the tight pulley, where it can run without danger from cut or hot bearings. A starting and stopping device of this sort is as durable and gives as little trouble as any part of the shafting. As shifting belts are ordinarily used, they are injured as much by running partly on the tight and partly on the loose pulley as from any other cause. It is, therefore, of great importance that each ordinary forked belt shifter should be provided with some appliance for insuring the belt being either entirely on the tight or loose pulley. We have found a simple and effective plan to be that of cutting two V-shaped notches in the edge of the slide to which the forks are attached, the same width each at the top as the face of the pulleys, and pressing a male V down into these notches with a light spring, the sides of the notches being made so steep that the male V could rest nowhere but at the bottom of one or the other of its mates.

Belts should be cleaned and greased every five or six months, just grease enough being put on to keep the surface of the belt moist and prevent it from cracking. It was found by experiment that every three months was oftener than belts required greasing. Belts will last well if repeatedly tightened under a strain of 71 pounds per inch of double belt, equivalent to 238 pounds per square inch.

It is very important for the life of belts, as well as to avoid excessive friction in the bearings, that they should not be overstrained; therefore, where the conditions permit, belt clamps should be used which are provided with spring balances for weighing the exact tension to which the belt is tightened, and a table should be carefully figured, indicating the strain to which each belt in the establishment should be tightened. In many cases, however, it is impracticable to use spring balance belt clamps in tightening belts, and in such instances it has generally been customary to guess at the amount of belt to cut out; the results of this guessing often prove disastrous both to belts and bearings.

It is safe to shorten a double belt $\frac{1}{2}$ inch for every 10 feet of length, if it requires tightening, when working according to the ordinary rules under a total load of 111 pounds per inch of width, and giving an effective pull of 65 pounds per inch of width. If it works under a total load of 54 pounds and effective pull of 26 pounds, it is safe to shorten the belt one inch for every 10 feet of length.

ONTARIO GRAIN.

THE latest bulletin issued by the Ontario Department of Agriculture and bearing date of April 16th does not give an over-promising outlook for fall wheat, though it is to be remarked that conditions have improved some since that date. In western and northern Ontario the promise is of a fair crop. The report is as follows:

Fall wheat.—This crop had entered a most crucial period, as correspondents wrote, and much uncertainty existed regarding its future prospects. Early in March fine, bright weather prevailed, and the protecting covering of snow disappeared, revealing the fields of wheat in a promising condition in most quarters. The latter part of March and the early part of April, however, was a season of alternate freezing and thawing, and the cold nights and warm days not only resulted in much "heaving" but also browned the tender blades, and left all but well-drained fields with an appearance anything but satisfactory. The situation at the time the correspondents wrote was as follows:—Fall wheat has been seriously set back by spring frosts and absence of warm rains. Should another week or two of unpropitious weather prevail much of the crop will have to be ploughed up or resown; but as the roots are vigorous timely showers and genial weather may carry the fields forward towards an average yield. Where the fields entered the winter with a good

top they are still vigorous and verdant, and those who practice under-draining rejoice in an encouraging outlook. The great fall wheat countries along Lake Erie send rather discouraging reports, and in the eastern portion of the Province, where the acreage is small, the prospects are equally poor for a good crop. In the Lake Huron group the County of Huron gives a cheerful report, while Lambton and Bruce are rather the reverse. The Georgian Bay counties reports are equal in tone, and on the whole the chances are nearly as good as usual. In the West Midland group favorable reports prevail over those of a less encouraging character, and the same may be said of the Lake Ontario counties. So far there has been an almost complete exemption from injury by worms or insects.

Rye. What little of this crop is grown came through the winter in fair condition, although injured by ice. The area of winter rye is inconsiderable, taking the Province over, but here and there in the eastern counties some stout advocates of this crop are to be found.

Farm supplies. There is not much unanimity of opinion regarding the quantity of hay, grain or fat and store cattle on hand. In three western districts of the Province the bulk of correspondents report a surplus of hay and wheat, and in some counties there are more oats than are needed for feeding and seeding. In the Lake Ontario counties there is but little hay to spare, and in the eastern and northern hay, wheat and oats are in store in only moderate quantities.

THE EXPANSION OF CHIMNEYS.

IT is seldom that facilities are afforded for the making of exact measurements of the expansion and contraction of a factory chimney. It is generally conceded that boiler chimney shafts should not be attached to the walls of any important building on account of the risk of cracking the walls by the expansion of heated brickwork, but data on the subject are scanty, and there are even persons who have doubts whether brickwork really expands or contracts when heated. An excellent opportunity of settling this question has recently presented itself in England. It was necessary to erect a casing of ornamental brickwork around a boiler chimney of 90 feet high, the inside of which was provided with a brick flue up to over one-third of its height. The near completion of the brickwork surrounding the chimney gave the opportunity of observing from the top of the casing any movement of expansion or contraction of the chimney itself. As the boiler fires were drawn on Saturday afternoon, and relighted on Monday morning, the chimney cooled down, and observations made from the top of the casing will show a contraction of the chimney of 5 millimeters, or 2-10 inches during that time. As the surrounding wall was still about six feet below the top of the chimney when the measurements were made, and the first 33 feet of the shaft remained practically cold on account of the air space between it and the centre flue, it may be taken that the length of the brickwork in which the expansion took place was about 50 feet. According to this a shaft 100 feet high would expand 4-10 inches when in use. It is probable that the expansion observed would have been 50 per cent. greater if the chimney had been allowed a longer time to cool down.

THE OLD WATER WHEEL.

It lies beside the river: where its margin
Is black with many an old and useless large,
And yeasty filth, and leavings wild and rank
Stagnate and latten by the crumpling link.

Once, slow revolving by the industrious mill,
It murmured, only on the Sabbath still;
And evening winds its pulse-like beating low
Down the soft vale and by the winding shore.

Sparkling around its orbed motion flew,
With quick, fresh fall, the drops of dashing dew,
Through mountain beat that gentle rain was flung,
And verdant round the summer herbage sprung.

Now dancing light and sounding motion cease,
In these dark hours of cold continuous freeze;
Through its black bars the unbroken moonlight flows,
And dry winds blow about its long repose;

And mouldering lichens creep, and mosses grey
Cling round its arms, in gradual decay,
Amidst the havoc of men—which does not suit
That shadowy circle motionless and mute.

—JOHN RUSKIN.

INDIFFERENCE TO BOILER FIRING AND MANAGEMENT.

BY DANIEL ANTHONY, M. E. S. M. E.

OBSERVATIONS extending over a period of a quarter of a century in a practical and professional way have presented opportunities to note, in the greater number of manufacturing establishments, a continuous decline in the grade of service of those in the position of firemen and boiler room managers, this corps of operatives seeming, at least, to have remained in "statu quo." The evil has become so glaring and the results so palpably fraught with disaster, destruction and waste as to warrant an effort to call the attention of those who desire to progress, to the false and inconsistent position which they occupy by permitting such a narrow policy in management, so widely at variance with true economy ignoring directly that the better intelligence renders the more valuable, and, hence, more profitable service.

It goes without saying that, during the past ten years, the concentration of efforts by scientists and eminent mechanics looking to the more perfect development of the steam engine in its various types has produced results which challenge the admiration of the most critical in this line of thought. Within the same period, from every source, there have been a multitude of features in the form of designs and novel applications of boilers, all converging to the important factors of increased economy, efficiency and safety. In the engine sphere, condensing, compound and triple expansion engines, with and without jackets; in brief, seemingly, all the necessary refinements have received and are now receiving close attention. In the boiler domain there has been also the evolution from the plain cylinder type to the tubular, and from that through the multifarious forms of water-tube designs, each striving for a superior degree of excellence. The amount of research and practical application that have been and are being instituted in attempting to increase efficiency and economy, is such as to be incalculable. A retrospect of the past, viewed in the light of present results, shows that these efforts have been of an exceedingly fruitful character.

The development has carried with it the imperative advancement of those in charge of engine management to such an extent as to create almost anew this body of men. Such an intellectual advancement in the department of mechanics, the writer believes, is without precedent, and in every sense challenges admiration from every quarter. Notwithstanding these favorable features we are constrained to say that all this is somewhat like the play of Hamlet with Hamlet left out; or, in other words, we are radically defective at the very threshold of this field, by reason of relegating the firing of boilers to the most ignorant of operatives; or, to put it in a plain way, there seems to be an almost unanimous idea that any one who can shovel and throw fuel is good enough for a fireman. Close observation and contact for a period of years, with numerous plants of varied character, increase the conviction of the writer upon this point. Recognizing, as we all do, that the furnace of the boiler is the prime feature and great initial point from which comes the source of power, does it not properly follow that if economy and efficiency are deserving of efforts in the advanced stages, as has already been pointed out, this is the very point that should be treated with every consideration of intelligence? Should not the fuel, furnace and boiler receive the thoughtful attention that the engine receives from the careful engineer? I think this will be accepted by every one interested in advanced ideas. No one, I think, will question the fact of the importance of the initial point of the boiler and its furnace, and that with mismanagement these other efforts of refinement are rendered, in many cases, completely void. It would seem so simple that argument would be unnecessary, were it not that on every hand the matter is entirely ignored, resulting in waste and destruction. We would ask are not the efforts of the best furnace designers often completely set at naught by reason of the manner in which they are operated? Is it not a glaring fact that in all cities where smoke abatement has been and is being attempted, the great stumbling block is the low grade of intelligence and low grade of the boiler operatives?

In looking upon this subject from a mechanical and engineering standpoint, we are fully alive to all the requirements to give complete combustion and thorough

distribution of heat units, proportion of grate area and openings. Proper amount of air, conduction of the heated gases, all are carefully considered. When all is completed we have the wonderful spectacle of these conditions being turned over to the simple treatment of ram-jam shoveling and slice-bar operations. I claim that the fireman should know, at least, the elements of combustion, the importance of proper management of fires to produce the greatest results with the least expenditure of fuel. It may be said that the application of mechanical stokers makes intelligent firemen unnecessary, a point that is frequently (and I believe without thinking) claimed by those interested in placing such stokers. This is a great mistake, well known by those conducting tests, the results always being superior with the greater intelligence of the operator of the machine.

Within the past few years, in every community where cleanliness, taste and health are considered, there has come forth a crying appeal to the authorities to lesson the great evil of smoke in the atmosphere. In response to this, inventive genius has promptly come forward. The multitude of devices that have been perfected and put in operation furnishes ample testimony of this fact. Many of these, when properly operated, accomplish satisfactory results in smoke abatement, but no inventor has ever had the temerity to label his machine or furnace, "No skilled fireman required." Per contra, it is well known that the most intelligent fireman produces the best results, and it is also an undeniable fact that the best devices are set at naught by incompetent operating. The writer has been brought in contact with large fields of boiler practice, and in many cases, aside from other disqualifications, the firemen were unable to speak or understand a word of the English language. It may be said, as I have heard it said, that these men are not paid to think, but to do. Well, they do do. They will "do up" a coal pile, furnace and boilers with alarming rapidity. I say alarming to those whose views are broad enough to consider the initial and important points. On the other hand, it is a lamentable fact that there are a great number of men in official positions, as superintendents and proprietors of establishments, who seem to be utterly incapable or unwilling to note the importance for the necessity for a higher grade of labor in the firing and management of boilers.

One of the most surprising features in connection with this state of affairs is the tendency of those interested to place boilers claiming, among their numerous merits, that less attention is required for them than for others, precisely on the old exploded claim applied to engines, "No skilled engineer required." I have now before me a letter from a boiler representative, who claims that his boiler will give the utmost satisfaction with one-half the attention that others receive.

What is greatly needed at present is to lay aside the idea that any one is good enough to fire and manage boilers. When you engage a man for your office do you not require that he shall possess some qualifications for the position, and if aptness is shown do you not show appreciation by advancement to a higher plane, the interest being mutual? Why not apply this to the selection of firemen? As it now stands we cannot but exclaim, "Strange, what a difference there should be 'twixt tweekle-dum and tweekle-dee!"

There are many plants in operation where, by incompetency in this line the steam efficiency is greatly lessened, furnaces and boilers are working in neglected conditions, fuel is wasted and the community is begrimed with volumes of unnecessary smoke. In addition to these evils, lives and property are jeopardized. Unless this matter is considered and such action taken as will improve this corps of operatives, it would seem absurd to be continually reaching and extending into the higher refinements of steam engineering. Under these conditions do not the pertinent questions present themselves to the employers: Are we not occupying a false position by this indifference? Do we not retard the development of a class of labor which, by a recognition, by an appreciation, that some skill and judgment are required, would be animated by some spark of ambition to qualify for advanced positions? Is not this condition of affairs a gross inconsistency, nay, a mockery, in the face of the query put by those guilty of this indifference.

Why can we not get better men than this? In reply to that I would say simply, it is not sought on your part. Just as long as this class of operatives is looked upon as mere shovelers, throwers of coal and carriers of water, ignorance with all its attendant waste, destruction of property and general demoralization, will be prominent in the boiler department.

ROCK EMERY MILLSTONES.

THE use of rock emery for millstones is something quite new in the grinding line, and has only lately been accomplished. As emery stands next only to the diamond in hardness, the abrasive power of grinding stones made from this material is something enormous. The rock emery suitable for making these stones is found only in a few countries, the best coming from Greece, though the largest importations are made from Turkish mines. One great advantage about rock emery is that its surface never glazes, and consequently it grinds rapidly and steadily, at the same time producing little heat. Millstones made from this material grind to any degree of fineness with almost no loss of the abrading material. For especially fine work, from 60 to 150 mesh, this is of great importance, as hard substances can be reduced to this size without injuring the stones or cause them to wear away and give an irregular-sized product. These millstones are turned out for all kinds of mills and for a great variety of purposes.

A NEW INVENTION.

A NEW crank, which does away with the dead point, is the asserted invention of a French engineer. The crank-pin works in a slot cut in a steel disc fastened to the end of the shaft, and is pressed upon by a spring, which is so adjusted that at the ordinary working steam pressure it is held firmly in place. If, however, the crank be at a dead point, when the full pressure of steam is admitted into the cylinder, the spring is compressed, the crank-pin slides in the groove so as to assume an angular position to the shaft, and the latter begins to revolve. As the pressure of the steam in the cylinder, while the engine is in motion is less than in the boiler itself, as soon as the shaft begins to turn the pressure against the spring is relieved, and the crank-pin flies back to its usual position. The tension of the spring is adjusted as necessary.

CHAFF FOR THE DUSTIES.

First Mill Proprietor—"Yes indeed, sir, the times are very depressing, very depressing. Only yesterday I received a large foreign order accompanied with the condition that all the flour should be packed in five-hooped barrels." Second Mill Proprietor—"And what did they want of the extra hoop?" F. M. P.—"It was to enable them to whoop up the market."

Roller Mill. That was a great grind I got off on you the other day, Flour. Flour—Oh, go on with your chaff, you've got wheels in your head.

"Waiter!" "Yaas, sah." "Have you some nice wheat cakes and maple sirup?" "Yaas, sah; but, boss, I'd 'vise you not to eat 'em now." "Why not?" "Bettah wait, sah, till it's a leetle darker. De gloamin' is de bes' time for to eat dem wheat cakes an' maple sirup, sah." "Why?" "Waal, you see, sah, de red ants done got into dat maple sirup, an' it's a good deal pleaser to eat it jus' after dusk, sah."

Iowa corn has been making a political and horticultural record this season that justifies some tall stories. But it hardly warrants the following, which a recent arrival from the west brought with him: "I saw," says the recent arrival, "a man standing at the foot of a corn-stalk." "How big is your corn?" I asked the farmer. "I don't know," was the reply. "I just sent one of my boys up to see, and I'm worried to death about him." "Can't he get back?" "No; that's not the trouble. The corn-stalk's growin' up faster'n he kin climb down."

Anything that makes us take an unselfish interest in others makes us better. If there were no troubles to talk about some people would always be silent. One of the hardest things to get people to believe is that little sins are deadly.

THE NEWS.

CANADA.

—The flour mill at Arden, Man., is offered for sale.
 —The flour mill at Neepawa, Man., is to be equipped with new machinery.
 —W. J. Reed, of Reedsville, Ont., is making improvements to his flour mill.
 S. Parish, flour and feed, South Edmonton, Man., has sold out to Juergens & Co.
 —The Otonabee flour mill at Ashburnham, Ont., is to be put in running order shortly.
 —Mr. Scott, of Paisley, Ont., recently shipped 1,000 bushels of oats to Hamilton, Bermuda.
 —Mr. D. Goldie, of Ayr, has purchased the flour mill at Highgate, Ont., the price being \$11,000.
 —Collingwood offers free water and exemption from taxes to anyone who will locate a flour mill there.
 —The flour mill at Cobocok, Ont., with several thousand bushels of grain, was burned April 22nd.
 —W. E. Ellis, of Trenton Falls, Ont., will build a 50-barrel flour mill at Vernon, B. C. He will also supply electric light to the town.
 —R. D. Martin & Co's grain elevator at Pierson, Man., containing about 12,000 bushels of grain, was destroyed by fire a few days ago.
 —A canvas for stock for a joint stock company to establish a flour mill at Virden, Man., is meeting with considerable encouragement.
 —The Allandale Mills, owned by the Messrs. Humphries, of Allandale, Ont., were burned to the ground a fortnight ago. The mill was originally built by Thos. Short. "Lost about \$26,000; insured.

The municipality of Oakland, Man., is desirous of securing the erection of a flour mill in that district. A \$5,000 bonus, free site, and a railway switch are offered as inducements.
 —The partnership heretofore existing between Preston & McKay, millers, Whitewater, Man., has been dissolved and a new partnership formed under the style of Hurt & McKay, C. J. Hurt becoming a member of the firm.

There is a well authenticated rumor going the rounds of the grain dealers' circle to the effect that a 2,000-barrel flour mill will shortly be erected in the city, and that a local miller will have complete control. —Winnipeg Free Press.

—The roller mills at Carp, Ont., have recently undergone extensive repairs. The contract for refitting was let to Messrs. Goldie & McCulloch, of Galt. The old engine has been replaced with a new Wheelock engine of sixty horse-power.

—The Lake of the Woods Milling Company will erect a grain elevator at Winnipeg, Man., to enable the company to buy wheat from the farmers at that market. A storage warehouse for flour will also be erected in connection with the elevator.

—The old and highly successful business of David Goldie, of Ayr, Ont., has been transformed into a joint stock company. The corporation are: David Goldie, John Goldie, G. E. Goldie, R. Nelson, of Ayr, and Hugh McCulloch, of Galt, Ont. Capital stock \$180,000, and the name of the new concern "The Goldie Milling Company of Ayr, Ont."

GENERAL.

—The journal of the Ministry of finance of Russia publishes a further report on the condition of the autumn-sown wheat up to March 27, according to which there is now much less reason than there was at the time of the last report to entertain any fear for the safety of the early crops.

—It is recorded that a miller recently sold in Chicago a round lot of fairly good bakers' flour for export at a price equal

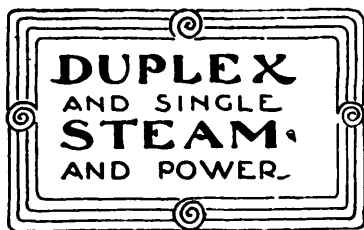
to \$15.50 per ton, which is \$1.50 a ton less than was paid for barley screenings at the same time. Bran and ship-stuff were selling at a price not much below this figure. Oats were in good demand and worth more per pound than either wheat or flour. Such an abnormal condition of the markets will remind many of the old time millers of the days before we had the telegraph, low freights and unreliable government crop reports. Then prices were governed by local supplies and often bore as absurd relations as they have recently.

Last year, according to The Miller, the United Kingdom imported 20,408,108 hundredweights of flour, against 22,100,000 and 10,723,003 hundredweights respectively for 1892 and 1891. Of this the United States supplied 17,995,001, 19,467,391 and 13,703,035 hundredweights respectively for 1893, 1892 and 1891. Canada 1,080,955, 1,350,120 and 1,029,243 hundredweights, and the Austrian Territories 1,009,614, 977,272 and 1,217,933 hundredweights respectively. Only 1,171 hundredweights were imported from Russia, 10,262 from the Argentine, and 2,800 from India.



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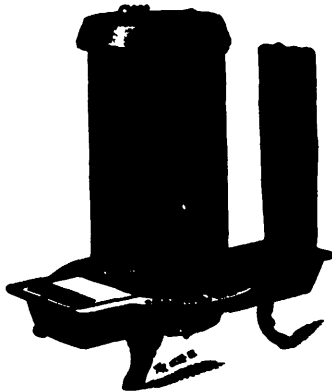
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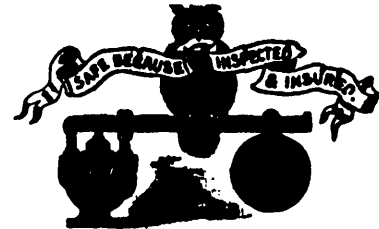
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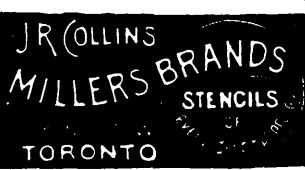
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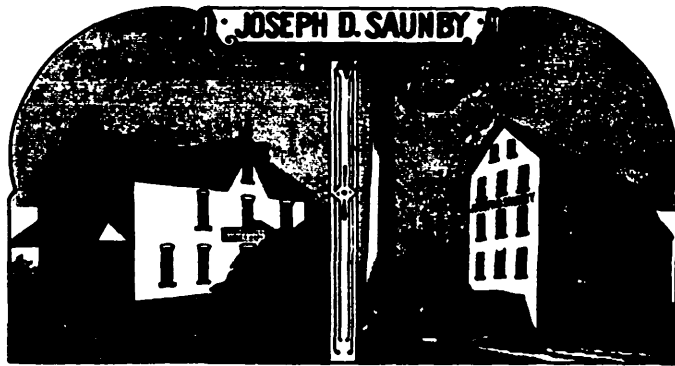
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