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CANADIAN MILLER

GRAIN TRADE REVIEW

NEW SERIES "MECHANICAL AND MILLING NEWS"

OLD SERIES, VOL. XI } NUMBER 4
NEW SERIES, VOL. IV }

TORONTO, ONT., APRIL, 1894

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New Series, Vol. IV. }

TORONTO, ONT., APRIL, 1894

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(SINGLE COPIES, 10 CENTS)

BISCUIT FLOUR.

NOTICE has been taken of some flours which occasionally find their way into biscuit-flour lofts flours with glens of so deteriorated a nature that they are just as unfit for biscuit as for bread making. A rough analysis of such flours reveals at once, says the writer in *The British Baker*, the weak spot, and this naturally brings up the question as to the merits and advantages of conducting analysis of flours. It has to be admitted that bakers and millers rarely resort to analytical examination of even the rudest nature—not perhaps so much because they are unacquainted with the different methods as because they are doubtful as to the advantages that accrue to them from adopting such processes. To a certain extent they are correct. Flour is of such a complex nature, and made up of so many constituent parts, that a complete analysis is a very delicate and laborious task, and capable of being undertaken only by those who have had a chemical training, which, unfortunately, few bakers have had. The biscuit baker adopts the more convenient and simpler method of getting at the merits and demerits of a certain flour by baking the flour into a particular biscuit. He takes care (at least he ought to) that the other ingredients put in along with the flour are not faulty, and that the dough gets justice at its various stages. If the biscuit turns out right, then the flour will suit him; if it turns out wrong, then he reports unfavorably of it, and looks for something more to his taste. This, of course, is rather a drastic way of proceeding, and often results in injustice to the flour. The biscuit made from a simple sack of flour may exhibit faults such as blisters or bad shape; the biscuits may spring too much, or may not spring at all; they may all crack up as soon as they begin to cool, etc. If any or all these things happen, the foreman rather hastily may assume the new flour to be at fault. A rough examination of the flour would at once corroborate any such assumption, for, unfortunately, flour is often blamed for producing certain effects on biscuits when it is entirely blameless. The blisters on the biscuits may have been caused by a careless machine-man or brakesman in dispensing his dust too freely, and may have had no connection whatever with the quality of the flour. The bad shape of the biscuits may have been the result of the dough being toughened in the mixing stage, and may not have been due at all to the strength of the flour. The want of spring in the biscuits may have been caused by the sodas and acids reacting on each other before the biscuits were fired, and may not have been due to rotten-glutened flour. The increased spring may have been due to several causes unconnected altogether with the strength of the flour. A superficial examination of the flour itself, however, would result in either exculpating or condemning it on the charge of having produced any of the effects mentioned above. The biscuit baker's task in this respect is lighter than that of the bread baker, for to him the question of tenacity, rigidity, viscosity, etc., is not of such paramount importance as it is to the man whose aim is to turn out the requisite number of well-risen loaves. Unless in the case of the cheaper class of biscuits, sold by count, the biscuit baker deprecates anything which tends to cause extra lightness in his biscuits. In the finer class of goods (especially of the pan series) he has to avoid a flour with such a characteristic. Now, as I mentioned before, anything in the shape of a complete analysis of flour is out of the question in practical work, even if the results would repay the trouble of such a minute examination. There is no necessity, for instance, for the biscuit baker to analyze flour so minutely as the following, in order to find out what particular part of the flour has caused his biscuits to be faulty:

CONSTITUENTS OF FLOUR.

	Household.	Best Household.	Best Whites
Starch and Dextrin	69.04	71.05	70.31
Cellulose	.52	.74	.77
Sugar	.71	.74	.68
Aluminoids and other nitrogenous matter insoluble in alcohol	9.36	7.94	9.40
Nitrogen matter soluble in alcohol	6.84	5.95	4.20
Fat	1.09	1.22	1.08
Mineral matter	.69	.73	.58
Water	11.84	12.77	12.90
	100.00	100.00	100.00

In the above analysis it will be noticed that the nitrogenous matter is divided into two portions—that soluble and that insoluble in alcohol. In the former is included gliadin and similar substances, in the latter albumin and fibrin.

For practical purposes the biscuit baker will find it sufficient to ascertain the amount of crude gluten in any particular flour he may wish to examine—*i. e.*, the substance left when flour is kneaded with water, and afterwards washed to remove the starch and the soluble constituents of flour. This crude gluten consists for the most part of three nitrogenous principles—gliadin, mucin and fibrin—together with some of the ash and oily matter. The mode of procedure adopted to eliminate the soluble matter and leave the crude gluten is pretty generally known, but as many readers of this journal may not be aware of the most reliable method of avoiding mistakes, I will take the liberty of giving the necessary details, with all due apologies to those who have them already by heart. A chemical balance is the only apparatus required.

Weigh out about forty grammes of the flour to be examined, and after placing it in a small basin add about thirty cubic centimetres of water and make into a dough, care being taken, of course, to see that none of the flour is lost; let the dough lie for one or two hours; get a piece of fine calico or fine silk, same as is used by millers for dressing flour, and wash the dough on the top of the silk; let a small stream of water fall on the dough while you knead it carefully and thoroughly with the fingers; the water carries off the starch and soluble material from the dough, and they disappear through the silk, while at the same time the silk catches any crude gluten which may by accident become detached from the mass; any which does not become detached must be carefully picked up, and added to the kneaded portion. After this process has been completed, take the lump of gluten and wash it thoroughly in a basin of clean water. The elimination of the starch is best attained here by rubbing vigorously with the hands and fingers; when the water becomes turbid pour it through a new piece of silk, which catches any piece of gluten that may have got separated from the mass; this, of course, is added to the mass. This washing in the basin must be repeated until the absence of turbidity in the water shows that all the soluble matter has been washed away. The water clinging to the gluten is then squeezed out, and the weight of the mass remaining gives the amount of wet gluten. Forty grammes of flour will give from nine to twelve grammes wet gluten.

As there is always (more or less) a quantity of water adhering to the gluten, to get accurate results this wet gluten has to be thoroughly dried, which is done by placing it for twenty or thirty hours in a hot-water oven, and allowing it to cool in a desiccator, which is simply a bell jar placed over a glass or marble surface, and containing within it a small quantity of strong sulphuric acid. The drier mass is then weighed, and the result gives the amount of dry gluten present in the flour. The estimation of the quantity of gluten, it will thus be seen, is an operation capable of being performed by every biscuit baker who may possess a chemical balance; and, though it be but a rude analysis, it is quite sufficient, in nine

cases out of ten, to give a fair idea of what a particular flour is capable of doing, as far as biscuits are concerned. Such an estimation is distinctly valuable as a corollary to the practical test, for it furnishes the reason for the particular result which the practical test may furnish. Take the case of a new flour being baked into a fine pan biscuit. The biscuit comes out of the oven, and has certain defects; say, for instance, it is oval-shaped, has large holes in the bottom, and springs too much. An estimation of the gluten present in the flour will show that it possesses a high percentage of that constituent, and if the gluten be examined it will be found to be of good quality; it will be tough and elastic to the touch. The amount of gluten found, however, will show that the flour is unsuitable for fine pan biscuits. The question dealing with the percentage of gluten most suitable for this class of biscuit has been already treated in the second article of this series.

Take another case where the biscuit will not spring at all. If this result be the fault of the flour, the gluten test will at once reveal it. The amount of gluten found may be fairly high, but the quality will be found to be bad. Instead of being tough and elastic it will be soft and sticky, and perhaps have a musty odor. There is an instrument called the aleurometer, the object of which is to test the quality of the gluten; but the result obtained from it cannot be depended on, and, in fact, the baker, with a little practice, can find from a close examination of wet gluten whether the quality of it is such as is suitable for whatever biscuit he may be wishing to employ the flour.

In selecting flours suitable for cracker biscuits (where the fermentation process is employed), Jago's viscometer may be used with advantage. This is an instrument for measuring the viscosity of dough, and takes into account the somewhat opposing characteristics of tenacity and rigidity. For full particulars of this ingenious invention the reader is referred to Jago's text-book, where details may be obtained. By making up dough and using it at once in this apparatus, and by letting dough made from the same flour lie for some time and then using it in the apparatus, results may be got which give hints as to the methods best suited for fermentation. You can detect by its aid those flours which fall away in the sponge, and such flours, of course, be either more quickly fermented or, what is better, used up in the doughing stage.

WHY PULLEYS RUN STRAIGHT.

CENTRIFUGAL force has less to do with making a pulley run unsteady than the mere tendency it has of trying to get where it can rotate about its own center of gravity. A wheel is generally looked upon as so much weight and, if held off its center, must go swiveling about like a heavy stone in a short arm sling, tending to pull the machinery to pieces. This may be well enough at the start, while the wheel is getting up to speed, but the time soon comes when the wheel will try to turn on its own center and let the shaft sling for a while. Just notice how the juggler can seize a dish of any kind, as a dinner plate, for instance, and throw it up in a whirling motion and, while in the air, catch it on the end of a stick and cause it to rotate with ease. At first the plate is swivelled about by holding it off to one side of the center, but as the speed increases, it gradually brings the point of support near the center, till at last it is allowed to spin on its own center of gravity. In this case all the driving power, supporting force and the resistance of the load were brought to one single point, with nothing to react upon the inertia of the plate. A wheel has recently been fitted up to revolve in a frame with no other force applied to it than what is derived from the vibrations of the frame itself. The wheel, of course, is out of balance, as far as its center of gravity goes.

AN IMPORTANT TRANSPORTATION TOPIC.

THE following letter, to which we have made editorial reference elsewhere, appeared as special correspondence in the Globe a few days ago, and is from the pen of Mr. James B. Campbell, a well-known grain dealer, of Montreal. The letter says: "In the usual market report of the New York Journal of Commerce, on the 13th of November, I find the following information:—"There is also a fair trade doing still in c.i.f., No. 1 hard Manitoba at 3½ cents over December, which is going into railroad elevators and lying in boats waiting a revival of the export trade. About 400,000 bushels have been added this week to the purchases of over 1,000,000 reported previously."

In the usual commercial columns of the New York Herald of the 27th of March last, the sale "of a lot of 48,000 bushels of No. 1 Manitoba spring wheat at 9½ to 10 cents over May f.o.b. afloat," is reported.

And now for a strictly business letter. This grain was grown by farmers in the Northwest. It was brought to the elevators on the C. P. R. and there sold for 45 cents a bushel and under. It was put on board cars and freighted by that railroad to Port Arthur. It then went on board vessels. It came down during the period of open lake navigation to the United States port of Buffalo, passed on to New York where it finally went into boats in bond, or into bonded railroad elevators, to await their export to Europe. The man in Manitoba who bought that wheat paid 45 cents for it, Brandon freights; early in the market it was quoted at 46c. to 48c. and afterwards lower than even 45c. The question has often been asked, why do Manitoba farmers receive so little money for such fine wheat? The answer is that such are the conditions of trade in our country that they are forced to sell it, not on its merits, but on the basis of the very inferior article represented by the grade of No. 2 American wheat, New York inspection. Most men in the grain trade will assert that such is the mixing of wheat that goes on before the ordinary American wheat reaches New York, that No. 2 wheat, New York inspection, would only grade No. 3 in Chicago. No. 2 wheat in New York is usually 3c. to 4c. cheaper than Chicago, taking the shipping charges into consideration, and it is the wheat of this lowest market which forms the basis of prices for our No. 1 Manitoba.

I shall now prove this. I have shown that on and before the 13th of November our No. 1 Manitoba was selling cost, freight and insurance afloat in New York at 3½c. over December. That is that at whatever price there were buyers of this inferior grade of No. 2 New York wheat 3½ cents over that price was the cash price which these sellers of our No. 1 received for their grain in New York; in fact, as things go, about parallel with Chicago No. 2.

How did these New York prices suit the buyers in Manitoba? The gentlemen who handle this wheat have not taken me into their confidence, although no attempt is made to pry into their private affairs, a fairly close c.i.f. can be figured by any shipper in the grain trade. Say:—45c. wheat; 11½c. freight to Port Arthur, 19c. per 100 pounds; 4c. marine insurance; 3c. freight Port A. to Buffalo; 1½c. Buffalo charges; 4½c. freight per Erie Canal to New York; total 63½c. c.i.f., New York.

The official report of New York quotations for wheat for December delivery were: September 30, 73c. to 75c.; October 5, 73c. to 74c.; October 10, 72½c. to 73¼c.; October 16, 68c. to 69c.; October 20, 70c. to 71c.; October 31, 69½c. to 70½c.; November 4, 68½c. to 69c.; November 13, 66½c. to 67½c., and 3½ above these figures was the value of our No. 1.

NET MARGIN OF PROFIT.

There was certainly a very nice margin, even at the low grade prices, left for Manitoba elevator charges. Every shipper has his own lines laid. I do not pretend that these items are all fractionally correct; they are only taken from the published reports, or well-known trade rates. It is not an easy matter to carry the trade of Manitoba in a few hands. Farmers must have cash as soon as their crops are harvested, and the unfavorable trade conditions governing our country have left them at the tender mercy of New York capital.

Let anyone look into the market reports of wheat in New York, and they will find various prices assigned to

various months for the future. We have had our attention fixed on the 13th of November. The closing prices for that day were cash nominally 66½c., December 67½c., May 74c. These higher prices for the future months represent the cost from the cash price for carrying the wheat in store to say the 1st of May, the fire insurance, storage and interest, and men are making contracts for these future months all the time. When the buyer in New York of our wheat made his contract, he immediately sold May against it unless he wished to speculate on the price. He had found a buyer for the like quantity of the inferior article, who was ready to pay him a price which would cover his storage, insurance and interest charges up to the first of May, provided he could always command a premium of 3½ cents a bushel over the price of the month ahead, on account of the excellence of the grain. His profit rested on the quality. In the jargon of the trade, he was "short" on inferior grade of grain for May delivery, and "long" on No. 1 against it.

I accept the statement of the New York Journal of Commerce, that he was awaiting a revival of the export demand. The demand came after navigation had closed on the lakes and no more Manitoba wheat could get to the seaboard except by high rail freights. We read in the New York Herald that he sold some of this wheat at a premium of nine to ten cents and bagged his profit. The four last words are a little addition of my own and not to be found in The Herald. Irrespective of the profit in the carrying trade, it turns out that New York had made a profit from five to six cents a bushel, and this profit was one which could not have been made except for the exceptionally fine quality of the grain and the result of the trade conditions under which we are running our country. This was not a legitimate business profit—it represented money which should have gone into our farmers' pockets, but went to the New York capitalists instead. If we insist upon doing a three-cornered trade, such as sending our stuff from Lake Superior away down southeast to New York on its journey to northern Europe, we must expect to pay for it in numerous ways besides in the longer freightage. The whole truth and nothing but the truth is that this high grade of wheat had been forced out of the hands of our farmers on the level price of a greatly inferior article, representing at the very best No. 2 Chicago.

Our millers doing business in the Northwest do not want an open market for our wheat. It is to their interest to buy it from the farmers at the lowest possible price, and the finer the quality the more interested they are in bottling it up and keeping it back from the English markets until the transportation on the lakes is closed. Had the wheat had a fair chance, Manitoba could easily have got ten cents per bushel more for her last crop. Let us look at the English markets.

ENGLISH PRICES.

In England the wheats of the whole world come into combination with each other. The sales—not the quotations where there are no bids—reported in The Mark Lane Express of the 12th of March were: Fine Manitoba, 24s. 9d. per 480 lbs.; No. 1 northern spring, 24s. 9d. per 480 lbs.; Californian, 25s. 3d. to 25s. 9d. per 500 lbs.; Australian, 25s. to 25s. 9d. per 500 lbs.; Argentine, 22s. 3d. to 24s. per 480 lbs.; No. 2 American red winter, 23s. 6d. per 480 lbs.; No. 2 Calcutta, 22s. 6d. to 23. 9d. per 490 lbs.; hard Tangantog (Russian), 20s. 6d. to 22s. 6d. per 490 lbs.; and beerbohm quotes No. 1 Bombay at 4s. 10d. per 100 lbs., equal to 23s. 2d. per 480 lbs., all on sample. So much for the English opinions of wheat gauged by £ s. d.

I have The Mark Lane Express before me. On November 20, Californian due in a week sold for 28s. On the 27th more of it sold at 27s. 9d. arrived. Coming along to December 11 the following sales are reported: "Old Australians, 28s. 3d.; new crop for January shipment, 29s.; Calferman, 27s. 6d. on passage; Oregon, 29s.; No. 2 red winter on Saturday fetched 25s. 3d.; No. 1 hard Manitoba, 27s." Between November 13 and December 11 the price of spot wheat had declined 1s. per quarter in England. It was these wheats which we were outranking in quality and price by March 12.

Wheat at 65 cents in New York, allowing 2 cents New York shipping charges and 2s. per qt. ocean freight, figures out 24s. 4d. c. i. f. Liverpool, and 300

lbs. California wheat were worth about 28s. I have not said anything about Manitoba elevator charges, but if this difference, even striking off 1s. for selling expenses, represents their share of the business, it is about time the country was understanding the price that they pay for the luxury. I insist that 45 cents in Manitoba was based on New York prices, not the English market.

Why did our wheat go to New York when our St. Lawrence was open? Conditions under which we manage the trade of our country sent it there, that is all about it. Gentlemen, when Manitoba has the power she will wring your necks, and serve you right, too. I have tried to make the situation in which our wheat growers are placed as plain as possible; but if anyone is not convinced with regard to my statements about the New York market let him take or send this open letter to any friend in whom he has confidence who is engaged in the grain trade on the Chicago or New York boards, and let him state over his own signature, as I state it over mine, whether that case on the New York Chamber of Commerce is stated fairly as it exists to-day, or whether it is not. And if my case stands solid as to the way this Manitoba wheat of ours is worked on the New York board, what then?

For fifteen years from about Chicago fire days I traded in my own name in the wheat pit of the Chicago Board of Trade. During those years, while not clashing with American sentiment, I maintained myself a Canadian. The foreign element is well known on that board. In returning to my native land I protest with all the little power I have against the conditions of trade as they exist to-day, which are placing our country tributary to New York and our farmers at the mercy of New York capital and local millers. The watershed of the United States drifts toward the Gulf of Mexico; they can make only a limited use of it for their business with Europe. Our watershed drifts right through our country eastward, yes, all the way through the Rocky Mountains, and at its outlet points straight at our best customers in Europe, but a pretty mess we make of it, and the Manitoba cat is being skinned.

I wish for one moment to draw attention to the two watersheds of this continent, one drifting south from north, the other east from west. I only throw out the suggestion that it is going to be very difficult to make one law that will benefit both. If one is stimulated by law it will be at the expense of the other. Water transportation is the only hope for our Northwest, and a glance at the map will show what it is the business of this country to strike for.

GOING STRAIGHT TO MARKET.

Australia has one grand advantage, she looks straight at her market. We are squinters. Prices have been very low all round, but at a moderate estimate squinting has taken ten cents a bushel out of the pockets of Manitoba farmers on their last crop. A gentleman, a leading man of Port Arthur, one engaged in the transportation business, informed me a few days ago that over 6,000,000 of bushels had been shipped to Buffalo. The editor of The New York Journal of Commerce writes me that 1,525,000 came to New York, that 600,000 went to Boston, that it went up to nine cents premium, and that it has been about all cleaned up now by exports. This 600,000 to Boston was particularly aggravating, for it must have gone by rail from Buffalo, and to Boston is 499 miles, while from Collingwood to Montreal is only about 340.

Under present trade arrangements there is very little relief to be obtained. The block is here in Montreal. We have neither the transportation facilities for a large business, nor have we the tonnage. I am informed Buffalo handled 200,000,000 bushels of grain and flour during navigation last summer. If we are to depend on New York, Manitoba must sweat. Suppose we arranged our business so that our farmers obtained better prices than those south of the line, and paid less for their wares would there be any trouble about emigration? Present arrangements permit of large lines of our best wheat being collected at the seaboard and held there without any real risk by those who can pay for it. After navigation closes the holders of this wheat, being protected by the higher rail freights behind them—S. H. Thompson, Secretary of the Duluth Board of Trade, has asserted that rail freightage in the States is seven times

dearer than water freightage—and in possession of the cheap freightage of the ocean, are in a position to deal out this wheat to the millers of Europe at the premium which the quality commands.

There is an economic revolution impending. It may take time and will come to a head gradually, but the development of Argentina and other cheap-labor countries must affect the conditions of life on this northern continent, and we must change with the times or stagnate. These cheap-labor countries are coming to the front with vast quantities of low-grade wheat. On the other hand, we happen to produce the wheat which outranks every other wheat in the world in quality, and when our producers succeed in securing a crop of such magnificent quality as they did last year, it is a scandal that they do not get the benefit of it. No one can tell what next year's crop will be in quality, quantity or price, but I see on high authority that we are to have wheat up to \$2 a bushel in eighteen months. I believe in encouraging the farmers to plant all they can; the United States crop is to be patchy, and at moment of writing California is in a ticklish position. But there is more to be done than encourage them to plant. Whether Manitoba is to get the benefit of her labor depends on whether the situation of the past fall is to continue or not.

Is it not suggestive that when the farmers' wheat was pointing to the elevator 45 cents was all that could be got for it at a time that California wheat was selling in England for 28 shillings for 500 pounds, and to-day when the wheat has passed out of the farmers' hands, and California wheat is selling for 25s. 6d. in England, 50 cents is reported to be about the price in Manitoba. I do not know what other Canadians may think, but 45 cents in Manitoba and 28s. to 29s. in England is a little too much for my weak nerves.

THE AGED BOILER.

THE life of a boiler, says the Age of Steel, like that of a horse, has its limit. The number of its birthdays depends, of course, on its original stamina, and the use or abuse of its service. If sound in material and construction, and intelligently handled, its term of life is prolonged into a respectable old age, and to this on these conditions there is necessarily a limit. It is possible, however, that any arbitrary limit is beyond absolute calculation, and is likely to overlap dates that at the best can only be approximate. The biography of a boiler is one of strain and tension, and is subjected to sudden transitions from a high degree of heat to the temperature of cold air or water suddenly admitted. That iron should lose its qualities as a boiler plate in the course of years it is reasonable to assume, and that when age and service have reached a certain point the conditions of safety are weakened, is equally reasonable. The basis of calculation must, however, necessarily vary, as the qualities of the metal used may not be uniform, nor the intelligence of service always at the same standard. From tests made of plates taken from iron boilers, varying from fifteen to thirty years of service, it has been found that there has been not only a loss in tensile strength, but also a marked loss in ductility. A plate that originally stood a test 45,000 pounds tensile strength after about twenty years of service, shows a deterioration of tensile strength to about 38,000 pounds. On this basis alone the conclusion is that the boiler, if weaker, is still good for considerable pressure, with the fact, however, left that the plate under certain conditions would act as a piece of cast iron would act, and also suddenly give way at a certain pressure. It is obvious that a boiler constructed of plate of this character would never tempt the money of a steam user. It might have a higher tensile strength than cast iron, but in the matter of brittleness the advantage would be scarcely apparent. As most, or many, boiler explosions are caused in whole or in part by a sudden shock, a boiler plate of a brittle nature is broken by a blow, which would be as ineffective as a drum tap; a plate of lower tensile strength. Here the quality of ductility asserts itself as indispensable to boiler safety, allowing it to sustain heavy shocks or strains without giving way. The presence or absence of this quality determines the value of old boilers so far as their safety goes, and for this reason it is the opinion of many engineers that boilers of the cylindrical-shell type are in their dotage at about twenty years of service.

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.

IS THERE A WAY OUT?

To the Editor of the CANADIAN MILLER.

Sir,—For a year or more millers have been toiling on, hoping, until the heart has grown faint, that the prices of breadstuffs would show an improvement. But almost no change in conditions seems near by. What are we to do about the matter? For one thing, it appears to me that we have got to watch with more diligence than we have been doing in the past the little economies of mill management. No doubt the past year has been severe enough in its experiences to compel all millers to exercise greater prudence than perhaps they had previously done; but still I have an impression that for a long time back there has been a want of proper business methods in the handling of milling business. There are two sides to milling. The practical man may be a first class operative miller, turn out good flour and understand the mechanical management of his mill, but he may be woefully wanting in business ability. Do business with such a man and you will find there are leaks all through the mill. He is probably an imprudent buyer, lacks in executive ability, and does not handle his help wisely. He is, worst of all, perhaps, care-less, slovenly in his book-keeping and office management, and let him get into financial trouble and you will find that his profits have gone in bad debts, that might have been collected if they had been looked after at the time; and in bad book-keeping generally. As my brother dusties quietly smoke the pipe of leisure, after the day's work is completed, let them think over what I have said here, and if I am out in my delineation of the case, no doubt the columns of the "CANADIAN MILLER" will be open to rasp me for what I have said.

"DECENCY AND ORDER"

A BROADER VIEW OF THE TARIFF.

To the Editor of the CANADIAN MILLER:

Sir,—From several articles that have appeared in your columns, I would judge that you take the view that it would be a mistake, in the interests of the milling industry, if there were reciprocity in flour with the United States. There is something to be said directly from the business standpoint on this question. For one, I do not entertain the fears of some members of the trade, that the altered conditions, as between now and when the former reciprocity treaty between these two countries existed, have so changed that what was good for the millers of Canada then would be hurtful to-day. I believe that milling methods are as far advanced here as in the United States; that we have as capable millers, and that with an enlarged field, we can produce flour as cheaply as United States millers. But aside from this phase of the question may we not, as millers, take a broader outlook, and believing that the pulling down of trade barriers would be a benefit to the great consuming trade of the country, for this reason favor free trade in flour. Now, I am well aware that the reply will come from some brother millers, that there is no business in an idea of this kind. Millers, we will be told, like every one else, must look after number one. Let the people look after themselves. Perhaps this is business, but it is selfish business, and the man who has read commercial and economic history with care has surely learned that the generous principle is, in the end, the most successful and paying. Any plan that will be helpful to the masses of the people is going to be helpful in the long run to the individual classes. The people cannot be put in the way of securing cheap bread without the men, who make the flour that makes the bread, being helped. These are at the sentiments of

ROLLER MILLER.

SKILLED VS. SCRUB LABOR.

To the Editor of the CANADIAN MILLER.

Sir,—The publishing in the last issue of your valuable journal of the curriculum of a German milling school gives some emphasis to the need there is for skilled labor in milling. We live in a day when, unfortunately, the disposition of too many men, in every vocation, is to accept short cuts in the attainment of their purpose.

Boys want to become journeymen after they have spent a year or two at their business. The result is that every branch of industry is loaded up with a host of imbecile workmen, and one reason why so many men are out of employment to-day is because they rank among the incapables. Take the census of the unemployed, and it will be found that among them there are few really skilled workmen. The good men get work. The chaff in the field of labor, as in that of agriculture, is cast aside. What I have said here as general to all trades, is, I believe, perfectly applicable to milling trades. More than at any time in the history of milling, experienced, skilled, educated operative millers are needed. The man who undertakes to fill the responsible position of miller must in the first place be a careful student of everything that pertains to the grinding of wheat into flour. He must go back of this, and have a knowledge of the grades and constituent elements of wheat, so that he can readily discern a good milling wheat from that which is ill-suited to such a purpose. He must more than this be possessed of a mechanical turn that will enable him to detect a weakness in the equipment of the mill in his charge, and ought to be able, after proper experience, to suggest to the mill-wright much in the way of improvement. All this means study and labor, but let millers remember that in their business, as in every other calling, there is no royal road to learning. We want no scrub millers.

Yours truly,

INDUSTRIAL.

THE HIGHEST WINDMILL TOWER.

THE town of St. James, L. I., can boast of having the highest and strongest windmill in the world. The proprietor of the land on which it has been erected tried for years to construct a well on the elevated land near his house, but without success. The spring from which the windmill pumps is on the beach at the head of a distant bay. The contiguous land rises so rapidly and the trees are so high that it was necessary to raise the windmill 150 feet, so that the bottom of the wind wheel would be above all obstructions within 1,000 feet of it. The scale on which the mill is erected can be seen from the fact that there are twenty barrels of cement in the foundation piers, besides forty barrels of cement, 20,000 bricks, 42,000 feet Georgia pine, and more than six tons of bolts and washers and iron plates. It is 22 1-2 feet in diameter and 150 feet above high water. There are 6,000 feet of pipe between the windmill pump and the reservoir, which contains about 65,000 gallons. The windmill has frequently filled it in two days. The maximum height to which the water is forced by this mill is 223 feet, before reaching which it has to pass a long line of pipe. There is no difficulty, however, in making a plant to throw the water much higher than this. It is merely a question of the pump, pipe and fittings being able to withstand the pressure, and the windmill being large enough to give power sufficient to do the work. Pumps are made strong enough to raise water 2,000 feet if necessary. The only question to be carefully considered is that of the tower, for it must be made to withstand the roughest weather likely to be met with in these latitudes.

WHEAT IN NORTHERN CANADA.

THE Winnipeg Commercial contains an interesting and suggestive note. It says that about April 1st there arrived at Edmonton, N. W. T., the plant for a small flour mill to be erected at Fort Vermillion. By reference to a map of Canada, Fort Vermillion will be found on the Peace River, in latitude 58 deg. 25 min., and west longitude 117. 30 min., so that the destination of the mill is over one thousand miles further north than Toronto, and about in line with Fort Churchill, on the Hudson Bay, and Cape Wrath, on the North Coast of Scotland. The Peace River empties into lake Athabasca, about 250 miles east of Fort Vermillion. On the north shore of this lake stands Fort Chippewyan, from which place wheat weighing 68 or 69 lbs. per bush, was sent in 1876 to the Centennial Exhibition. Wheat has been grown in Canada as far north as Fort Simpson, on the Laird River, in latitude 62, nearly 250 miles further north than Fort Vermillion, but it is doubtful whether the wheat lands extend beyond the Peace River Valley. The fact that a flour mill is to be established 550 miles further north than Winnipeg is, perhaps, as conclusive proof as could be advanced that the Peace River country is well adapted to wheat production. Fort Vermillion is, as stated, about 350 miles north of Edmonton, and 2,300 miles from Toronto to Edmonton and can now be reached by rail.



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 enter-1 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 endeavoring to promote the interests of our subscribers.

Correspondence is invited from millers and millwrights on any subject pertaining to any branch of milling of the grain and flour trade.

NOTICE OF REMOVAL.

SUBSCRIBERS, advertisers, and others concerned are respectfully 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.

PRESIDENT VAN HORNE AS A PROPHET.

THE exceedingly optimistic view of the future of wheat prices as told by Mr. Van Horne, president of the Canadian Pacific, in an interview published in another column, is creating abundance of talk and criticism, even though it may not bring wheat at an early day up to \$2.00 a bushel.

With his opportunities of studying the question Mr. Van Horne's opinion on a subject of this kind ought to be worth a good deal, but after wheat has been hovering around 55c and 60c a bushel for many months we are afraid there are few ready to pin their faith to the prediction of the great railroad magnate. One must admit there is logic in the contention that the cheapening of wheat will cause thousands who have hitherto ate rye, and other edibles less tempting than those, to eat wheaten bread. This would mean a large increase in the populations of the world consuming wheat and would serve as one element in helping wheat prices. Another contention is that the continued lowering of prices of wheat will drive large numbers of farmers, who are now producing wheat, into giving their attention to other lines. But these conditions, favoring an increased price of wheat, are largely, if not more than offset by the rapid increase in the growth of wheat producing countries, as instanced by the opening out of large wheat fields in the Argentine republic and the development of the wheat fields in India and Russia. The accounts that we get from these countries would appear to show that there is large room for development in the future, thousands upon thousands of acres yet waiting for cultivation. What is also the case in most of these foreign countries the cost of raising wheat is a great deal less than on this continent and this, it must be admitted, is not a favorable condition to increased prices. At the same time, whilst we cannot be sanguine of \$2.00 for wheat, it would look as though a better price than the present might prevail in the future.

THE WHEAT-PRICE PROBLEM.

ANYTHING that will shed intelligent light on the problem of the low price of wheat, that is now agitating the people of all countries the world over, is acceptable reading to every student of this question. A contribution of more than average importance on this line is a letter of Mr. James B. Campbell, of Montreal, published in the Globe of the 21st inst., and which we republish in full in another column of the MILLER. Some of the figures and quotations that this writer has gathered together will bear careful study and thought. The

import of the letter is in the contention that Manitoba farmers are receiving only 45c for No. 1 hard wheat, while the same wheat sells in the English market for about double that figure. It is known to our readers that the larger part, if not all of Manitoba's export shipments to the United Kingdom, go by way of New York grain dealers. Where the heavy expenses come in that swell up the price of this wheat nearly double is the problem that Mr. Campbell strives to solve. It is suggested that this cost may in part come from unfair elevator charges in the Northwest, but Mr. Campbell, himself, does not give credit to this criticism.

The question is believed to be one of transportation and it is in this particular that Mr. Campbell's letter is both suggestive and instructive. Here is Canada possessed of a water-way through the St. Lawrence that is the natural outlet to the European markets and yet the greatest wheat-growing section of this Dominion is sending its exports by way of an expensive and unnatural channel. We have, as a Dominion, to solve this water-way question. The policy at present may be, and this is probably accentuated by the financial stringency of the times, to withhold any large expenditure on capital account, but we have yet got to place our waterways in that shape that the large grain exports that this country will send forth to Europe shall go through our own waters.

That any section of our grain producing people would seem to have placed themselves, whether by necessity or choice, in the hands of capitalists of a foreign country, is a point that is full of suggestion and ought to cause earnest reflection from the business men of our Dominion.

MR. VAN HORNE OFFICIALLY.

THE report of the year's business of the Canadian Pacific Railway Company, furnished shareholders at the annual meeting in Montreal, on the 4th inst., is interesting reading alongside of the wheat prophecy of the president, Mr. Van Horne, which was given out about the same time. The company, whilst showing a satisfactory business, have to admit a decrease in profits for the year. This change in the situation, over previous years, is accounted for by the extraordinary depression in the prices of wheat, influencing farmers to store their wheat, rather than sell it, and, in so doing, avoiding immediate transportation. The losses, it is pointed out, are entirely west of the great lakes, the company's eastern lines showing increased earnings.

In their official capacity, the president and directors give their opinions on the probable future of grain. What the business of the company in the near future will be will depend on the prices of grain. If these continue, as now, abnormally low, no marked development of traffic is expected. But Mr. Van Horne does not officially, it is a different matter when he is talking to our friend "Don" of Saturday Night, hold out any unusually sanguine hopes of what prices in the future will be. The report is content with saying: "There are, however, indications of improvement in various directions."

Touching on the cost of transportation, and this is a matter of interest to grain men and millers, the directors take the position that, although the price of grain in the world's markets have never been so low, yet, western farmers have, on several occasions received no more for wheat than at present, for the reason that the cost of transportation has been greatly reduced in late years. This is an expression, that adds interest to the question of transportation, as discussed by Mr. Campbell in another part of the MILLER this month. There can be no doubt, with profits in grain growing and milling, cut as low as they have been of late years, that the future of these trades will rest largely on the facilities and the cost of transportation of these products to foreign markets.

The people of Canada will, we believe, generally, agree with the directors of this great road when they speak, not only in hopeful, but glowing terms of the fertility of the soil and the fact that nowhere in the world is there to be found a wheat producing area where the quality of the wheat is superior to that grown in the Canadian Northwest.

DUTY ON WHEAT AND FLOUR.

A LIVELY brush took place in the House on Friday before the committee of Ways and Means over the tariff proposition touching wheat and flour. Mr. Charlton raised the question, which, however, was not new to millers, why wheat and wheat flour had not been included in the reciprocity offer of the Canadian government to the United States. The reply came prompt and decisive from the Minister of Finance, that this was not done, because it was not considered to the advantage of Canada to offer wheat for wheat or wheat flour for wheat flour.

The introduction of the matter in this shape opened up the old question of whether Canadian millers would be gainers or losers by having the enlarged market for their product thrown open to them. Mr. Martin, speaking for Manitoba, said that the duty on wheat was absolutely of no value to Northwest farmers and to this remark he added that the grinding-in-bond privilege destroyed all the advantage. Mr. Campbell, member for Kent, argued vigorously for reciprocity in flour. He holds to the view that Ontario millers would be benefited by having the United States market thrown open for their trade. The discussion was participated in by prominent members on both sides of the House and the opportunity was not lost by Mr. Davin to renew his protest, which had been introduced last session without success, against the grinding-in-bond privilege. To the various objections Mr. Foster was very firm in stating that he believed that there was not one miller in ten who favored reciprocity in flour.

The ground on this question has been pretty fully gone over in these columns. Whilst it is the case that a certain proportion of the milling trade, who find an able representative in Mr. Campbell, himself a large miller, hold the opinion that Canada need not fear reciprocity in flour products, yet the view of the Dominion Millers' Association was, perhaps, not entirely unanimous, yet largely so, against this contention. There is this to be said, that the milling trades here are already handicapped to some extent, and it would be a serious blow to them if they should find their market broken into through the province being flooded with flour products from across the border at a price which they could not with profit, touch.

EDITORIAL NOTES.

INFLUENCED, no doubt, by the example of France, the Italian government is moving in the direction of placing an increased duty on wheat. There, as in other countries, there exists a strong rural discontent. Just in passing, it may be remarked, that nearly all over the world the chief centre of discontent is among the agricultural classes, a people whose lot has always been held up as a most happy and contented one. As regards wheat producing countries the effect of this new trade barrier will be to cause larger quantities of wheat to go through these places to the countries where no such barriers exist. We are not sending wheat from Canada to France or Italy, but these people had been getting their supplies from Austria, Germany and Russia. These will now seek other fields and in this way the competition with Canadian wheat will be increased.

THE hopeful words of Mr. M. McLaughlin in his annual address at the last meeting of the Dominion Millers' Association, though they may not bring immediate relief to the depression in wheat prices, ought to be full of encouragement to all who grow or trade in wheat in Canada. He then said: "The country which grows the best wheat known to the milling world and, which has only begun to bring under cultivation the millions of acres that produce it, has a future that cannot be shown in colors too bright." This high tribute to Canadian wheat this well-known miller said was based on the judgment of English millers, who were at all times prepared to pay the highest price for the hard spring wheats of Canada. At a time when those concerned are discussing the question, how far it is wise to extend the cultivation of wheat in this country or whether, indeed, it may not be prudent for farmers to turn their energies in another direction than wheat growing, these words of the ex-president of the Millers' Association may be taken, in the language of a well-known provincial statesman, into the serious consideration of everyone interested.

TALKS WITH OPERATIVE MILLERS.

WHY be distinctive in the heading of these talks? someone may enquire. The reason is. We draw a distinction between the man who makes the flour and he who looks after the business end of the concern. The same man may do both, but the purpose of these talks will be to help directly in the line of making the flour. In a word, we are going to walk in among the rolls and scalpers and rub against the miller himself. I would like, really, that the operative millers themselves should do most of the talking in this column of the CANADIAN MILLER from month to month. Every day some matter doubtless occurs to the miller, that raises an enquiry in his own mind and that might be answered by someone else, if he would only let that someone else know what is troubling him. Again, he, likely, has a particular suggestion, born of his own experience, that is worth while naming to someone else. Do you catch on, brother dusties?

The man at the business end of the mill is concerned over the future of bran and shorts, to the extent that the offal will help to level up the low price of flour today. From this point of view he has encouragement in the fact that of late a very decent price has been obtained for bran and shorts. The man inside the mill is going to help him out all he can in way of suggestion; and I have learned lately that aside from many purposes for which bran is used, giving commercial value to the article, for it may be known that the tanner, the calico printer and even the manufacturer of children's dolls, cushions and kindred articles finds bran of use to him, it is now being used as a very good substitute for coffee. The claim is that it is perfectly healthful, especially for children and dyspeptics. Two quarts of bran, mixed with it a cupful of molasses, mixing and rubbing it well together until it is moistened alike, makes a very palatable and inexpensive breakfast drink. Let the man inside try the experiment, and a new use for bran will, perhaps, have been found.

Not a little trouble has been caused millers since the introduction of round reels. One difficulty, I presume, has been in not knowing exactly how they should be handled and what is the outcome of work upon them. The cloth itself sometimes wears a great deal faster with round reels than with the hexagon reels. Now, what is the cause of this? There is very little difference in the speed of the round reel and the hexagon. The cloth cannot, therefore, be taxed more in the one than in the other case. It is true, however, that every inch of cloth is brought into actual use in the round reel. Then with the hexagon reel the stock is thrown against the cloth with great force. Contrariwise, because the stock falls a distance of rather more than two feet and is dashed upon the cloth, very little pressure is required by the hexagon reel, while the round reel calls for an automatic revolving brush kept running at a high speed. Where the millers need to exercise judgment is in applying the brush and not allowing it to act upon the cloth with too great severity.

I have come across a clean-cut statement from a milling writer against the value and work of patent flour. His words are these: "In my judgment patent flour making is a prostitution of the business and is illegitimate." This is a stiff statement from a practical man and the argument is, that millers have been driven into the making of patent flour, simply because of a whim of the public who had got the idea that there was something nicer about this modern-made flour than some of the products of a few decades ago. I take it for granted that every miller knows, generally, of the history of patent flour. A quarter of a century past patent flour was unknown, and, as someone else has said, to the millers of an early day, the products of which patent flour is now made was an objectionable article; a product they would gladly have avoided making, or doing anything with, if it could have been done; but it was ever with them and they had to make the best of it. It was ascertained, because of the hardness and brittleness of spring wheat, that it could not be ground on burrs or by any other means without having a large middlings

output. Then the flour was dark in color, contrasted with what would come from the softer, winter wheat. So it was that an ingenious individual came along and invented the middling purifier and we have gone on making our patent flours steadily and increasingly to this day. It is a case, I suppose, when in Rome we must do as Romans do. When the great consuming public demands some particular article we are obliged to give it to them, though it may go a little against our own notions of what is sensible and best.

The danger with many people is to go to extremes. The pendulum of the clock swings rapidly from one side to the other. Necessity arises for strong measures to cure an evil, and with many the operation is carried too far. For a year past there has been, and there was good cause for it, a great outcry against dirty wheat, and the miller has been most careful to see that the wheat that came into his mill was thoroughly cleaned before he started to turn it into flour. A writer in the Milling World considers that this practice has developed into a perfect fad. While not depreciating the need of using only clean wheat, he says that an investigation will show very often that, what looks like dirt is only a bran-coat. He says that the bran-coat plays so important a part in breaking, reduction and purification, that it would be a mistake to weaken the coat by brushing and scouring too far. If broad bran be essential to cleaning it should not be so severe as to weaken the coat so that it will not break "broad." Broadly speaking this writer says wheat is as clean as it ought to be for the rolls when its coat, absolutely intact, shows no awns, no black matter in the outer crease, and no surface depression containing dark foreign matter. Late revelations concerning the crease-dirt shows that the crease actually folds on itself in such a way that a part of the dark matter is really inside the grain. This fact, established, it would seem incontestably, by the photographs of Mr. F. Garton, the English experimenter, at once puts a stop to the attempt "to remove all the dirt in the crease," and it to that extent simplifies the work of scientific and practical cleaning. The idea of using water for cleansing the coat has a basis in reason, but whatever good water is able to accomplish in cleaning the skin of wheat, it offsets by the inevitable trouble it causes in the chemistry of the berry. The ideally clean wheat is a washed wheat, but wetted and steamed wheat is not so good after wetting and steaming as it was before. American millers have generally avoided the wetting process, and even the European millers, who use it extensively, use it under protest. Some oriental and Russian wheats ground in western Europe are so very dirty that nothing but thorough washing will answer.

JAN.

DOMINION MILLERS

WILL FIGHT THE RAILWAYS ON DISCRIMINATING FREIGHT RATES.

A MEETING of the executive of the Dominion Millers' Association, fraught with much interest to the future of milling in Canada, was held in the Board of Trade building on Tuesday 17th inst. There were present, A. H. Baird, of Paris, president; Wm. Galbraith, M. McLaughlin, J. L. Spink, and C. B. Watts, of Toronto; J. D. Saunby, London; W. H. Meldrum, Peterboro'; J. D. Flavell, Lindsay; James Goldie, Guelph; H. Barrett, Port Hope, and J. Galbraith, Allandale.

The following millers were elected to membership in the Association: W. H. Schneider, Mildmay; Rollins & Williams, Exeter; Bennett & Constable, Spencerville; S. Copeland & Son, Penetanguishene; G. E. Martin, Lindsay.

A resolution was passed instructing the secretary to communicate with the Dominion government, protesting against an increase of 10% duty on half-bleached jute bagging, for the reason that such goods are not woven in this country or are likely to be.

The Ontario government are to be communicated with asking that in tenders for public institutions in future the specifications be made to call for standard grades of flour.

DISCRIMINATION IN FREIGHT RATES.

The important business of the meeting was to consider a report of the freight committee, which had been in session for some time prior to the hour of calling

together the executive. Following up the work done at the last annual meeting of the association in the direction of making right the discrimination in freight rates against flour, and also to counteract the one of under-billing, a delegation of the freight committee had visited Montreal twice during February and March, where conferences were held with the head officials of the Grand Trunk and Canadian Pacific railways and with representatives of the various steamship lines regarding export rates on wheat and flour. The committee reported as a result of their investigations that very unfair discriminations in freight were made against flour. A rate of 20c per 100 lbs. was given on wheat for export, while the rate from Ailsa Craig on flour was 29c. The rate on grain on the 6th of March from Chicago to Liverpool was 27.34c per 100 lbs., while on flour it was 27.44c, whereas at the same time from Ailsa Craig it was 26c per 100 lbs. to the same port. A rate of 14c per 100 lbs. has been given this month by the Grand Trunk on wheat from points west of Toronto to Liverpool, and they refused to accept less than 20c per 100 lbs. on flour.

How completely these discriminating rates have operated against export trade is shown in a letter received from David Plewes, agent of the Ontario Export Association, Liverpool, Eng., and read at the Montreal conference, when the Hon. Mackenzie Bowell, Minister of Trade and Commerce, met with the various railway representatives and Mr. M. McLaughlin and Mr. C. B. Watts, of the Dominion Millers' Association. The letter is dated Liverpool, Eng., January 25, 1894, and is as follows: "In reply to your favor of the 12th inst., 17-9 to 18 is the very highest obtainable, but I ask you how can I sell flour when your freight is 29c per 100 lbs., when wheat is only 20c per 100 lbs. The thing is impossible. If arrangements could be made so that your freight on flour were even 2c per 100 lbs. over the current rate of freight on wheat I could sell lots of flour. If you had a 22c rate on flour alongside the 20c rate on wheat you could have filled all the orders I have sent you. Why don't your association pull in this direction? If there is no better arrangement made to get better comparative freights on flour as against wheat I will return in June, as it is utterly impossible to sell freely against such odds in freight."

This letter clearly explains the situation. Wheat is being carried to the old country at equal to from 3 to 5c a bushel less than the charge for wheat. In other words the English miller buying our wheat has an advantage over the Canadian miller equal to about 20c per barrel in freight alone. Not only this, but any mill doing an export business is compelled to bring wheat in on which they pay an average of say 5c per 100, which added to the discrimination of 9c per 100 lbs. mentioned by Mr. Plewes makes a total of 14c per 100 lbs., which a mill exporting flour is charged more than the grain exported.

This is the wrong the Dominion Millers' Association have set themselves to remedy, and a result of the deliberations of this meeting was to pass a strongly worded and determined resolution setting forth the unfairness of the present discriminations, noting the fact that these unequal rates are given in direct opposition to the law of the Dominion government freight tariffs, and instructing the secretary to write to the General Manager of the Grand Trunk Railway, respectfully asking him to furnish satisfactory assurance to the effect that henceforth any special rates given to shippers of wheat shall at the same time be offered through the secretary of this Association, to all millers who may wish to avail themselves of such special rates. Failing to receive this satisfactory assurance, the secretary is instructed to lodge complaint before the Railway Committee of the Privy Council, and press for the carrying out of the Railway act, section 233 which says: "No company shall make, or give any secret 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 a concession given to anyone."

A copy of the resolution was ordered to be sent to the Hon. Mackenzie Bowell, minister of Trade and Commerce, and to the General Managers of the Grand Trunk and Canadian Pacific Railways.

The executive of the Dominion Millers' Association will meet regularly the second Tuesday of each month.

COOPERAGE D'P'T.

There is a close affinity between the work of the cooper and the business of milling. The miller, either he owns a cooper, having a cooperage as an adjunct to his mill, or else he relies for his supplies on an outside cooperage. The cooper in any case finds one of his best customers in the miller. The object of this department is to bring each in close touch with the other and to materially advance the interests of both trades.

THE MONTH'S TRADE REVIEW.

DURING the month of April the demand for dry cooperage stock has increased considerably and all last year's stock is about wiped out, in fact, a good many staves cut this year are now being shipped to no orders.

The first vessel for the North-west was loaded a few days ago with 500,000 No. 1 28 1/2-inch flour barrel staves for Minneapolis to go via Gladstone and the Soo line.

Navigation to Duluth has not yet opened, but a vessel is engaged to sail the 1st of May with 35 car loads of staves and hoops, the hoops for Fort William and the staves for Duluth. This vessel was originally engaged to sail on the 20th inst, but owing to the ice not being out of the bay at Duluth, the vessel will be unable to leave before the 1st of May.

The demand in the North-west is at present very good for dry flour barrel material, and a great many of the shops are buying kiln-dried stock at an advance of 25c. per thousand over air-dried stock.

The eastern markets have also been much better this month than for the previous three months, and coopers are beginning to realize that prices are likely to advance all along the line.

The flour trade in Canada has been rather quiet, and not many of the mills are running on full time, consequently the demand for flour barrel stock in Canada is not very brisk at present.

We do not anticipate there will be any advance in prices on cooperage stock in Canada for the next sixty days; after that, if the present prospects of a large apple crop continue good, we anticipate an advance in prices, as there has not been half a stock of logs got out in Canada this year, and the heavy rains we have had recently have flooded the woods so badly that no operations can be undertaken in the way of getting in logs for the next two months and probably three months.

The large salt works at Windsor have commenced operations again and if the wells hold out and no further accident takes place to them they will consume a large quantity of barrel material. This company use a very high grade of stock, almost equal to flour barrel stock, and of course will take a good deal of material off the market.

The following are the present ruling prices for cooperage stock delivered in Toronto, Ont.:

	Per net 1,000
No. 1, 30" jointed flour barrel staves	\$5 80
M. R., 30" " elm staves	5 45
" 2, 30" "	3 80
" 1, 24" "	4 60
No. 1, 5 1/2 ft. patent coiled elm hoops	6 00
" 1, 6 1/2 ft.	6 60
	Per set
No. 1 17 1/2" kiln dried heading	4 1/2 c.

The above prices are for high grade stock, for lower stock from small mills and where the timber is poor these prices have been shaded from 10c. to 25c. per thousand, but these are the prices that are asked by first-class mills for the highest grades of stock.

The above prices are for full car loads or mixed car loads of stock, for less than car load lots the prices would be correspondingly higher, according to the heavier rate of freight paid from the mills to Toronto.

The usual terms are net cash thirty days from date of shipment.

Hoops for the wired hoop barrel, colored and grooved, are worth 25c. per 1,000 more than the above figures, but they have not come into general use as yet, only very few of the mills having adopted the wired hoop barrel.

WHAT IS A MUGWUMP BARREL?

The barrel was nicknamed mugwump on account of its hoops. It is neither a flat hoop barrel nor a round hoop barrel, but half and half. For the barrel end, the hickory hoop is, no doubt, better than the flat one,

because it will stand pounding from the top without danger of breaking a great deal better than the flat hoop; but, on the bulge, the flat hoop is best, because it is a little larger and protects the barrels much better when they are piled up, by not allowing so much pressure on the staves.

UNITED STATES MARKETS.

COOPERAGE affairs in Minneapolis are quiet. But about one-half the flour milling capacity is now in operation, hence but about the same proportion of the flour barrel factory capacity is at work, and the market for flour barrel stock is correspondingly low. But the signs are all for a swift change in affairs, for at the opening of navigation, which comes immediately, there will be a stimulus given to the milling trade. Two of the cooper shops are crowded with work. The rest are idle.

There is a more active enquiry for dry stocks of staves, and a growing belief that the supply is not large. A few cars have been bought here, and the prospects are that a good trade is about to develop. Stocks on concrete are about exhausted, with such shops as have not yet renewed their contracts. It will be the policy of the shops to buy on the market this season as long as the market seems easy. The prices now are not below \$6.75 for dry staves, though for future delivery there are some lower offerings.

Heading is still held at 4 1/2 cents. The greater part now used in this market is on contract with the members of the combine who are holding the price at the figures quoted, but all or nearly all the stock bought on the market is offered by concerns outside the combine at 4 to 4 1/2 cents. It is thought that the stocks of heading are large, and that when the contracts expire in June the coopers will buy on the open market and force the price down to 4 cents or thereabouts. The weather has not been as good for the drying of stocks as was expected, so that both dry heading and staves are from two weeks to 20 days behind time.

The coiled elm hoop market is fairly firm at \$7 to \$7.25 a thousand, but there are a few offerings by small concerns below \$7. It is the belief of holders of this stock that a shortage is sure to develop not later than August, and that it will pay to hold on to stocks at this time. Hickory hoops are all off from any market price. It is a case of "save himself who can" with the holders of hickory hoops. They have been offered as low as \$5 to \$6 in this market. To our coopers who have paid \$7.25 for this stock steadily for years, these prices look demoralizing. There are scarcely any wanted even at this price.

Chicago reports as follows: The cooperage market is unchanged. Lard tierces are firm at 90c., and pork barrels at 70c. Receipts from outside very light, and only small stock on hand here. Dry staves are arriving slowly and are in good demand. No. 1 tierce, sawed, listed and dry, are quoted at \$20.50 to \$21, and No. 1 pork, sawed, listed and dry, at \$17 to \$18. There is also a good demand here for 24-inch and 19-inch cut-offs, at \$9.50 per M. for the former and \$7 to \$7.50 for the latter. Hoops have shown some strength since last month, and are quotable at about a dollar per M. higher. No. 1 oak tierce are salable at \$11 per M., and No. 1 pork at \$7.50 and \$8 in car lots. Headings about the same as last reported.

The report from Milwaukee, Wis., runs like this: "The past month has been one of the months that was unsatisfactory to the cooperage business. While no great improvement was made, yet there was more inquiry from out of town which usually brought an order of some kind or a promise. Considerable stock was received this past month and the trade is looking forward for a better demand this coming month. Staves and heading rule about the same figure, \$5.75 to \$6 for prime stock. Occasionally there are sales under this for off grade. The market for flour barrel hoops is a sick one and the offerings are largely in excess of the demand. The tight barrel trade shows no improvement as packers are not buying.

It is said that, on an average, one operation per day is made in New York for the removal of the vermiform appendix, the worm-like termination of the big intestine.

COOPERAGE PAST AND PRESENT.

If we go back into ancient times, it is learned that the art of manufacturing barrels from staves dates back to the Romans, at the period of the Christian era. An old definition of the term makes cooperage consist of only what is made into barrels after they are completed, and classifies it tight-barrel cooperage, slack-barrel cooperage, and white cooperage, which is known as small woodenware, made usually of white wood. In the present day it is pretty generally understood that staves, whether rough or dressed, and heading in like condition, hoop-poles, shaved hoops, cut hoop iron, rivets for making hoops, hoop fasteners, hoop-keepers, clout nails, bungs, bung bushings, and, in fact, glue for making the inside of barrels for oil tight: all these, if found in a cooper shop, are classed as cooperage.

Writing historically of the cooperage business, Mr. B. F. Pratt, says in the Wood Worker: "There is, perhaps no industry that has risen and had its fall so rapidly as the manufacture of barrels. The absence of its use has brought about a shrinkage in the desirability for its use, because of the high prices it was driven to, and the consequent resort of the shipper to substitutes and selling his products loose. My earliest experience in re-coopering was the tar kegs made in a hurry and filled with hot tar, when a boy as a clerk in a country store which had the traffic in this merchandise over a large scope of country. An eastern Kentucky tar camp was usually run in those days by the members of a family going into the woods and taking a hand in its manufacture. After the kegs were made and a hole bored in the head to pour in the tar, the keg was filled and the hole plugged up with a corn cob. The kegs were wined together so that they could be swung across the "critter's" back, and the "old man," or his son or daughter, would mount another "critter" and the tar would be marketed, say two or dozen kegs at once, which was carried to town, the girl or boy who made the trip using a pack saddle to hold the kegs in place on one horse, and riding the other, either on a pack saddle or with no saddle at all. In this way very narrow roads could be traveled, and a trip could be made in a day and part of a night, a distance of fifteen to twenty miles. This was doing business within your means. No bank account was necessary; no entry clerk or book-keepers."

The petroleum oil business gave a great stimulus to the cooper's trade, afterwards to be reduced again from the fact that pipe lines were laid from the oil fields to the refineries; tank cars are now used; tin cans are made a great carrier of oils, lard, paints, tar, and some iron packages have been used to supplant barrels and kegs, and thus the trade in many different ways has had its ups and downs more so than many other departments of commerce.

FRAUDULENT BARRELS.

A FEW weeks ago, says a Boston paper, we alluded to how the buyers of turpentine in the north are defrauded by the manufacturers of turpentine barrels in the south, who make dishonest barrels, by inserting extra thick heads and staves, thereby making the barrel hold less than the gauge will show. Charles Richardson has handed us the result of the recent test made by him. He emptied five barrels, filling the same with water. Here is the result:—

Gauge of barrel.	Actual measurement.
53 1/2 gallons.	50 gallons.
52 1/2 "	51 "
50 1/2 "	48 1/2 "
51 "	50 "
49 "	48 "
25 1/2 "	24 1/2 "

A shortage of 6 gallons.

CLOCK OF BREAD CRUMBS.

ONE of the curiosities of Milan, capital of Lombardy, is a clock made of bread crumbs. It was made about 150 years ago by an ambitious workman whose time was not money. He had not the means to, buy the metal necessary in the construction of the works, and so conceived the ingenious idea of taking his bread crumbs from day to day and solidifying them with a strong addition of salts, from which he constructed his clock.

AN AZTEC MILL.

A RECENT traveller in New Mexico sketches a picturesque mill which he found in an unfrequented spot. He says: "One day while riding across the country, we came to an old Mexican mill built thirty years ago. It is a primitive affair, and the grinding is done between two coarse stones propelled by a turbine wheel. The machinery is enclosed in a tumble down log hut, and is owned by an old Mexican couple who have long since ceased to derive any revenue from it. The man must be 70 years old, and his wife is probably but few years his junior. They were glad that we came and dug them out of their seclusion. The place is never visited by travellers, and their gratitude took on the inimitable



AN AZTEC MILL.

Spanish obsequiousness. The wife ran to the house and got the key and showed us the old machinery. Then she took us through her homely flower garden, where there are old-fashioned flags and hollyhocks and those flowers that old ladies of every clime like to cultivate. Though she apparently prized them very much, she cut a bouquet for us. Then the old man showed us his farm and fruit trees and market garden, much as a proud young Yankee would show us his treasure. The wife followed at a respectable distance, rolling a cigarette. When we offered her a little money for the trouble she had been to in showing us the mill, she received it with as much dignity as though it were a ducal ensign. One of the party gave her husband a cigar, but he passed it to his wife with a gay little shrug, explaining that she did the smoking for the family."

LONG VS. SHORT ROLLS.

THERE seems to be a growing disposition among British milling engineers to increase the length of rolls, and for small milling plants this practice has found favor with American engineers also, writes J. Myleys in the Australian Miller. Rolls of 18-in. to 20-in. length, looked upon as standard only very recently, are rapidly disappearing to make room for regular "giants" up to 40-in. long. It is claimed by the respective makers that a mill can be fitted at less cost if long rolls are employed; that the long rolls do comparatively more and better work than the short ones, and therefore prove more profitable for the miller all round. It certainly is a fact that the cost of fitting up a mill with, say, 40-in. rolls, is less than if 20-in. rolls were employed, for having to deal with less machinery, fewer belts and pulleys are required. Referring to the belts, however, the saving will be found very trifling indeed, for to drive one 40-in. mill nearly as many pounds of leather will be required as to revolve two 20-in. mills.

Regarding the work, however, it is utterly misleading to say the long roll will do more and better work than the short one, for practice goes to prove just the opposite; or, to say it better, two 20-in. x 9-in. mills will show better milling results than one mill 40 in. x 9 in., granted, of course, for both sets same conditions as to material to be reduced, speed, et cetera. This may seem incredible for any one not accustomed to the different machines, but it is, indeed, one of those cases where theory is not borne out by practice. Any pair of chilled iron rolls, no matter what length, show a greater reducing capacity in the end sections than in the middle, and the longer the rolls the more this fact becomes evident. Get the rolls ground as true as mechanical skill can do it, employ a feeding apparatus as complete as you possibly can procure it; yet your mill will produce softer stock on the ends than in the middle.

A certain Australian milling engineer, interrogated about this conundrum, solved it in this way: "The break roll grooves act like screws, drawing the feed toward the middle, therefore cramming the stock here, and leaving the end sections but half fed." Some say the rolls get bent by the action of the adjustment gear; others, again, blame the cog-wheel drive. Certain millers and engineers give it a point blank denial, blaming the feeding apparatus for the deception. Dealing with the Australian milling engineer's solving of the problem, is there time for the stock to travel any distance between the rolls? I for my part never could convince myself of its being so by practical tests, for I don't take into consideration that condition where a mill is overfed, and the rolls don't deliver as quickly as the feed is piling up between them. Under ordinary circumstances any miller may try the experiment. Drop small shavings along with the stock, watch the point where they will be ejected, measure the way they have been drawn toward the middle. I never could manage it—even in an overfed mill I failed to see any screwing action; the stock keeps rolling over, but not travelling either way. Why should the grooves, running over the whole length of the rolls, act like left and right-handed screws meeting just in the middle? That theory neither seems logical nor is it proved by practice. If the theory were right, the stock ought to be screwed along the whole length of the rolls, and not from both ends into the middle; and practice makes quite evident the scissors-like action of the grooves.

We find the defect in smooth mills in a by far more marked degree, yet here there are no grooves to do the screwing. What, then, is the reason of the deficiency? Further, the engineer referred to said: "The stock is cramming toward the middle, leaving the end sections but half fed." This again does not seem feasible, calling the practical test to your help. Regulate a mill as even as you can get it, catch the stock, feeding the end sections, say 4 in. each side, for about a quarter of an hour—viz., before and after passing the rolls; do the same with 8 in. of the middle part, and compare results; they will be almost alike. Again, block the feeding apparatus of a mill running on dust for about 4 in. each end, so as not to feed here at all; set the mill as true as possible, and let it run in this way for a couple of hours. It is necessary to do so for reasons given later on. Here we find the end sections but imperfectly fed, and the middle crammed; but the reducing action of the ends is found imperfect; the stock throws the rolls apart, and opens the end sections as well, passing the thin layer of stock hardly touched. As said above, to try the experiment the rolls want to be well set—one side to get as much pressure as the other, else the rolls run hard together on one end, diverging from each other as length increases.

As to the bending of rolls, is it imaginable ordinary milling work can bend a 9 in. or 10 in. chilled iron column? Why don't the rolls bend, as long as they are cold? Start a long mill, being perfectly true and level, besides having stopped for a night, it will do its work as well as any short roller; overhaul this machine again in about two hours' time, and it will soften better in the end sections than in the middle. So there the rolls bend as soon as they get warm. Let him understand this who can. Should not the continual friction and dislocation of the small iron crystals forming the roll make the metal brittle enough in time to crack the roll through the middle? If you think of a smooth roll revolving about 1,500,000 times in six days' work the bursting should not be unlikely at all. We have seen cracked porcelain rolls, but I never saw, heard or read anything of chilled iron rolls failing in this way.

The cause of the evil is, from my experience and in the opinion of many practical millers, not to be found in any of the causes dealt with. The radiating heat of the bearings, also the heat developed by the friction between the rolls and stock, expands the rolls unevenly, and the same power that generally cracks the porcelain roll, I should suggest to blame for the defect found in chilled iron rolls. There is one reason at least why the end sections of rolls will always expand more than the middle part, and therefore show different reducing results. Chilled iron rolls are cast solid in many cases, the steel shafts being forced in by hydraulic pressure. Some manufacturers cast the rolls hollow, but allow iron enough in the ends to carry the shaft; but very few rolls are manufactured like shells,

ends and shafts being fixed similar to those in Wegmann's Porcelain Rolls. However the rolls are made, the end sections must be the closest-grained parts—consequently, when warmed must expand most. This seems to be verified by the working of rolls. Softening more in the end sections, one would feel inclined to think those very parts should wear down and bring the roller face to a level, so to say, but that is not the case; on the contrary, the longer the mill is at work, the more hollow it gets. The end sections expand most, yet, being of closer texture, stand the wear better.

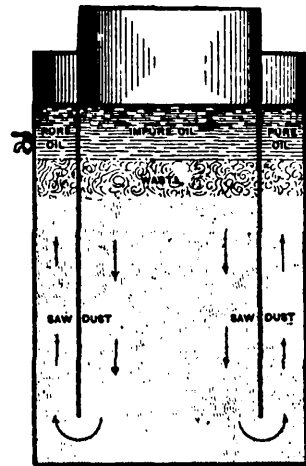
Through bad adjustment, sometimes one end of a mill will run closer than the other, and not being noticed for some time, the bearings will get hot. The quickest way to remedy the evil will be the opening of the rolls; kept going in this way, the bearings soon are cool enough to warrant the setting of the mill afresh. Here, again, the rolls have been expanding all the time, radiating the developed heat through the shafts to the bearings, besides forcing a higher pressure upon them.

The engineer referred to above had once ground for me a 30-in. x 10 in. mill smooth. The job not being finished to my satisfaction, I showed the man the rolls set tight in the frame. He would not credit the rolls were not done true. I convinced him of it by showing the streak of light that could be perceived for about 6 in. in the middle. Taking some very thin tracing paper, he tried whether the rolls would bite it right along. They did so, indeed; cut the paper where the rolls covered each other, and held it tight where you perceived the streak of light. The man was satisfied with this experiment, for he argued: The fault is so diminutive the mill must work. To his great surprise he found it did not work, at least what you may call satisfactorily. Where you saw light through the rolls the stock passed almost untouched. The expansion, again, was the agent to bring this about, to the greatest surprise of the engineer.

Whether I am right or wrong with the expansion theory, I don't know. In any case, I am quite satisfied that short rolls have a better reducing efficiency than long rolls.

HOME MADE OIL FILTER.

A CORRESPONDENT of Power gives the following description of a home-made oil filter which he has found to work successfully: It is made of an old oil can that will hold about 40 gallons. Inside this is placed a galvanized iron or tin tube, raised from the bottom by a couple of sticks and projecting about six inches



HOME MADE OIL FILTER.

above the top of the can. The can and tube are then partly filled with clean sawdust, with a layer of waste or cloth on top, as indicated in the sketch. The impure oil is poured into the tube, filters down through the waste and sawdust and up again in the can, whence it may be drawn off through the cock as needed. By pouring in a few buckets of hot water first, you have a water filter for the oil, as it will pass through the filtering material in the same way. I have made two filters in this way, at slight expense, and they work all right.



The particular purpose of this department is to create an increased market for Canadian mill products—flour, oatmeal, cornmeal, rolled oats, pea barley, brose meal, split peas, etc.—at home and abroad. The interests of the miller who grinds the grain will have thoughtful consideration. Any matter that is likely to lead to an improvement of conditions in the local market of any of the various provinces of the Dominion will be carefully considered in this department. A close study will be made of the foreign markets with the aim of further developing the Canadian export trade. The Mill Leaf each month covers very effectively the field of flour-handlers and buyers of mill products, not only within the borders of the Canadian confederation, but in Newfoundland, the West Indies, Great Britain and other European centres. This department will be made valuable to them in discussion of the conditions of the market in this country, reliable market data, the manufacture of mill products, methods of transportation and shipping intelligence in its bearings and relationship to the milling industries. We invite correspondence from millers, shippers and buyers on any matter so long as these important questions.

NAMES OF FLOURS.

EVERYONE is familiar with the oft-quoted words of Shakespeare, that a rose by any other name would smell as sweet. This is the case where the poet, perhaps, was a little astray. In business a name has much to do with success. We are not going to moralize, however, and talk of the necessity of a business man bearing a good name, and how far such goes as capital in the management of his business. All ought to understand this.

We are thinking just now of a name as representing, probably, the trade-mark of a concern, used in the case of the miller as a brand of the flour produced. Not long since in these columns we had occasion to point out to what extent sometimes a well-known brand was prejudiced by the dishonesty of some unprincipled miller, who would steal a good name and apply it to an inferior quality of flour.

There is another thought in connection with the names of flours, and it is the multiplicity of them among individual millers. We take up the letter heading, or business announcement, of almost any miller throughout the country. We find that he is producing a variety of flours, as far as distinctive names are concerned, that must keep his mill busy, making sure that there is sufficient stock of each brand on hand to meet the calls of his customers. Is this not a mistake? A study of the world's commerce shows that the men who have got hold of an article of genuine merit, baptised it with some catchy name, and rung the changes on toys by judicious advertising methods from year to year, and decade to decade, are the ones who have made the most money. There is nothing like familiarizing the people with the name of an article, and the article once firmly established and kept constantly before the people, secures a grip on their confidence that is difficult for any rival to take away from them. Let the miller have sufficient variety of names to cover the leading grades of flour that he may manufacture, and then his aim ought to be to let the people know that these particular flours, as bearing the names chosen, have no equal anywhere.

Touching on this matter of names or trade-marks, our notice has been drawn to some remarks on the question in a late issue of Milling, where the writer comments on the similarity flour brands or trade-marks bear to each other. Certain familiar symbols appear over and over again. The star, the anchor, and designs of this class, with sufficient modification to make the designs differ one from the other, are adopted by our millers. Then the craze is for words of like character such as, "snow-flake," "white lily," "crown jewel," "gold dust," etc., whilst every miller makes, of course, "choice," "standard," "best," "superior" or "extra" flour. This method of branding flours has been adopted to so wide an extent that we would think there was a good place for an ingenious advertising writer to strike on an entirely new line of thought, and catch a good business from some enterprising miller who wanted to be a little more original than some of his brothers.

The town of Mattawa, Ont., has decided to grant exemption from taxation and a bonus of \$2,000 for the erection of a great mill at that place.

OBSERVATIONS.

An explanation of the slackness of local flour trade in some sections of the country, is explained by the fact that farmers have had abundant supply of potatoes in their cellars, and they have been feeding on these rather than bread, fearing that they would rot on their hands.

It is quite plain to anyone who studies with care the very unsettled condition of the flour market, that all sorts of explanations are in order in interpreting the situation. Just now low flour has been selling in England is known to every miller, and we are told by one authority that the cause of this is that English millers are making up flour from Russian wheat of an excellent quality, and which is bought at a price that discounts even the very low prices that North American wheat is now selling for.

MR. C. K. GRAHAM, of Belleville, who has recently returned from a business trip to the West Indies, gives quite an encouraging account of the possibilities of trade in those colonies. He had been doing business on behalf of Canadian woolen mills and reports a good trade. For products like cheese, butter, canned goods and even potatoes and onions there is a good business. In the reports that we have seen of his remarks no particular mention has been made of the flour trade, but from what is already known of the flour business in the Indies, when Mr. Graham speaks favorably of the generally healthful tone of business in those parts, we have reason to believe that Canadian millers need only to keep their products well to the front and they will obtain as good a market, relatively, as other products, which Mr. Graham has been handling.

OATMEAL millers felt that they were badly treated when the new tariff was announced, leaving the duty on oats at 10 cents per bushel, while that on oatmeal was reduced from 1 1/2c. per pound to 50c. per barrel. The effect of this would be, according to a view expressed by Mr. John Wright, oatmeal miller, of Owen Sound, to enable American millers when their oats were low-priced to send their meal into the Dominion, while, if a Canadian oatmeal miller wished to import oats to keep up his trade it would cost \$1.00 to a \$1.10 to do this, as it takes from 10 to 11 bushels of oats per barrel of each according to quality of the oats. In Parliament on the 20th inst., however, in committee of Ways and Means, the tariff resolution being under discussion, Mr. Foster changed the proposed duty on oatmeal from 50c. to 68c. a barrel, with the view, he said, of equalizing it with the duty of 10 cents a bushel on oats. The proposition brought a vigorous protest from Sir Richard Cartwright and others, but was finally passed.

ENGLISH milling journals are giving a large amount of space of late to a discussion of the character of American flours that are being sold in that country. With a certain class of writers there is hardly anything too strong that can be said against American flours. Reading these articles one can come to no other conclusion than that Americans are making the worst class of flour for the purpose of exporting it to Great Britain. There is reason to believe that there has been a considerable quantity of flour of a very poor quality sent from the United States to the old country, and this has done a heap to prejudice the product of the flour mills of this side of the Atlantic. But when a general onslaught is made on the characters of the flour producers of this continent, we have an object lesson, showing just how far prejudice will carry even common-sense people. The British and Foreign Confectioner and Baker seems to have taken a fair and impartial view of the situation when in a recent issue it remarked of American millers: "If they are not all as honest as they should be, we are at a loss to know where to turn to find much better. We are not always sure of the honesty, even of the British miller, the one is, perhaps, as easily watched as the other." It is the common mistake to denounce whole classes of people, because of the misdoings of a certain section of this people, and this is where our English milling writers seem to have erred.

A flour mill is being built at St. Henry Mission, Fort Vermilion, N. W. T.

WHEAT TO GO TO TWO DOLLARS.

DON, of Saturday Night, by way of diversion, we suppose, has dropped his weekly homilies on politics, morals, and society affairs, for the nonce, and taken to commerce. In a late issue of that journal he publishes an interview with Mr. Van Horne, of the C. P. R., which is rose-colored in its predictions of the good things in store for Canada in the near future. Mr. Van Horne said:

"I have asked a dozen men high up in railroad and speculative affairs in the United States to tell me what the wheat product of the world is, and I have never found one who knew. Of course it is part of my business to understand something about wheat and its future, as the C. P. R. depends so largely on the success of wheat-growing in the North-west.

"By the way" have you any idea what the wheat product of the world is?

"Say, you fellows write very sagely on the price of wheat, and yet I have never met one of you who knows enough about it to really make your opinion worth much. Of course it is difficult to get any accurate statistics, but as far as I have been able to find out after a careful scrutiny of everything that is provided in a statistical way, the world's product of wheat is between twenty-three and twenty-four hundred million bushels per annum. I have been unable to find any trace of seed wheat being taken into consideration; this I reckon at about three hundred million bushels, bringing the total annual product of wheat up to between twenty-six and twenty-seven hundred million bushels.

"Of course the wheat-producing area is being continually enlarged, south Africa and Argentina, for instance, but their total output is so small an item in such large figures that it is more than offset by the fact that millions who used to eat rye bread are now eating wheat bread owing to the decreased price.

"Last year the raisers of wheat at best received little better than the cost of producing, while in many instances their return per bushel was smaller than their expenditure. This can have only one effect, the discouragement of the wheat producer and consequent decrease of the acreage.

"Now if there is a decrease of ten per cent. in the production of wheat this year, owing to the low prices of last year, there will be a shortage of two hundred and seventy million bushels, and ten per cent. of a decrease is well within the mark. As far as I can remember, there has never been a surplus of a hundred and fifty million bushels.

"This year the surplus has been used up by feeding it to the stock, and we will probably start in with as nearly a clean sheet as ever before. Now, if there is a shortage of only a hundred and fifty million bushels, this will not be discovered until it is too late to sow more wheat, and wheat will go up with a jump.

"Even one year of higher-priced wheat will not bring back the old acreage, and for two seasons no doubt there will be a large advance, and within eighteen months I expect to see wheat two dollars a bushel.

"Why," said he, "when I was in the railroad business in the southwest I remember when the farmers of Illinois produced so much corn that the price went down to six, seven, eight and nine cents a bushel, and was used for fuel, burned like coal, in the central Western States.

"People said, 'Oh, corn will never come back to its old price; there is too much of it grown.' Next year it was over forty cents a bushel, and has never gone back to anything like a ruinous price, though the production has been multiplied a hundred times."

"It will be the same with wheat; the re-action will come and it will mean astonishing prices. If the re-action comes the Northwest will get the benefit of it. It raises the best wheat in the world, and in spite of the fact that the C. P. R. is charged with exacting exorbitant freight rates.

"I can tell you that we haul wheat from the North-west to the seaboard more cheaply than it is carried the same distance anywhere else in the world. Why, in Australia, where they are beginning to raise wheat for export, they pay as much freight for a hundred and fifty miles of transportation as the Western farmer pays the C. P. R. for fifteen hundred miles of haulage. Talk about Russian and Indian wheat, South American wheat! None of them get to the seaboard as cheaply as the wheat of the Northwest."



Office of the CANADIAN MILLER.
April 23, 1894.

THE GENERAL SURVEY.

INTEREST in the markets during the month has gathered, largely, around weather conditions, and prices have been affected according as these have been favorable or the opposite. This was seen quickly after the publication of the United States government report for April, on 10th inst. In fact, before the report had been published, speculators had, in anticipation, sent the price of May wheat up to 66 1/2. The story had been circulated that the damage to crops was considerable, but when the official document was published it was found that winter wheat throughout the Union was nine points over the condition for the same time last year. The result was that the market soon dropped again after this to 58 1/2, a decline of almost eight cents a bushel.

Some uncertainty, however, has existed as to the real import of the government report, which was in these words: "The returns in regard to the effects upon wheat from the recent cold spell are not so conclusive as is desirable. The injury to the crop is undoubtedly considerable, if not great, but the comments of correspondents accompanying the reports would seem to indicate that the full extent of the damage was not fully determinable at date of transmission." The Price Current, of Cincinnati, has offered this comment: "The improved condition of winter wheat reported by the Government plant offsets the decreased acreage of 7 per cent, reported in the December statement, and with normal conditions for the remainder of the season a yield equal to last year may be expected." There is reason to hope, even though the crop reports have not let us entirely out of the woods, that wheat prices will continue firmer. These conditions are noticeable in the Chicago market where a stronger feeling now exists, subject at same time to some fluctuations, and a sympathetic feeling of buoyancy has found a place in both Ontario and Manitoba.

Referring again to the report of the Secretary of Agriculture at Washington, the following statement, specially called for by resolution of the Senate, and indicating the visible and invisible supply of wheat, will be found interesting just at this time. The minister says: "The total supply on March 1, 1893, was 610,000,000 bushels. Exports from March 1, 1893 to March 1, 1894, consumption from March 1, 1893, to March 1, 1894, amount in farmers' hands March 1, 1894, and visible supply, March 1, 1894, amounted to 739,000,000 bushels, which is given as the total amount distributed and available for distribution. The apparent discrepancy is 119,000,000 bushels. The supply on hand March 1, 1894, was 190,000,000. The probable consumption from March 1 to July 1, 1894, is 121,000,000 bushels, leaving 69,000,000 bushels available for exportation from March 1 to July 1, 1894."

Late official reports from Russia, so far as they can be relied upon, tell of favorable weather conditions in that country. In some places excessive humidity is complained of, chiefly in the provinces of the Baltic and Poland, but generally the outlook is encouraging for a good crop. What a large crop means for Russia and its relations to the wheat-growers of Canada, may be better understood, if for a moment we consider the place Russia is fast occupying as a chief provider of wheat for the United Kingdom. Dating from 1st. of last August to the early days of March of this year, that country shipped 78,872,000 bushels to Great Britain, whilst the shipments from Canada, the United States and the Pacific coast, were only 61,412,000 bushels. Taking this view of the situation into account, and remembering that with cheap labor and lower freights in her favor, she is likely to become a still more potent factor in the future, it would appear as though at a comparatively early day we might expect wheat prices to be fixed abroad, and not from this side of the Atlantic. The situation is made further complex when we recognize the position of the Argentina and India, as wheat growing lands, whose position is rapidly becoming strong.

The Mark Lane Express, in its weekly review of this date, of the British grain trade, says: English wheats have been quiet, and foreign wheats a trifle lower. California has sold for 250 3/4 a quarter; fine hard Manitoba at 250 9/4, and No. 2 red winter at 230. Corn has been steady, mixed American feeding 175 6/4 a quarter. Barley and oats have been firm, and beans sold 6d lower. English wheats have averaged 25s 5d. In fore-

ign wheats American reds obtained full terms. Flours are without demand, and corn is slow at 3d decline. Oats are quiet. Barley dull, and beans and peas are held for an advance.

The following table shows the quotations per cent at Liverpool, to-day 23rd, inst., as well as for the five preceding days. In the case of wheat highest prices are given.

	April 17, 12 3/4 p.m.	April 18, 12 3/4 p.m.	April 19, 12 3/4 p.m.	April 20, 12 3/4 p.m.	April 21, 12 3/4 p.m.	April 22, 12 3/4 p.m.
R. Winter	5 0 1/2	5 0 1/2	5 0 1/2	5 0 1/2	5 0 1/2	5 0 1/2
Cal. No. 1	5 2	5 2	5 2	5 2	5 2	5 2
Corn	1 10 1/4	1 11	1 11	1 10 3/4	1 10 3/4	1 10 3/4
Peas	4 11	4 11	4 11	4 11	4 11	4 11
Pork	70 0	70 0	70 0	70 0	70 0	70 0
Lard	40 0	40 0	40 0	40 0	40 0	40 0
Bacon, heavy	23 0	23 0	23 0	23 0	23 0	23 0
Bacon, light	18 0	18 0	18 0	18 0	18 0	18 0
Tallow	25 0	25 0	25 0	25 0	25 0	25 0
Cheese, wh	48 0	48 0	48 0	48 0	48 0	48 0
Cheese, red	58 0	58 0	58 0	58 0	58 0	58 0

Beerbohm, London, Eng., says: Floating cargoes—Wheat, weak; corn nil. Cargoes on passage—Wheat, steady; corn, slow. Mark Lane—Wheat, English, quiet; foreign, steady; corn, quiet; flour, slow; spot No. 2 Calcutta wheat, unchanged; present and following month 3d higher; Plata wheat, off coast, unchanged; present and following month, 3d higher.

Later, 4-30 p.m.—Antwerp—Spot wheat, quiet; red winter, 137 87 1/2; was 137 75c. Paris—Wheat and flour, quiet; wheat 20f 40c, was 20f 50c for May; flour, 43f 20c, was 43f 10c for April.

CURRENT PRICES OF BREADSTUFFS.

WHEAT—Toronto—White selling in limited quantities at 60c; red and white, middle freights west, 58c; spring wheat on Midland, 58c; gouse, 58c; Manitoba: No. 1, hard, 73c; No. 2, hard, 71c. The Trade Bulletin of Dominion Millers' Association reports Toronto wheat, 64c on track for fall wheat, and Ontario wheats; car lots, fall wheat, 58c, holder asking 58c to 60c, straight for fall, and 60c to 61c, for spring. Montreal: Prices are fairly steady; No. 1, hard, Manitoba, 79c to 80c; No. 2, 75c to 76c. Chicago: Wheat dropped at this writing a cent for May, and a cent for July. Futures closed: April, 57 1/2; May, 57 1/4; July, 60 1/4; September, 62 1/2. Duluth: No. 2, hard, 61 1/2c. for May; 61 1/2c. for July; No. 1, Northern, 60 1/2c. for May; 62 1/2c. asked for July. Toledo: 57 1/2c. for cash and April; 58c. for May; 60 1/2c. for July; 61 1/2c. for August. St. Louis: 54c. for cash; 53 1/2c. for April; 53 1/2c. to 53 1/2c. for May; 56 1/2c. to 56 1/2c. for July; 57 1/2c. bid for August.

BARLEY—Toronto—Best malting barley is now on a par with feed prices, the latter having advanced. No. 1, west, 41c. United States malsters are buying slowly, whilst a considerable demand exists for feed.

OATS—Toronto—Sales steady. White, west, 33 1/2c.; old sales are quoted at 34c. Montreal: No. 1, in store, 40c. to 41c. Buffalo: No. 1, white, 40c.; No. 2, white, 39c.; No. 3, white, 38c. Toledo: 34c. for cash.

PEAS—Toronto—Quantities have been bought on speculation for export. Prices are firm. Exporters bid 55c. for C. P. R. and G. T. R. lots west. Holders are asking 56c. to 57c. Montreal: No. 2, 39 1/2c.; No. 2, delivered, 40 1/2c.; No. 3, 39c.; No. 2, white, 41c.; No. 3, white, 39 1/2c.; track mixed, western, 39c. to 40c.; track white, western, 40c. to 41c.

RYE—Toronto—On Midland, 46c. Value for export, 51c. about Montreal, or 46 1/2 at east lakeports. Montreal: 52c. to 53c.

BUCKWHEAT—Toronto—Little doing. Car lots quoted at 40c. to 41c. Montreal: 45c. to 48c.

THE FLOUR MARKET.

LOW prices continue to be the rule with flour, and the volume of trade does not materially increase. In country sections local mills are doing probably as satisfactory trade as can very well be expected and we do not know but what their position is a better one than that of some of the larger mills. In export trade we have learned of good shipments to Newfoundland. One case is reported from Montreal of a sale of 2000 barrels of straight roller flour, though the price is said to have been exceptionally low. The Montreal Trade Bulletin says: It is estimated that 25,000 to 30,000 barrels of flour have been awaiting opening of navigation, of which about 12,000 barrels are said to be American. A commercial journal, published at St. John's, Newfoundland, states that flour remains the same price in all grades with no appearance of a change for some time to come.

PRICES OF FLOUR AND MEALS.

TORONTO.—(Toronto freights).—Straight roller, \$2.55 to \$2.90. The Trade Bulletin of the Dominion Millers' Association, reports of Ontario flours: "Sale of straight

roller, \$2.70 and 90; Patents \$2.90 and 80; Patents at \$3.05 f.o.b. for Lower Provinces. Bran, \$1.75, \$1.5 and \$1.0. Shorts, \$1.50 and \$1.0 f.o.b. Export market, no sales reported.

MONTRÉAL—Patent winter, \$3.40 to \$3.60, Patent spring, \$3.60 to \$3.70; straight roller, \$3 to \$3.10, extra, \$2 to \$2.80; superfine, \$2.50 to \$2.70; strong bakers' \$3.50 to \$3.60. Ontario bags, 1 3/4 to \$1.40.

NEWS AND NOTES.

CANADA.

Mason & Bonith will operate a gust mill at Magog, Que. Wm. W. Smith will operate an outfall mill at Portage la Prairie, Man.

Melita Milling Company, Ltd., Melita, Man., J. S. Ferguson is dead.

D. Goldie, of Ayr, intends this summer to enlarge the capacity of the Greenfield flouring mills from 400 barrels to 700 barrels per day.

Ralph Kidd has purchased the whole interest of I. & R. Kidd, millers, Tilbury Centre, Ont. It is the intention of Joseph Kidd to build and operate a mill at Prince Albert, Sask.

The Ogilvie's and Lake of the Woods Milling Company have closed down their elevators at Thornhill, Man. 200,000 bushels of No. 1 hard wheat were marketed at this point the past season.

The McKay Milling Company, Ottawa, Ont., have closed down the night watch in the Chaudron Mill for the present, throwing about twenty hands out of employment for the present. The mills have not been running regularly for some time past, having on hand an overstock of flour.

The Municipal Council of Vernon, B. C., have accepted the offer of W. E. Ellis, of Fernlecote Falls, Ont., to build a 50-barrel flour mill, the municipality granting a bonus of \$5,000, a free right and exemption from taxes for 10 years, and are also to give the exclusive right to supply the electricity required by the town for 10 years.

The case of Leon M. Carrier, the defaulting grain man, is before the courts at Quebec, this week. Among the witnesses are a large number of flour merchants who are being called to prove that in their opinion the oats were delivered when placed on the spur line opposite their store and their name checked on them. Full particulars of the nature of this case have already been given in these columns.

"We are on the outlook," said Reeve Fowler, of Wawanesa, Man., "for a man with money to invest in a good roller mill. We offer \$5,000 of a bonus, a free site, and a switch into the mill. There is no flour mill within a radius of twenty miles, and at the various elevators in the neighborhood last year about half a million bushels were marketed. If the prettiest location and the best wheat country in the province are any inducement," continued Mr. Fowler with enthusiasm, "why we've got that to offer."

GENERAL.

During the year ended with July, 1890, France imported 34,625,572 bushels of wheat and flour, against 45,211,570 bushels in 1891, against 112,840,000 bushels, in 1892, and 31,240,000 bushels in 1893. During the first seven months of the present crop year the total was 43,928,000.

Two of the largest flouring mills in St. Louis closed down a few days ago ostensibly for the purpose of making repairs to machinery. It is reported that nearly every flouring mill in this district will close down for an indefinite period. It is set forth that there has been an over-production of flour, and this, in addition to the low price of flour, makes it necessary for the mills to close down.

Reports from Chicago say the grain fleet commenced leaving there on April 1, being ten days in advance of the opening last year. There is a great contrast in the business. Last year, with a good prospect of good freights and return loads, there was a great rush of vessels to get away. This year there is a little freight to be moved, at low figures, and when most of the boats reach the lower lakes there will be little for them to do but to lay up till business improves.

PERSONAL.

Mr. W. F. Swanton, head miller in Ogilvie's mill, Winnipeg, has resigned his position, and it is said, will take up his residence in Minneapolis.

Mr. Alick Smith, head miller in McElroy & Co. smelting roller mills at Richmond, Ont., has accepted a similar position in their mills at Carleton Place. Mr. Archie Gemmill takes Mr. Smith's position.

IEWS AND INTERVIEWS.

A Queer Year.

Probably every period of time is marked by some peculiar phenomena. Certain great events, or the rise or fall of some prominent individual, marks an epoch of time. In the commercial world there have been many of these remarkable periods. Black Friday is travelling through the ages of commercial history. The bursting of the South Sea bubble has become an event that makes history incomplete without its telling. In later years there has been the Credit Mobilier, that blackened the name of men like Schuyler Colfax. The recent financial failure of that great Frenchman De Lesseps is fresh in the memory of everyone, even yet. Directly in the line of the grain and milling trades the past year goes on record as marking a sudden and continuous drop in prices, such as the trade had not seen for years. Take the year throughout, so far as these trades are concerned, it has been a queer year. Oats, usually looked upon as an inferior grain, have brought as good a price as wheat, pound for pound; and apples have sold at a higher figure than oranges, peck for peck. The hog had been fattened to be killed, and that is where the profit is supposed to come in, but all winter through hogs have been worth more alive than dead. Middlings and feed, the off-scourings of wheat, have sold for more than wheat. And so we might continue the chapter of trade anomalies that have been witnessed throughout the year. No wonder people ask: Are the times out of joint?

The Gain of Do. Times.

Busy times, no matter how much we may desire them, are not all gain. It is true that at this period many matters that call for careful attention are sadly neglected. Everything is hurry and turmoil during the days of a roaring business. One thing crowds another in quick succession, and we neglect many things. The dull times give us a chance to pick up, and they may be accepted as blessings in disguise. On these lines a writer in The Koller Miller reminds us that it is during just such times as we have experienced for a year past that a fitting chance is given the miller "to do the hundred and one things which for years, it may be, he has been putting off to some more convenient time. There is first of all that detailed plant of the mill, floor by floor, machine by machine, shaft by shaft, and belt by belt, to be drawn in duplicate, one copy for the office and one to keep at home, against a possible day of reckoning with the astute fire insurance adjuster. There is a better arrangement or connection of machines, long talked of but always deferred. There are those small repairs the neglect of which has maintained so many little leaks to get in their evil work on the year's balance of profit or loss. There is the new machine or system or process that can now be studied at leisure. There is the question of further economies in manufacture or disposition of product. There is the subject of possible new fields for trade, which can now be taken up deliberately. On the miller who rightly considers these things dull times confers an opportunity the value whereof is expressible only in terms of gold.

India As a Wheat Competitor.

So much has been written of late of India as a wheat competitor that we are generally taking it for granted that she occupies a formidable position in this respect. We do not know that it is safe to belittle her position, at the same time the nearer we can get to facts in the matter the better. Mr. J. R. Dodge, in The Cincinnati Price Current of a few weeks ago, discusses this question. We, in Canada, as a wheat growing country, are much interested in the subject. India, we are told, has now about the same breadth as 25 years ago. Mr. Dodge's own words are these: "The normal wheat acreage for years prior to 1874, as stated by the most reliable statistical writers upon India, was, 26,000,000. About that time in the progress of commercial enterprise following railway extension, there was a revival of interest in wheat growing, and in the course of ten years the conservatism of growers did yield sufficient to add 2,000,000 to the normal aggregate. Then many of the commercial journals of this country

became alarmed at the prospect of the loss of our wheat trade. I saw that the Indian wheat movement had reached its limit, and prophesied a reduction of both acreage and exports, and was criticised in some quarters for the opinion, but the decline promptly set in. In 1887 I discussed Indian wheat prospects with Sir James Card at his residence in Sendon. He had been an Indian finance commissioner, and was an eminent agricultural expert. He indulged fully my views as to Indian wheat growing, as did Professor Wallace, of Edinburgh, afterwards. The present acreage is reduced to the normal breadth of long ago, and there is no immediate danger of further Indian competition."

Rip Van Winkle Methods.

How far, it may be queried, will the following story from an English source, find an application to Canadian milling methods. "Once in the Foreign Office a new chief was taking possession of his rooms, and he came face to face with a soldier, pacing the passage. He marvelled because the guard gave the word: "Keep to the left." "Why do you say, 'Keep to the left?'" "I don't know." The statesman investigated the singular affair, and, after not a little trouble, a clue was found and followed. It seems that fifty years previously the passage had been painted, and an orderly had trumped it with orders to bid everyone to "Keep to the left," and avoid the wet paint. This order had stood unchanged and practically unquestioned for a term of fifty years." This man, probably, had a reason for the faith that was in him, but it was a poor reason. We are all familiar with the story of the farmer who always sent his lad to the mill with a bag of grist thrown over the back of the donkey, the product in one end and a large stone in the opposite end, the one to balance the other. He might have divided his grist in half and accomplished the same purpose and saved loading up the jack ass with a double weight. But a suggestion to this effect from the lad was indignantly resented by the father. He had gone to the mill after that fashion, and his father, grandfather and great grandfather before him had done so. Why change now? It was the case of

Not to reason why. There's but to do or die.

But the business man who goes on this Rip Van Winkle line is going to be left in the race of business, sure.

STRENGTH AND YIELD OF FLOUR.

WILLIAM JACO, chemist to the national association of British bakers, who visited this country in August last, for the purpose of making an analysis of the various grades of flour produced on this continent, is publishing in installment: a report of his investigations. Writing on the question of strength and yields of flour in one of these reports, he says:

"The word strength is used in the sense of a measurement of the capacity of the flour to produce a bold and full-volume loaf. This capacity is, no doubt, due to the quantity of albuminoid bodies present, and to their character. The universally employed test for this purpose is the extraction of the gluten of the flour and determining its quantity, and, second, forming some opinion of its quality. In determining amount the writer prefers to prepare a dough from flour mixed with 30 per cent. of water, and thoroughly kneaded until perfectly smooth in a Meisler machine: 15 grams of the dough are at once weighed off and allowed to stand in a glass of water for one hour. At the end of that time the gluten is extracted by washing in successive quantities of water at 70 deg. F. until the last water receives just a trace of milkiness, and gives only the slightest reaction with solution of iodine. The exact point can only be determined with practice, as some of the glutes begin to dissolve before the whole of the starch disappears. Each lot of washing water is passed through a sieve, and any stray fragments of gluten thus recovered. The gluten is pressed as dry as possible, and weighed and registered as "wet gluten." It is next allowed to stand in the fresh air till the next morning, say fourteen to eighteen hours, and its condition observed: that is, whether still fairly firm and elastic or "runny" and flabby. Its character at the expiration of this time affords valuable indications of

the general quality of the gluten. Unfortunately no means exist of giving a numerical register or determination of the judgment formed on this basis. The gluten is next dried until the weight is constant in a hot-water oven. This takes approximately thirty-six hours; if weighed at the end of twenty-four hours the results are, in any case, about 0.25 per cent. too high. The weight thus obtained is termed "dry gluten."

"The yield necessarily depends on the inherent moisture of the flour and also its capacity for absorbing water and retaining the same throughout fermentation and baking. The percentage of moisture in each sample of flour is given; but it is probable that owing to the hygroscopic nature of flour, all have absorbed more or less moisture between collection and analysis. To ensure accurate moisture results, flour should be kept in absolutely air-tight vessels. The doughing test, by which the stiffness of dough from measured quantities of flour and of water is judged, affords a means of estimating the water-absorbing capacity of a sample of flour. In the following tests doughs are made with one and a half ounces of flour and water measured in units, each of which equals the quart to the sack of 280 pounds. The stiffness of the dough to the hand is observed, and then the dough is tested at the expiration of an hour in the writer's dough viscometer—an instrument which mechanically measures in a registerable form the viscosity (combined rigidity and toughness) of the dough. The figures obtained are the number of quarts of water per sack necessary in order to produce a dough of arbitrary viscosity. That selected as a standard is the one best fitted for readings with an instrument of this kind, and is, with strong flours, about the consistency of north-country tin-bread dough. Its essential use is the obtaining results which are independent of individual judgment and capable of numerical expression. It may here be incidentally mentioned that a prolonged experience of this instrument has led the writer to the opinion that as at present constructed it is more sensitive to tenacity than rigidity. A stiff dead dough from weak flours runs through proportionately more quickly than a comparatively slack one from hard, strong flours. The possibility and advisability of endeavoring to so modify the instrument as to increase its sensitiveness to actual stiffness as distinct from tenacity is at present under the writer's consideration.

"The water-retaining power of flour can only be definitely judged by following it through fermentation and baking, and in respect of these it is difficult to make exact comparisons between tests made respectively on the large and small scale."

HORSE POWERS OF SINGLE LEATHER BELTS.

NO one can tell at sight what a leather belt will drive; almost anyone knowing the width, thickness and speed, can figure it out in a minute. This table is to save figuring; and is correct for belts 7/32 inch thick, in good condition, wrapping half way round cast iron pulleys, and joined by single leather lacings.

The rule by which it is got says "the horse power is equal to the width in inches multiplied by the speed in feet per minute and divided by 650." Thus a ten inch belt at 2,000 feet a minute should be good for (10 x 2,000) divided by 650, equals 30.77 horse power; a 20 inch belt at 2,500 feet, for (20 x 2,500) divided by 650 equals 76.92 horse power; and so on.

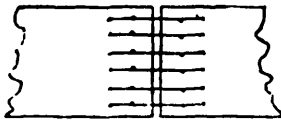
This table is for leather belts in good condition, wrappings 180° on cast iron pulleys, and joined with single leather lacings:

WIDTH IN INCHES	SPEED, FEET PER MINUTE									
	1000	1200	1400	1600	1800	2000	2200	2400	2600	2800
10	15.38	18.46	21.54	24.62	27.69	30.77	33.85	36.92	40.00	43.08
12	18.46	22.15	25.84	29.53	33.22	36.91	40.60	44.29	47.98	51.67
14	21.54	26.15	30.77	35.38	40.00	44.62	49.23	53.85	58.46	63.08
16	24.62	29.53	34.62	39.71	44.80	49.89	54.98	60.07	65.16	70.25
18	27.69	33.22	38.85	44.48	50.11	55.74	61.37	67.00	72.63	78.26
20	30.77	36.91	43.08	49.25	55.42	61.59	67.76	73.93	80.10	86.27
22	33.85	40.60	47.37	54.12	60.87	67.62	74.37	81.12	87.87	94.62
24	36.92	44.29	51.67	58.85	65.73	72.61	79.49	86.37	93.25	100.13
26	40.00	47.98	56.15	63.54	70.93	78.32	85.71	93.10	100.49	107.88
28	43.08	51.67	60.07	68.16	75.55	82.94	90.33	97.72	105.11	112.50
30	46.15	55.38	63.85	72.14	79.53	86.92	94.31	101.70	109.09	116.48
32	49.23	59.23	67.69	76.12	83.55	91.08	98.61	106.14	113.67	121.30
34	52.31	63.08	71.54	79.85	87.38	94.91	102.44	110.07	117.60	125.13
36	55.38	66.92	75.37	83.98	91.11	98.64	106.17	113.70	121.23	128.76
38	58.46	70.77	79.12	87.93	95.14	102.67	110.20	117.73	125.26	132.39
40	61.54	74.62	82.87	91.64	98.86	106.39	113.92	121.45	128.98	136.02
42	64.62	78.47	86.62	95.49	102.61	110.14	117.67	125.20	132.73	140.15
44	67.69	82.32	90.37	99.34	106.72	114.25	121.78	129.31	136.84	144.37
46	70.77	86.17	94.12	103.19	110.83	118.36	125.89	133.42	140.95	148.50
48	73.85	89.85	97.87	106.94	114.54	122.07	129.42	136.95	144.48	152.63
50	76.92	93.70	101.62	110.69	118.25	125.18	132.71	140.24	147.77	156.76

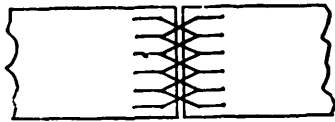
BELT LACINGS.

By a PRACTICAL MILLER.

EXPERIENCE teaches us the best methods and the most desirable course to pursue in the various details of the mill. After twelve years experience in the milling trade and a trial of all the different styles of lacing belts that I have seen, I have settled on the two following methods as the best suited for all purposes:



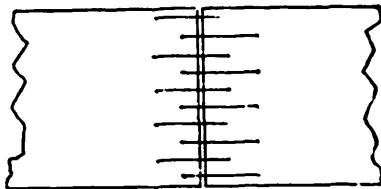
No. 1



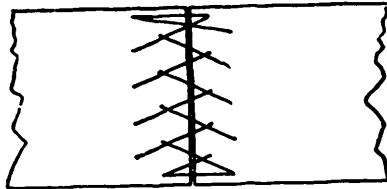
No. 2

Cut No. 1 represents the right side of a belt, or the side running next the pulley, while cut No. 2 represents the reverse side of the same belt. On the right side the lacings are double between the two inside rows of holes, while a single lace runs from the inside to the outside holes. I use this style of lacing on roller belts and have found it the only style that will wear where the work is heavy. (Owing to the vicious manner of belting many of the roller mills the strain on belts is very severe, and there is no style of lacing that will wear for any great length of time. I have found, however, that this style of lace will outwear any other that I have ever tried, and runs over the pulley with very little noise. In putting in this lace, begin in the middle of the belt and lace to the edge and back with each end. This will bring you back to the starting point, where the ends can be securely fastened.

The second style of lacing is one that I use on all large belts for heavy transmission.



No. 3



No. 4

Cut No. 3 represents the side running next the pulley, and No. 4 the outside of the belt. This is a single lace, there being no place where the lacings double. I can not recommend this for roller belts, but for a large drive belt it is the best thing I ever saw. The strain is distributed over so much surface of the belt that the holes will never tear out and the lap will "crack" but very little as it goes over the pulley. One important item in lacing a belt is to cut the holes clean and true, and not have them jagged and torn. Be sure, too, that you have a punch the right size, so that when the lacings are drawn through they will lie flat and even, instead of being drawn up in a tight roll.

In this connection it is proper to add a few items in regard to qualities of belting. Leather belts are considered by many as the best means of transmitting power, but few ever know or stop to think that there are different grades of leather belting. In the manufacture of leather belts the select parts of the hide are used for belts of the first quality, while the refuse parts are worked

into belts of inferior quality. Usually in first-class belts the pieces are of good length, and the laps are from six to eight inches with three or four rows of rivets while the second-class belts have shorter pieces with laps 18 to 24 inches and six or eight rows of rivets. Millers should see to it that they get nothing but first-class belts, as cheap belts will soon give out under the severe use to which roller belts are subjected.

SPONTANEOUS COMBUSTION.

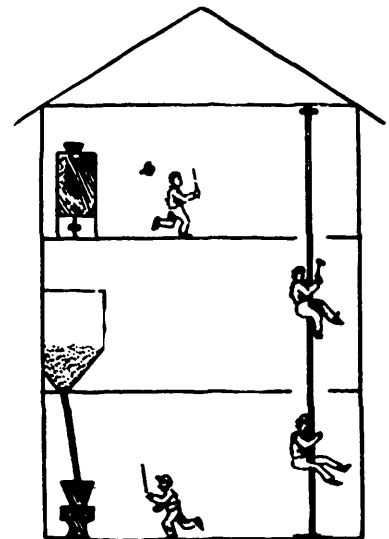
THE following is a condensed report of an address delivered by Professor Vivian Lewes to workmen, at the meeting of the British Association recently held in Nottingham, England:

The learned professor began by showing how the labors of Priestly and Lavoisier had led to a true knowledge of the actions taking place during combustion, and showed by experiment that in all the ordinary cases of combustion a chemical union was taking place between the constituents of the burning body and the oxygen of the air. The idea of combustion, however, must not be limited to processes of oxidation, although they were the most important; and in order to a true conception of the action, combustion must be defined as "the evolution of heat during chemical combination." It was then shown that the rate at which chemical action took place was, to a great extent, influenced by various factors, and that there were many cases in which the action was so slow that the heat escaped as fast as it was generated, and no perceptible rise of temperature took place, and such actions were generally looked upon as cases of "slow combustion." Slow combustion was one of the most important natural actions, and by its means the waste matter in the world was slowly got rid of, and converted once more into simple gaseous compounds, all cases of decay being slow oxidation or combustion. All inflammable substances had a fixed temperature at which they burned actively with flame or incandescence, and this was called the "point of ignition." In some cases an inflammable substance undergoing slow combustion was surrounded with a non-conducting material, and the heat due to the actions going on gradually rose until the point of ignition was reached, and it was this change from the little noticeable slow combustion to ordinary combustion, with its manifestation of flame or incandescence, to which the term "spontaneous combustion" had been given. The lecturer then proceeded to consider special cases of spontaneous combustion, and showed that freshly burned charcoal, especially when powdered, absorbed oxygen from the air with considerable rapidity and with a rise of temperature, which with a large mass was in some cases sufficient to set it on fire. The important bearing of this was that beams, skirting boards, etc., in contact with flues and heating pipes, were liable to become charred at a comparatively low temperature, and this form of charcoal was very liable to spontaneous ignition when air came in contact with it. In the same way coal had the power of absorbing oxygen from the air, and when in masses of a thousand ton or more, especially when much broken and moist, would undergo heating, and even ignition. This was due to the absorbed oxygen setting up chemical action with the hydrocarbons of the coal, and not, as was generally supposed, from the oxidation of the coal. Nearly all vegetable and animal oils had the power of absorbing and combining with oxygen, and this gave them the power of drying; and one of the most usual causes of spontaneous ignition in workshops and factories was to be found in oily waste or rags, as the oil being spread on the surface of the material, offered a large surface for oxidation, while the rags or waste, being excellent non-conductors of heat, allowed the temperature to rise until ignition took place. Well authenticated cases were known in which sparrows building their nests of oily waste in the eaves of houses had caused serious fires. Hayricks which had been built from grass improperly dried before stacking were also very liable to spontaneous ignition; this being due to the sap of the grass taking up oxygen during a process of fermentation, which evolved heat, and the heat kept in by the surrounding hay, rose until the ignition point was reached. If grass once well dried then became wet by a shower, it became mouldy in the stack, but did not heat. The lecturer then concluded by

emphasizing the fact that the so-called spontaneous combustion was merely an increase in the rate of chemical combustion from the slow stage, which was hardly noticeable, to active combustion, and showed the fallacy of supposing that the living body could undergo any such action.

POLES FOR QUICK DESCENT.

THE device illustrated and described in this article is to be credited to a correspondent of the American Miller, who, whilst admitting it is not entirely new, believes it is new as applied to the science of milling. The mills of the present day, this correspondent remarks, represent the advancement of centuries and are supplied with every appliance to perfect the manufacture of their products, and the operative millers have kept pace with the march of improvement and are equal to the occasion. However swift the modern miller may be in thought or action, there are times when his dexterity is hardly sufficient for the trials that often envelop him.



POLES FOR QUICK DESCENT.

The present article treats of a device that will enable him to quickly descend from the upper floors of the mill building, saving time and possibly an injured anatomy, which is often the consequence in going down a flight of stairs in a hurry. It will be found very useful in many ways: for instance, bill collectors, book agents and mature maidens with subscription lists will not be kept so long in waiting as by the old way. Or, if they should get on the miller's trail and he wished to shun their presence, he could apply the device and disappear like the ghost of Hamlet's father; and in the case of a choke up or other difficulty where it is necessary to turn in a general alarm, it will greatly expedite affairs, and in case of fire the men on the upper floors can quickly make their escape.

The device shown in the illustration given herewith, is the apparatus used in fire stations to assist the firemen to reach the lower floor quickly from their sleeping apartments, and consists of a long pole about ten inches thick, extending, in the case of the mill, from the grinding floor through openings in the other floors to the attic. It should be well rounded and rather smooth. It will soon acquire an extra smoothness, however, by use, and it should be made of wood not liable to splinter. Around the base of the pole should be a padded cushion to break the force of a rapid descent.

Professor Pickering reports the discovery of forty small lakes in Mars.

Some recent investigators claim that the sweetness and fragrance of the very best butter is due to a certain beneficent species of bacteria.

A non-conducting covering for boilers, steam pipes, etc., recently patented by a Canadian inventor, consists of mica, soap-stone, molasses and bicarbonate of soda, combined in specified proportions.



THE wheat prediction of Mr. Van Horne has recalled a story of the late Jacob Hespeler, of Hespeler, Ont. It is as follows: At one time Mr. Hespeler was consigning large shipments of flour from his mills at Hespeler to Gillespie, Powis & Co., of Montreal, at that time one of the largest commission houses in Canada. After he had filled every available foot of their store rooms and announced the shipment of a lot in addition, he sent instructions to sell out on a certain date, some months in advance. The firm refused to store and sold out much to Mr. Hespeler's annoyance, but being a commission firm he was powerless to prevent the sale. A clerk of the firm in Montreal, who was struck by the peculiar circumstances of the case, made a note of the date Mr. Hespeler had set for the sale of his flour, and when it arrived found flour was just fifty cents per barrel higher than any day during the preceding year or that following. The clerk was certainly astonished, and some time after when he became a wholesale merchant, being none other than the Hon. Adam Brown, of Hamilton, meeting Mr. Hespeler asked him if he would explain the circumstances which he cheerfully did, stating it was a chart that was in the Hespeler family for generations, giving the rise and fall in wheat and flour for the preceding 200 years, and the probable rise and fall in values of the following 200 years. This chart was his guide, and Mr. Brown can testify as to his correct forecast on that occasion. It is hoped Mr. Van Horne may prove as correct.

I AM free to admit having an anxious interest in the young miller. What is to be the future of milling is going to depend on the stuff that is in the young millers of to-day. It is just as true of milling, as it is of morals, that as the twig is bent so is the tree inclined. If the junior millers of Canada are to be slipshod and careless in their methods, in another decade or two the good name of Canadian flours will have depreciated. A recent writer has complained that the average young man in business to-day is nothing more or less than a plodder a mere automatic machine. He comes to his work in the morning; is faithful in the duties he performs; goes to lunch at twelve, comes back at one, takes up whatever he is told to do until the bell rings at evening and then goes home. One day is the same to him as another. He has a certain routine of duties to do, and he does them day in and day out, month in and month out. His duties are regulated by the clock. As that points, so he points. Verily, it is true of him that he is the same yesterday, to-day and forever. In a way he serves, perhaps, just as useful purpose as the separator or aspirator in the mill. When the steam is up and the belt is applied, he runs all right, but he stops with the stopping of the motive power. Young millers, if they are to be worthy of their fathers, must put brains into their work. It is brains that tell to-day. Let the young miller give thought to the work of milling. Strive to see where he can improve grades, where the machinery of the mill is weak, and try to suggest an improvement in the machinery. Non-miller, young or old, can be too capable a miller.

"It would be very pleasant to think so, but I cannot see any good reason for making any hurrah over the \$2.00 wheat prediction of Mr. Van Horne," said Mr. J. D. Flavell, of Lindsay, as I met him on the streets of his own town a fortnight ago. "We are experiencing too large competition from other wheat growing countries, and from new wheat growing countries to look forward to any near approach to \$2.00 a bushel for wheat. It may be said, that the Argentine republic with only 50 or 70 million bushels to export, will not play a very large figure in the export trade of the world, but with increased export supplies coming from India and Russia, these figures

are not to be belittled. This, however, is only the present. Look at the great territories that the Argentina has yet to develop for wheat growing purposes, for, we are told that there is, so far, but a very small percentage of that country under cultivation." Mr. Flavell, in answer to my inquiry as to the present condition of the milling trade gave the universal reply that everything was very quiet just now. "A good level-headed fellow," is the way I heard a prominent business man of Lindsay, to whom I had mentioned Mr. Flavell's name, speak of this well-known miller whose level-headedness and good abilities are shown in the careful and yet progressive management of his mill. And of this opinion millers generally know something, for Mr. Flavell brings to the councils of the Dominion Millers' Executive, of which he is a member, just these same desirable qualifications.

FROM several varying standpoints I was interested in the Oriental entertainments, in costume, given by Lydian Von Finklestein, in our city a few days ago. As a miller, I was interested in her description, and practical operation, of a hand-mill of Bible times, as given on the platform on the evening of her first lecture. We do not need to go as far back in ancient history—we, may indeed, confine ourselves to modern times—to form an idea of the wonderful development in milling operations, since the days of the upper and nether mill-stone. But it was quite a sight to see the use of the little hand-mill in the hands of two women. Milling in those days was a very crude affair, and if no greater speed in the turning out of the product existed to-day, we would have no occasion to worry ourselves about an over stocked market at home or across the sea. The lecturer was, evidently, one who believed in woman's rights, but I thought that the illustration of milling pointed in an inverse direction. The millers in those days were women, two of them usually operating this simple little hand mill, and with the explanation and illustration of Miss Von Finklestein on this point, we were able to better understand the words of the good book which says, "the one shall be taken and the other left." In connection with the milling operation we had an illustration of bread-baking in those times, and were told that the bread was made twice a day. Those were indeed primitive times when roller mills and planifiers were an unknown quantity, and the millers were not harassed day by day with the condition of the wheat and flour market.

It is quite exciting in its way these times to knock up against the grain and commission men of the country. They hardly know sometimes from day to day where they stand. Whether to hold on or to let go; is it better that they should tackle wheat or pork, are some of the few troubles that meet them. I learned the other day that the "street" in Montreal was all excited over the quotations then going for wheat; they had been holding May wheat. Pork became strong and has been ruling at about \$2.00 per barrel. Where were they? An old speculator put the case in the words: "Montreal got nipped because they held on too long; they want big profits instead of taking small ones, and suffering at times small losses." It is indeed the case that large sums of money have been lost by Montreal speculators these few years. The figure has already been given in these columns as running as high as \$10,000,000 during 1873, though that may be wide of the mark.

It is not to be supposed that the various theories held, explanatory of the low prices of wheat, can all materialize in fact. On one hand we have the argument given us, with much to support it, that there can be little hope of wheat ever again reaching \$1.00. The antithesis of this view is reflected in the opinion of president Van Horne that \$2.00 may be looked for. I find it very interesting to get the opinion and theories of different people on this question, if for nothing else than to show how widely different the opinions of men of the same class may be. An operator of some prominence in the New York market draws attention to the fact, in support of his view that wheat will reach \$1.00 again, that the consumption of wheat has increased much more rapidly in this country during the past twelve years, than in any previous twelve years. Starting with this fact he raised the query: "Why

is the price of wheat lower than it has ever been? His answer is: Simply because the crop aggregate of 1891 and 1892, so far at least as the United States are concerned, was grossly under-estimated to the extent of 200 or 300 million bushels. It is this wheat, he argues, that has kept down the price. He concludes from these premises that wheat is bound to advance on the common law of supply and demand, and that the popular theory of dollar wheat has gone for ever, and with it the many theories built upon India and Argentine competition in the Liverpool market. Well, we shall see, perhaps that is the safest ground I can take at present.

"YES, I'm just waiting for wheat to touch \$2.00," said Mr. C. B. Watts, secretary Dominion Millers' Association, as I chatted with him the other day about grain and milling matters. "I fail to see any condition to warrant such a prediction, nor have I any strong hopes of seeing wheat very near \$1.00; at least not for some time to come. Of course some unforeseen calamity might transpire,—a famine, perhaps a big war—and the good times we are all hoping for would come along, but nothing looks that way now. Times and conditions have changed and there are good reasons why we might be satisfied with lower prices for wheat than prevailed in past years. Cost of living is much less than it was five years ago, and there is a noticeable change in a decade. I can remember in my time when in the summer we paid \$2.00 a day for farm help. \$15.00 a month and board will be accepted by scores of men to-day, and half that amount in winter. Machinery has revolutionized work on the farm, reduced the needed help, and lessened the cost of production. In a word a dollar goes farther to-day than it did a few years ago. An important factor in keeping wheat prices down, no doubt, is the expansion of wheat fields in other parts of the world. Look at the Argentina, India, Russia and even Egypt, if the proposed irrigation schemes, can be successfully developed. It is not alone the increase in the size of the wheat growing territories that has to be figured on these days, but the cost of labor in these newer countries is so much cheaper than here, that it becomes a hard matter for us to compete with some of them. Changes in methods of transportation are among the more important causes that will help foreign competition with the wheat growers of this country. India has now no difficulty in getting her wheat to the sea-board. Argentina is yet behind in this respect, but improvement is coming there. Briefly we enjoyed these privileges years ago, when India and other places knew them not. They are now coming up along side of us, and in part can do better than we can. Let these factors be considered by anyone who goes into the line of prophecy."

"No danger of reciprocity in flour with the United States," said Mr. McLaughlin, in answer to a query on this point. "It would be the height of folly to make a movement in that direction. My friend, Mr. Campbell, the member for Kent, would be one of the first to find this out, despite his vigorous efforts for free flour before the Ways and Means committee a few days ago. He may say that we can send our flour to the New England states. St. Louis flour would knock us out every time, unless we would be prepared to drop below a paying price, and we are near enough there just now. Farmers in the interior of Missouri are getting only about 40 cents for their wheat, and splendid wheat it is. Can we make up flour to compete with wheat bought at such figures? Then freight rates would be against us. No, unless millers want to see their business ruined, they do not want reciprocity in flour. Conditions are not now as they were in the days of a former reciprocity treaty. It is true that export business with Great Britain continues slow and unsatisfactory. We in Canada are being handicapped by the discrimination railroads are making in rates of flour and wheat. Let this difficulty be overcome and we could export with some profit. The Dominion Millers' Association are moving actively in the matter and I have strong hopes the evil will be overcome. The law is on our side, as it is distinctly stated that wheat and wheat as flour come under the same classification."

ANTI-FRICTION MATERIALS.

By KILLINGWORTH HEDDER, M. INST. C. E.

THE use of oil as a lubricant in machines is to separate the rubbing parts and diminish the friction of metal upon metal by an intervening film of the lubricant. If the oil is supplied in sufficient quantity to cause the entire separation of the metals, the friction may be reduced to a measure of the viscosity of the unguent used; where oil is furnished in less quantity, the friction of metal upon metal is usually resistance due to interlocking particles of the revolving and stationary parts, the oil used under this condition finding its way from the bearing, loaded with the metal that is gradually torn from either the revolving shaft or the bearing in which it has worked.

In discussing the subject somewhat over a year ago before the British Association for the Advancement of Science, the author remarked it to be a well-known fact that heavy lubricants effect a better separation of the metals than those that are more limpid, although the power required to slide the surfaces one upon the other is much less with the latter than with the former, but at the same time the wear and tear of the metal may be greater. It has been stated by more than one authority, that it makes little difference what metal is used for the bearing of a revolving shaft, provided oil in sufficient quantity can be introduced, so as to separate the shaft from the bearing in which it revolves. This is proved by the success which attends the use of cast iron for the bearings of ordinary shafting, it being no unusual occurrence to find the cast-iron sleeve of an adjustable hanger showing the tool marks after running several years with an excess of lubrication. Such a bearing would, however, quickly seize if the oiling were neglected, and therefore the friction may be said to vary according to the attention paid to the oiling. For very low pressures, amounting to only a few pounds on the square inch on the rubbing surfaces, oil causes a loss of power, so as to make it advisable, wherever possible, to dispense with it altogether. Professor Coleman Sellers even goes further than this and states that even when the pressure on the rubbing surfaces is less than 50 pound per square inch, the viscosity of the unguent acts as a sensible retarder.

Engineers have for a long time been looking for a material capable of being used for bearing surfaces and having a low co-efficient of friction when worked dry and without any oil. The idea is not one of recent date only, but may be said to go back to the time of the Romans, as some of the hand flour-mills found at Pompeii have the lower stone fitted with an iron bearing which evidently worked dry in the stone socket of the upper stone. The celebrated Coulomb experimented with an iron axle moving in a bush of elm, the friction being stated to be "1/24th of the force of pressure." He also made numerous experiments with wood axles slightly smeared with tallow, and also recommended the use of blacklead. The material which he found to give the best results was green oak on elm, and I believe the wooden axles of wagons which are used in some parts of England at the present time to transport heavy grindstones from the quarries, are constructed with axles of oak in a similar manner. Throughout Egypt, in the Nubian water-wheels, which are everywhere employed for irrigation, unlubricated wooden bearings are used, which appear to wear very slowly, the surface of the bearing acquiring a fine glaze. Stone bearings have also been employed for shafts. According to Rankine, the natural stones fit for this purpose are those which are wholly free from grittiness and are somewhat inferior in hardness to iron, such as gypsum, pure clay slate, compact limestone, marble and silicate of magnesia. From the latter the substance called "adams" was made by calcining the magnesia, grinding and molding it by hydraulic pressure into blocks, which were then baked.

In addition to these oilless bearings there are others in which, perhaps, a small quantity of grease might have been employed, such as the leather bushes used in spinning wheels, and the leather band on that part of the oar which works in the oarlock may be quoted as an instance of leather working on wood. Glass has also been tried, but the only kind which has survived to the present, and has been the most successful of all, is the plumbago bearing. The author has been told by the old millwrights that this material was often used in the footstep bearing of

the upright shafts in water mills, and most of us have seen plumbago employed instead of tallow for lubricating wooden bearings, and there is the familiar example of the carpenter's screw. The first adaptation of plumbago in a more practical form was the invention of Gordon, who inserted a number of molded plumbago plugs in the standard-size axle-box of an ordinary carriage wheel. It is said that the vehicles ran successfully without any lubrication.

Graphite or plumbago is the principal ingredient in numerous inventions for dry bearings, many of which have not got further than the Patent Office. It has been mixed with pulverized iron, asbestos, vegetable fibre, paper pulp, blood and in one curious instance sponge is used. In nearly all these applications the anti-friction composition is packed into suitable grooves, which are used in the bearing in very much the same way as asbestos is used in cocks. A substance which has been termed "metalline," which, although it contains graphite, appears to be composed of finely divided lead, has been rather extensively employed. The chief disadvantages were the expense due to the way the material was used, in the form of little plugs let into drilled holes, and the necessity for oiling when the plugs were worn sufficiently to cause contact between the metallic surfaces, thereby changing the character of the bearing.

The latest form of dry bearing is of solid material, which can either be molded so as to fit any plummer-block, or can be tooled or worked in the same manner as an ordinary brass. A new material for this kind of bearing, recently tried in the United States, is termed fibre-graphite, and consists of finely ground plumbago, mixed with wood fibre in a moist condition, and pressed into a mold of proper form. It is then saturated with some drying oil and oxidized in hot dry air. This bearing has been favorably reported on by a committee of the Franklin Institute, and a shop has been fitted up complete, so that the whole of the machinery, including the steam engine, runs without any lubrication at all. The report, which may be taken to apply to dry bearings generally, states "that an invention of this kind by diminishing the use of lubricants, diminishes the cost of machine construction by doing away with the many devices incident to oil—oil cups, oil-hole covers, the oil-hole themselves which have to be carefully placed, oil tubes to lead the lubricants to the inaccessible parts of machinery, as well as the cost of the personal attention and the cost of the lubricant required to keep the machinery in perfect order."

My own investigations on a suitable material for an oilless bearing began with the use of plumbago, which was molded so as to form a circular bush, but this was soon discovered to be a failure on account of its rapid wear. I then constructed bearings of ordinary carbon, such as is used in batteries, and for producing the electric light by means of the voltaic arc. The first experiment was made with the bearings of a small dynamo, which ran for a considerable time, but the drawback of using carbon was mainly on account of the impurities which it often contained. A small amount of silica in the carbon was found to cut the shaft very badly, while if soft carbon was used the wear was as rapid as with plumbago. In order to lessen the cutting action and the friction, finely powdered steatite was mixed with the carbon, and thenceforth no difficulty was experienced, even when the load was unequally distributed on the bearing. The name of carboloid has been given to this mixture, its specific gravity being 1.66, that of carbon as used in arc lamps being about 1.68; therefore carboloid is about one-fifth the weight of brass. It can be molded with the same ease as carbon, and can be turned, bored or shaped to any desired form. In practice it is found that the cylinders, as they leave the molds, are quite true enough to be put into bearings without any tooling, although it is preferable to run for a short time with half the load and then remove and scrape the bearing, so as to equalize the surface of contact.

Professor Sellers, writing on the Franklin Institute report, states that "the co-efficient of friction is lower with the dry bearings experimented on than that of many oiled bearings in good condition, and that it is undoubtedly lower than with metal bearings, as usually operated with moderate attention and poor qualities of oil. It seems to be constant in its frictional resistance, whether warm or cold, while it does not run lighter when worn by use,

as some oiled bearings do. Its uniform action is better than many oiled bearings and very much safer; the constant amount of frictional resistance being known can be provided for in the power of the machine." The above agrees in the main with Professor Unwin's experimental results with carboloid. A bearing 1 1/2 inches in diameter by 2 1/2 inches long, cut in halves, was tested under loads varying from 100 pounds to 1800 pounds, or about 15 pounds to 170 pounds on the square inch, at speeds from 110 to 490 revolutions per minute, the period of test extending over six days, during which the bearing was kept almost constantly running without any lubrication or attention.

Summarizing the experiments, it appears: 1st. That the co-efficient of friction is almost the same and has not diminished as the carbon became worn to a better bearing surface. 2nd. That the co-efficient of friction increased as the temperature increased during the run, but is practically the same for any increase of pressure, and diminished with increase of speed, the maximum number of revolutions per minute being 490. 3rd. That no injury is caused to the shaft even if the bearing gets very hot, as it was found to be impossible to make it seize.

The conclusion arrived at by the author with regard to dry bearings is that the frictional resistance is governed by the conductivity of the shaft and the holder or support of the bearing; if this be so arranged that any heat generated be dispersed, the co-efficient of friction will not exceed that of a lubricated bearing.

If the bearing works under such conditions that any heat, generated at starting a new bearing, may readily be conducted away, the first cost of a dry bearing will be less than any form of brass, but taking a case of a dynamo bearing where any excess heat might be disadvantageous, it will be necessary to carefully true the bearing by scraping so as to fit the shaft, and under certain conditions where there is a great pull on the belt, it may be necessary to keep the bearing cool by means of a circulating flow of water. The economy of working is very marked. Besides the cost of the lubricants used in large establishments, there is also the attention required to apply the oil and keep the parts clean. In laundries and in those trades where unskilled labor is employed, the danger of oiling machinery in motion is very great; besides this there are instances where the lubricant used is in itself a source of danger, such as the risk of oil waste taking fire by spontaneous combustion, and the dip from bearings certainly renders the floors of the mills highly inflammable.

The principal application of carboloid up to the present time has been for the bearings of ordinary shafting, and for bushing loose pulleys. It has also been applied for the bearings of steam heated rolls such as are used in cloth mills and paper works. The result of two years' experience and many experiments with light trucks seem to point out the desirability of extending its use to the axle-boxes of tramcars, and perhaps railways generally, as it involves no change in the axle-boxes; even the existing brass can remain and be faced with carboloid, which can be cemented to either a smooth or rough surface.—Cassier's Magazine.

MIX THE MOVEMENTS.

DOUBTLESS many of our readers, who are not experienced engineers, may have noticed that frequently the oscillations of the main belt in a mill come in unison with the beat of the engine, and a perceptible slapping about of the belt is noticeable. The beat of an engine will often come in sympathy with the sway of the building, and so increase it as to be very perceptible. If this were continually going on in exact time it would become so great in time as to be dangerous, but one or the other gets ahead and mixes the movements so that it gradually ceases until they are again in unison. If the speed of the engine is changed in either case the swaying will be kept mixed all the time instead of occasionally. On long lines of shafting this will appear also, the pull on the belt at the commencement of the stroke being in unison with the spring of the shaft, thus causing a marked oscillation. The remedy is applied here to mix the movements purposely—and the trouble is partly if not entirely removed.—Machinery.

MILLING SYSTEMS.

ONE of the most familiar names among the writers on milling topics in the present day is that of R. James Abernathy. In a late issue of the *Tradesman* he discusses at some length various milling systems, ancient and modern, touching the matter of power for mills, which is always timely. As to engines, the same rule should be observed, and secure such as are the most economical users of steam. For mills of 100 barrels capacity and upward what is known as the Corliss type of engine is perhaps as well adapted to flour mill purposes as any class of engine now made, although there are others that are equally well adapted in every way. It is not intended to make any improper comparisons nor to make biased distinctions, and the name Corliss is here mentioned because it was among the first, if not the first, engine of that class ever produced, and still possesses all the essential features of the most perfect types of automatic engines.

This class of engines, all who are familiar with steam engines are aware, consume just the required quantity of steam for doing the actual work by automatically cutting it off the instant sufficient has entered the cylinder for doing the work of the stroke, as against the old method of each stroke absorbing a given quantity of steam whether required for actual work or not.

By the old plan the valves were set to close the inlet port at a point when it was sure that steam enough would be admitted to safely carry the engine through the maximum struggle it would be likely to be subjected to, otherwise the engine when laboring under heavy burdens might stop and cease to do its work. If, therefore, an engine on the old plan takes steam at a half or five-eighths stroke in order to do the heaviest work, it also takes the same when doing the lightest work, except as the volume may be regulated by a governor-throttle, which is at best an imperfect regulator.

By the automatic plan, however, the governor which holds the port valve open lets go of it the instant the lessening of the work demands it, and the port is closed at that instant. On the contrary, if an increase of work demands more steam the governor clings to the in-port valve long enough to admit the quantity of steam required and then lets go. It is the adapting itself to the varying requirements of the work being done that makes the automatic engine an economical consumer of steam, and the best for not only flour mills but other manufacturing plants. The very small mills are, as a rule, obliged to use different types of engines. But among the classes of small engines there are quite a number of what are called automatic engines which, while if not quite so economical in the use of steam as their larger brethren above referred to, are at least quite an improvement

over the old class, and from those every small mill owner seeking for a new engine ought to be able to make a good selection by following substantially the suggestions here given and remembering that economy, other things being equal, should be the main guide.

In the line of general suggestions Mr. Abernathy has this to say: When buying belts to transmit power, it always pays to buy good ones; belts that have life and energy to them. This should be true of all belts in use in flour mills, or for any other kind of work, but more especially should good belts be purchased for driving the rolls. The peculiar method of belting most roller machines makes it severe and trying on the belts, but the best oiled and tanned should be used for the purpose, and they should be either heavy single, or light double.

Tightening pulleys are very vicious devices, and add much to the trials and vicissitudes of a belt when hard at work. They do much to wear out and shorten the life of belts, and should never be used except when necessity compels it.

If obliged to use tighteners, never fail to place them against the slack fold of the belt. Placing tighteners against the tight fold of a belt is simply compounding a felony. When so placed by accident, ignorance or otherwise, they have to be kept so hard against the belt in order to make it work at all, that the life of the latter is reduced to one-half or less. Look out for this evil and do not commit the error.

The spouting velocity of water is as the square root of the pressure, or the height of the head. Thus from under a head of 4 feet the spouting velocity is 16.2 feet per second. From under a 16 feet head it is 32.4 feet per second, and from under a 64 feet head the velocity is 64.8 feet per second.

At first glance it looks a little odd that when the head is increased sixteen times in height the spouting velocity is increased only four times; but such are the peculiar laws of nature.

Flour packers are now so very cheap that every mill should be provided with one or more, as the case may be. Those that need more than one generally have them, but the small mills needing one only usually or very frequently have not that one. It is a great labor saving machine and will be found an immense relief in all small mills where help is small and light.

With the very best arranged mills and the best steam power plants the amount of coal consumed to the barrel of flour made may be reduced to 30 pounds or less, but the average is much above that. He emphasizes the necessity of good judgment being used in all such cases, whether steam or water motors be used. The former being more commonly in use, so very numerous and of all kinds and varieties, probably require the

closest attention and the strictest vigilance in making selections.

It has heretofore been the custom to give more attention to the engine than to the boilers, although the latter would seem to be of just as much importance to the user as the former, where economy in the use of fuel is considered, and that is really the prime factor.

In the boilers the steam is generated by the combustion of fuel, and if there be any difference in boilers in that respect the one generating the greatest amount of steam or evaporating the greatest quantity of water with the least quantity of fuel is, if other things are anywhere near being equal, the one to be selected.

Of course, in addition to this very important feature, the boiler must be well and scientifically made and of the very best material.

It will not pay to select a cheaply made boiler, one that will burn out or blow up in a few years, because it is an economical generator. In construction it should be good in every way, and if all these good qualities are combined that is the generator to select.

SOLD FOR \$57,000.

THE sale by auction of the Peterborough Milling Company's property took place, at Peterborough, Ont., on the 11th inst., and from the valuable interest which is represented in the property excited considerable attention. A couple of hundred persons attended the sale, which was conducted by Mr. John Haggart, auctioneer. Only \$1,000 bids were taken up to \$50,000 and then \$500 offers were accepted. In the course of the sale it was announced that the reserve bid was \$55,000.

The bidding started with an offer of \$25,000 and this was jumped with \$5,000 leaps to \$40,000. Messrs. T. G. Haslitt, John Carnegie and Thos. Bradburn were the only bidders, and Mr. Haslitt dropped out after \$42,000 was reached. When the figure had been carried up to about \$47,000, the bidding came to a standstill and an intermission of five minutes was taken. When the sale resumed Mr. Bradburn and Mr. Carnegie renewed the bidding, and the hammer finally fell at \$57,000, which was Mr. Carnegie's offer.

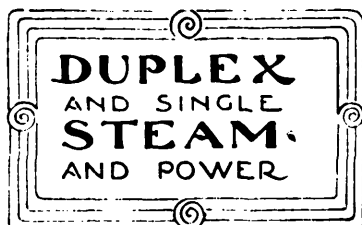
It is understood that Mr. Carnegie has purchased the property entirely independent of the Company, and it is probable that the mill will be leased to a tenant without much delay, and put in operation before long. The property cost the Company, it is estimated, between \$70,000 and \$80,000, and the mill is equipped with the most improved machinery.

It is an interesting fact to recall that on April 11th, 1864, just thirty years back, Mr. Carnegie began the work of building the stone mill that has stood for so many years on the property and that has just been improved and enlarged. On April 7th, 1864, the first mill, a wooden structure, was burned.

Chlorine gas, decomposed from sea water by means of electrical machines, is employed for disinfecting the hold, store-room, etc., of vessels of the Italian navy.

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CHEAPEST NOT ALWAYS THE CHEAPEST

It has come to be admitted by even superficial buyers of the most trifling articles of consumption or wear, that the cheapest, so far as the price charged may be considered, is not always the cheapest. Ask the sensible house-wife on this point and one will get her answer.

We are hearing a great deal lately of the cheap wheats of India, Argentina and other foreign countries, but the question is being asked by some, is the value really in these wheats after all? A great deal depends on the cleanliness of the wheat received at the mill; if a bushel is made up partly of dust and dirt its price must be discounted just that much. There is room for improvement in wheat cleaning and clean wheat in this country. Manitoba had her experience in this respect a year ago when considerable smutty and dirty wheat was exported to the United Kingdom, and Manitoba suffered and the entire Dominion suffered. Our friends in these territories were quick to see this error and are not likely to allow their reputation for fine wheats to be prejudiced again in this manner. It is generally admitted, however, that in the wheat that goes from this side of the Atlantic a brighter, cleaner and more useful wheat is to be counted on; and whilst the foreign importer may be influenced by price he will come to see by a little experience that price is not everything in wheat any more than in other matters.

MR. LAURIER TELLS WHY.

CLOSING the debate on the tariff a week ago, from the Liberal point of view, Hon. Wilfred Laurier devoted some attention to the present depression in wheat prices. To his fellow Commoners in the House, he said: "What is the cause of this decline in the price of wheat? In the days of old, when Rome, with her four million souls, was the political and commercial centre of the world, she drew her food supply from the lands washed by the Mediterranean Sea, from Spain, Egypt, Sicily and Algeria. In the present time England is the great commercial centre of the world, and England, like Rome, cannot produce wheat enough for her own consumption, and she has to import it from abroad. For many years she got it from the continent of America, but of late years she has gone to Southern Russia, to India and to the Valley of the La Plata in South America. She has so many sources to draw from it is not surprising that prices in England should have reached the lowest point. It is acknowledged that the price in Canada is regulated by the demand in England."

SENSIBLE MAN.

In a communication published in this issue, says the American Miller, a fireman gives a very good reason for leaving a place. In order to propel the machinery of the plant it was necessary to carry more steam than a test of the boiler showed it should carry. The shell was very old and rotten and the fireman would have been very foolish to have remained in charge any longer. If every fireman would refuse to stay in charge of plants that were unsafe many boiler explosions would be avoided and the owners would be saved much money.

A shipment of 8,000 bushels of wheat was recently sent from London, Ont., to Great Britain.



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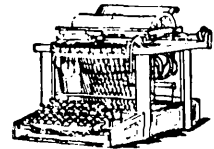
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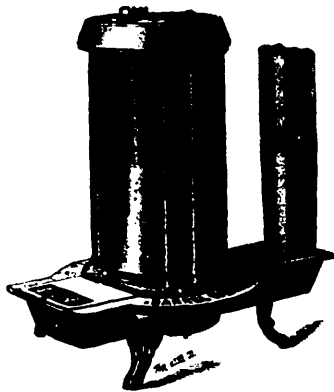


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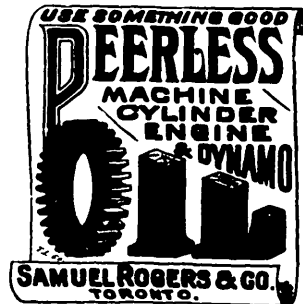
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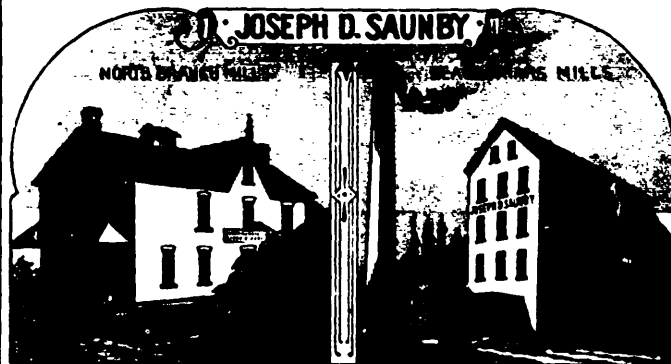
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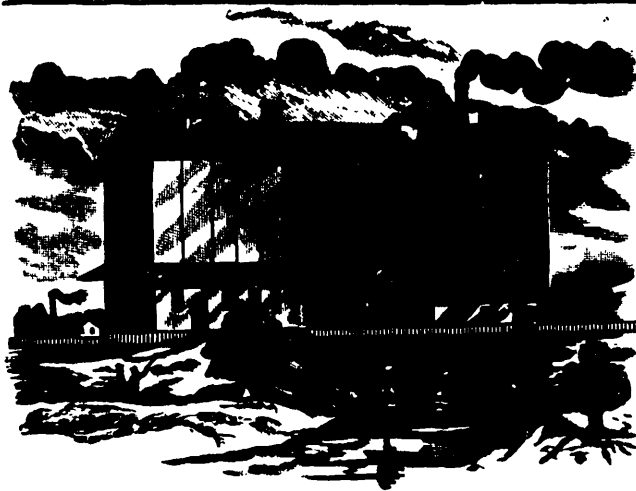
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The report was adopted, and the retiring Directors unanimously re-elected. The Board of Directors is now constituted as follows: James Goldie, Guelph, president; W. H. Howland, Toronto, vice-president; H. N. Baird, Toronto; Wm. Bell, Guelph; Hugh McCulloch, Galt; S. Neelon, St. Catharines; George Pattinson, Preston; W. H. Story, Acton; J. L. Spink, Toronto; A. Watts, Brantford; W. Wilson, Toronto.

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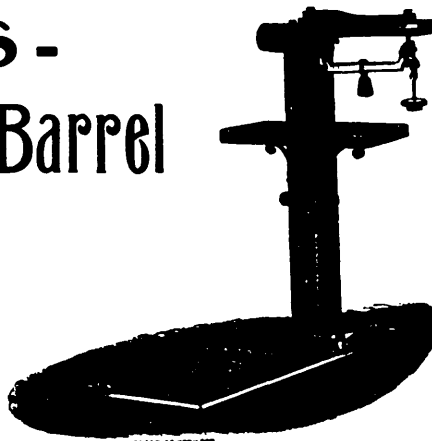
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Flour Bag and Barrel

SCALE

With Improved Drop Lever



This Scale replaces the old
style of "Flour-Packing
Scale," and is superior to
it in many respects

MANUFACTURED BY

THE GURNEY SCALE COMPANY

HAMILTON, ONT.

Capacity, 600 lbs. Platform, 20x28 ins.

NOTE.—We manufacture all kinds of Scales. Write
for Illustrated Catalogue.