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CANADIAN MILLER

GRAIN TRADE REVIEW

NEW SERIES "MECHANICAL AND MILLING NEWS"

Old Series, Vol. XI. } NUMBER 6.
New Series, Vol. IV. }

TORONTO, ONT., JUNE, 1894

TERMS, \$1.00 PER ANNUM
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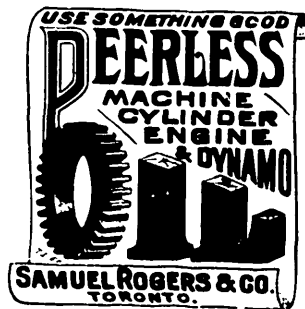
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OLD SERIES, VOL. XI } NUMBER 6
NEW SERIES, VOL. IV. }

TORONTO, ONT., JUNE, 1894

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FLOUR MILLING AT LAKEFIELD, ONT.

Eight miles from Peterboro' is to be found the pretty town of Lakefield. It is an incorporated village at the head waters of the Otonabee river, for it is here the stream widens so as to be dignified by being called a lake.

Occupying a prominent place among the industries of the town is the flour mill of Mr. John Hull. A glance at the picture that we here give of the mill, and the water power that "makes the wheels go round" is evidence to our readers of the almost unlimited extent of this power.

Mr. Hull's mill has a capacity of 125 barrels daily, and is equipped with full roller and centrifugal process machinery. Mr. Hull has been a resident here 31 years, and the mills were erected in 1857, and came into his possession in 1864. The brands of flour manufactured are:—"Diamond Star," "Regal" and "Jewel." A market is found in the Maritime Provinces, Newfoundland and some is exported, but everywhere Mr. Hull's stamp is a guarantee of excellence. At the World's Fair Mr. Hull carried off a gold medal for his flour exhibit. Mr. Hull began his milling experience when fourteen years of age, and he is always at the post of duty; but all this does not prevent him taking an active part in municipal matters. At present Mr. Hull is a member of the village Council, and in this capacity, as well as that of a citizen generally, no man is more highly respected. In fact he has represented his constituency—with the exception of three years—since 1875, although he never yet solicited a vote.

BAKERS AND BREAD IN ITALY.

By OLIVE MAY EAGLE.

ON coming to live in Rome, I failed to assign the public baker his proper position in house-hold economy, because my only life has been passed in the Old Dominion, where a housekeeper's reputation depends upon the quality and variety of bread which she places before her guests, and where a cook is valued according to her skill in baking.

Naturally I was dismayed at the first site of an Italian kitchen with no provision for baking, and with only two or three small gratings filled with charcoal for cooking purposes. Twelve years of experience have taught me that an astonishing number of dishes can be prepared about these round holes, and that fowls can be roasted beautifully on the spit that turns by clockwork and is found in all kitchens. Small ovens for pastries can also be bought, but only fine cooks know or care about using them, since most delicious pastries of every known variety lie temptingly in wait at the corner shop. As for the rest, one soon learns to run to the nearest baker with the beet and potatoes, or with a favorite cake which he will bake for two sous—far less than the cost of extra fuel at home, to say nothing of the labor saved. True, the boy who brings home the roast often disposes of the brownest potatoes, and the cake is occasionally burned black on the edges, but then, housekeeping has its drawbacks everywhere.

In isolated country houses, bread is both made and baked at home, and in the hamlets inhabited by peasants who own tiny grain plots—I cannot magnify them into fields—the woman of the house makes bread once a fortnight, and either carries it on a board to the village oven, or else to a private oven built by several families in partnership. With these exceptions the mass of the

people, both in towns and cities, order bread from the public baker, who is, in consequence, an important factor in the general weal. The bread, whether in loaves or rolls, is baked in an old-fashioned brick oven which is heated by a blazing fire of twigs kindled within. When these twigs have settled into red-hot coals, they are shoveled out and put aside to be sold for use in braziers.

The oven is then carefully swept clean of ashes, and the bread is put in on long boards, the largest loaves being pushed further to the back, as they require greater heat. The smoke aperture and the door are then closed until the bread is done, by which time the heat has moderated sufficiently to permit easy handling of the fresh loaves. Except for special orders, the bread is made without any salt, and is generally well baked, there being small chance for either under or over baking. The depth of the ovens varies from two feet to two yards, the smaller ones being reserved for cakes, pastries and buns, which are baked in the daytime.

Cakes are invariably of the sponge-cake family, but pastries are fit for a king, while there are buns to suit every taste. A plain ring-shaped bun is called clambella,

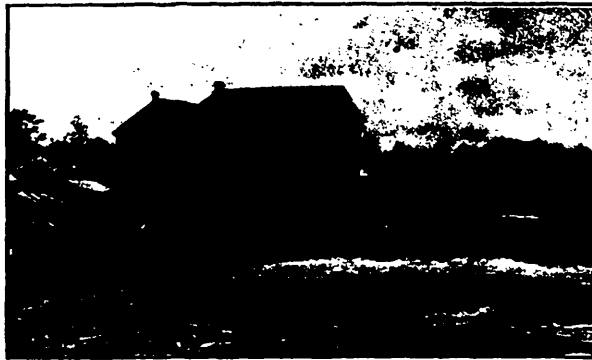
ing to the quality desired. Much of the wheat used in Italy is imported, and there is a heavy duty upon it, as also upon sugar and other necessities of life. The military bread is hardest and blackest of all, and one often sees it carried through the streets piled high in nets of rope, and looking like so many rocks. It is made in the barracks by the soldiers themselves, but that they can make better bread I can testify from a familiar of it some years ago. The Roman bakers went on strike, and almost before their customers knew of the threatened dearth, the municipal authorities had overhauled the large garrison and put a hundred professional bakers to work. They did the city baking for a week, and at the end of that time the regular bakers found it to their interest to resume operations, while the soldiers as quietly returned to military life.

Bread shops are as plentiful as barber shops, which Mark Twain says adorn every street in Italy, and are as liberally patronized by all classes. Although of course, as in other countries, the rich consume less in proportion, Italy may be called truly a nation of bread eaters, and the working classes have a peculiar fancy for sopping bread in a liquid. If not already stale, the bread is toasted and crumbled into coffee, soup, oil, wine—anything liquid.

The beggars go from place to place, stuffing their pockets with the hardest crusts, which they carry home to *incuppare* in whatever they can afford hot water seasoned with pepper and oil not being disdained. Servants will submit to limits in other food, but insist upon plenty of bread. Most of them care nothing for fruits or sweets, and are content with meats once a day, but it would seem exaggeration to state how many pounds of bread a female cook requires to crumble into her morning coffee, her noonday broth and supper salad made sloppy with vinegar and olive oil.

One source of wonder is the indifference of Italians to the careless handling of bread as it runs the gauntlet from forno to table. A well-appointed Roman kitchen is an attractive sight with its rows of shining copper and cooking vessels, and the kitchen tables have marble tops that are kept scrupulously clean, but bread boards and boxes are not considered essential articles of kitchen furnishing. At the forno the bread is thrown loosely into a covered hand-cart, which is pushed from place to place by a boy whose business it is to leave the proper quantity at each house in his round. At the street door he tucks the loaves affectionately under his arm, and running up the steps rings the bell. If the housemaid be sweeping the hall, she dumps the bread on the nearest chair and calmly continues to raise further dust on her mistress' breakfast rolls. If, however, she fails to answer his ring promptly, the boy leaves the loaves to ornament the doorstep, and hurries off to finish his morning duties. One often sees a youth carrying a basket under his arm so that his wet or dirty coat sleeve rests on the upper rolls, and a woman's favorite way of slicing bread for the family meal is to hold the loaf firmly against the chest and cut towards her. It is not uncommon to see children carrying some bread for the next meal, and dropping it anywhere in order to inquire into the whys and wherefores of a street fight, or to indulge in a wayside game of castelle, the Italian boy's substitute for marbles.

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FLOUR MILL OF T. HULL, LAKEFIELD, ONT.

and there are others flavored with almonds and aniseed and which are in much demand with those who prefer quantity to quality. The maritozzo is a Lenten specialty of Rome, and is made with olive oil. The name means literally "a piece of Mary," and the mere mention of maritozzo will make an old Roman's mouth water when he is far from home, for strange to say this toothsome bun is not to be found in other Italian cities.

Some large bakeries make a practice of turning out "hot cross" buns every afternoon about 4 o'clock, and these are distributed by hundreds among small dealers, besides being sent in baskets to the public squares and street corners to catch the pennies of scores of school children, who return home about that hour. Many, however, are retailed hot from the oven for "one a penny, two a penny," and good customers may venture to inspect the open and fast cooling ovens, or peep into the huge flour bins. The head baker is generally on exhibition, powdery and picturesque in rather scanty attire of white linen. After dark, one may bask in the red glow from the night oven and catch glimpses of shadowy white figures sadly lacking in drapery; but out of regard for to-morrow's breakfast, it is best to penetrate no further into such mysteries, for popular voice will have it that those ghosts knead without hands, and are adepts in the treadmill business.

The qualities of bread are numerous, and the prices vary from 5 to 10 cents a kilogram—36 ounces—accord-

VIEWS AND INTERVIEWS.

**Primitive
Flour-Milling.**

In some districts of the Lower Rhine, we are told by the London, England, Miller, flour-milling appears to be in a very primitive condition. Custom mills abound, the toll on the grinding of 100 pounds of rye, barley, oats or maize being six to seven pounds. As the miller has to fetch the grist and to deliver the meal, which often means two journeys of many miles each, he cannot be said to be overpaid for his labor, especially if he uses a steam motor. But even for these modest gains he has to fight hard with the co-operative farmers' mills that are starting up on every side. In custom mills the wheat is ground just as it comes from the peasant's barn floor. No cleaning is attempted by the miller, nor is it usual with him to dress the meal, that operation being left to the sender of the grist. As a rule, mills of this description are destitute of the rudest bolting-chest. In this part of the world there are also said to be some large mills that are quite innocent of roller-milling, and yet produce fine white flour.

**The Better
Way.**

"A dram of prevention is worth many tons of cure," is especially true in the case of the miller who is maimed for life, wisely writes the American Miller. It is very poor policy to delay covering that big set screw which has caught your sleeve or pantaloons so often. It should be covered with one-half of a solid rubber ball or with sheet iron bent about shaft so that the end of the outside lap will follow and not precede the part which supports it. Exposed gears should be covered up before some one slips or by carelessness gets caught therein. Running belts should be encased, and kept so. Where danger lurks wire netting or a cover should be put up. A kindly disposed millowner frequently gives assistance to the family of an operative caught and killed in his man trap. He never thinks of the greater service he would have rendered that family by placing guards about the dangerous places, but immediately seeks a new miller to risk his life in the mill. The very careful miller is no more likely to escape the mill's death traps than the careless one, for the most cautious, wary and vigilant miller has spells when he is very careless.

**A Jack-at-all-Trades
Miller.**

The Jack-at-all-Trades is not usually thought much of, but a writer in the Milling World comes nobly to his defence in this fashion: "Those who ridicule the 'Jack-at-all-Trades' do not remember that the same talent that enables a man to do one thing well, is likely to enable him to do another or twenty other things quite as well. Because a man has skill in manipulating the cleaners of a mill, it is ridiculous to assume that he cannot do quite as well in manipulating the roller-mills and the purifiers. Yet that assumption is openly made by certain writers on mill subjects. Recently I visited a 200 barrel mill, in which I found a perfect specimen of the 'Jack-at-all-Trades,' and I have the owner's word for it that the man is master of all the work implied in the superintending and running of a mill. Says his employer: 'He can turn his hand to anything, from programming a mill down to mending a bolt silk, and anything he has ever done has been done simply perfectly. He is worth ten times his wages to me. I go to him with everything that turns up, or breaks, or gets out of shape in any way. He is a whole mill-wrighting, mill building, mill-furnishing and mill-maintaining establishment in one. When he leaves me, I'll quit the business.'"

**The Practical
Engineer.**

In an article in the Stationary Engineer, George Geisler argues that the man who learns to be a good engineer by actual practice in the engine room is more practical than one who has been a machinist. A good engineer, he says, will never stop an engine during working hours, unless he is absolutely forced to do so on account of damage that might be done. Where a factory or other plant is in operation with a number of hands employed, a shut-down means a loss in time that cannot again be made up. Much is to be left to an engineer's judgment in case an accident occurs, or a defect is shown, and the engineer who has learned the business in the engine

room is much more likely to know what course to pursue than one whose training has been of an entirely different nature. In case of an accident a machinist will take the injured part out and repair it in the way he learned to do it in the shop, which, in most cases, will take considerable time; and the practice will differ from that of the real practical engineer, who will find some means of repairing the damage, or overcoming the difficulty, temporarily, or until such a time as the engine can be shut down and the work done in a thoroughly practical manner.

**Water Pail
Fire Engine.**

Let us despoil not the day of small things, for in some of the affairs of life the good old ways are even yet the best. The utility of the water pail as a fire extinguisher is a case in point. "With all the refinements that have been made in fire extinguishing apparatus," says a writer in Cassier's Magazine, "the fact remains that the simple pail of water is, even to this day, one of the most efficient pieces of apparatus of this class that has yet been in use. Insurance statistics indeed show that more fires are put out by water pails than by all the other appliances put together, the only point that can well be raised against them being that, while they are generally provided abundantly enough in places where they are likely to be of service, the water is very apt to be wanting. It is true also, in a measure, that, even if the pails were kept full, they are often borrowed for some purpose and not returned, so that when most needed they were unavailable. As a way out of this difficulty, it has been proposed to use pails with round or conical bottoms, which will not stand on a floor, and are not, therefore, likely to be taken off for some use for which they were not intended, but this form seriously diminishes the value of the pail as a fire extinguisher, since a man with two of them in his hands, arriving at the scene of action, cannot use either without setting the other on the floor and losing all its contents. As an improvement on this, a superintendent in one of the large New England mills, who had found it difficult to keep the fire pails full and in good order, some time ago adopted the following interesting expedient, of which we find an account in some scrapbook data. The hooks carrying the pails were fitted up with pieces of spring steel strong enough to lift the pail when nearly empty, but not sufficiently so to lift a full pail. Just over each spring, in such a way as to be out of the way of the handle of the pail, was set a metal point connected with a wire from an open circuit battery. So long as the pails were full, their weight, when hung on their nooks, kept the springs down, but as soon as one was removed or lost a considerable portion of its contents by evaporation, the spring on its hook would rise, coming in contact with the metal point, thus closing the battery circuit and ringing a bell in the manager's office, at the same time showing on an annunciator where the trouble was. As the bell continued to ring until the weight of the delinquent pail was restored, it was impossible to disregard the summons, and no more reason was found to complain of the condition of the fire buckets."

BROAD BELTING.

WHEN a great power is to be transmitted and broad belts are required, cotton belts may be used with best success, says the Textil-Zeitung. In such cases they are preferable even to the best leather belts, because they are not only cheaper, stronger and more durable than the latter, but they also run much more steadily and uniformly. They also stretch less. The explanation is readily afforded. The leather belts must be cut from tanned hides. Hides are invariably thickest upon the back and thinner on the sides and flanks. From this fact arises the great difficulty of making a leather belt equally strong throughout its entire breadth. The broader it is the more insurmountable the difficulty. The greater, however, the power to be transmitted, the broader the belt must be. When, therefore, very broad leather belts are to be used, they will show defects in running that cannot be corrected in any manner. Unsteady running, stretching and lashing are some of the defects which may be mentioned. The cotton belt behaves much better. When well woven, its strength is unlimited, it may be made of any breadth and it is able

to resist a much greater strain than the best leather belt. At the same time it is perfectly uniform in material and thickness throughout its length and breadth and, consequently, entirely free from the objections urged to the leather belt. Its price is also much less. While the cost of increasing its breadth depends upon the increased quantity of raw material and labor, the price of the leather belt increases in much greater ratio with its augmented breadth.

THE FOOD QUESTION.

BY DR. EMMA DENSMORE.

WHENEVER bread is the only food man is able to procure, it is important, as the Grahamites claim, that such bread be made of the entire wheat, and that none of the dark-colored gluten be separated from the flour. It is undeniable that the very poor classes, such as abound in the east end of London, and whose nourishment is made up very largely from bread alone, would be considerably benefited if they could be induced to use whole meal bread instead of that made from white flour, which has been robbed of a considerable portion of its gluten, and for this reason does not afford the needed amount of nitrogen.

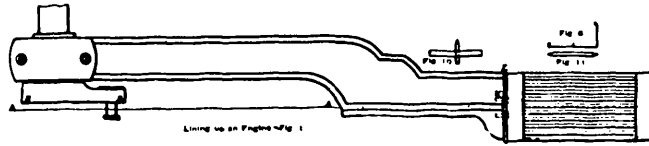
It is only among the intelligent and well-to-do classes that entire-wheat bread has found favor; and this bread has been and is a damage to this class. The well-to-do the world over habitually use a considerable portion of milk, eggs, cheese, fish, flesh and fowl. These foods furnish an ample supply of nitrogen in a form much more easily digested than the gluten of wheat; and these foods have the additional advantage of being rich in oil, a necessary element in man's dietary, and one he has insisted upon having throughout the ages. To those who are provided with flesh and animal products, in quantities to supply the needed nitrogen, bread made of fine flour is preferable because it is much more easily digested than that having a large portion of gluten. I have elsewhere shown that all but one or two per cent. of starch foods is digested in the intestines. A person provided with an ample supply of nitrogen and oil in animal products does not require the nitrogen of the gluten, which is much more difficult of digestion; and if fine flour white bread is eaten with such animal products the needed nitrogen is readily obtained from the animal products, and the starch foods soon pass on to the intestines to undergo transformation into a glucose; whereas, if the entire wheat bread has been eaten, there is necessarily a considerable effort on the part of the system to separate and digest the extra amount of gluten, the need for which has already been anticipated by the animal products. This necessity on the part of the system to separate and digest an element which is not needed and not used is a very considerable strain upon the nervous system.

A glance at the history of nations will supply proofs of this connection. The Chinese, Japanese, and the millions in India who subsist chiefly on vegetable foods are smaller in stature, shorter lived, are weak relatively, both mentally and physically, and have accomplished far less of the world's work than the English and German nations, who have been liberally supplied with a flesh dietary, and (so far as England is concerned at all events) whose bread has been chiefly made of ordinary fine white flour. Another proof that bread and starch foods are a great strain upon the digestive powers is found in the phenomenal benefits accruing to invalids by the use of the Salisbury diet, which consists exclusively of beef or mutton and water. When these patients recover their usual health they generally return to a diet of bread and starch foods, and frequently relapse again into invalidism, to be again cured by again adopting an exclusively meat diet. The increasing favor with which a milk diet for invalids is being received by physicians of all schools is another strong evidence of a non-starch diet. The German Spas and continental health resorts are filled each year by tens of thousands of patients from the effete and luxurious idle class in Europe, to "undergo" a yearly "cure." These establishments insist upon a greatly diminished amount of bread, no potatoes, and a corresponding increase of meat, eggs and milk.

LINING UP AN ENGINE.

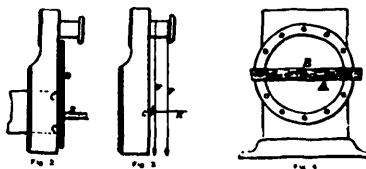
By W. F. CHASE.

ENGINEERS are often bothered by the pounding of their engines, and as pounding can be heard by everyone in the neighborhood, it is very annoying. There are many things that cause pounding, so that in some engines the cure of it is quite a complex subject. Being out of line is the general cause. Either the shaft is not in line with the cylinder, or the crank pin is not put in straight, or something else of the kind is the matter. A high speed engine perfectly in line will be very



apt to pound with a light load, unless there is considerable depression, owing to the heaviest thrust coming on the end instead of the commencement of the stroke. The thrust is caused by the momentum of the moving parts. To ascertain if an engine is in line, the back cylinder head should be taken off, the piston, piston rod, and cross-head should be taken out of the way, and a line A, A, Fig. 1, should be put through the cylinder and extended beyond the crank. To hold this line in the cylinder we take a strip of board, A, Fig. 4, and bore a couple of holes to fit over two of the studs at the end of the cylinder, and in the center of the board we bore a larger hole, say 1 1/2 or 1 3/4 inches in diameter, and attach the cord to a little stick B, that stretches across the hole. The strain on the cord will hold this in position, and it can be readily shifted.

In front of the crank set up an upright, A, A, Fig. 5, with a hole in it and a stick B across it. The hole should be in line with the middle of the crank pin. The cord used for this purpose should be strong and small, and should be made of something that will stretch perfectly straight. A silk hair line, such as is used by fishermen for fly fishing, is the best. Some men use annealed wire, but wire gets hard and stiff, and kinks get in it which can never be perfectly straightened, and one of these kinks is very apt to come where you want a perfectly straight line. Wire is not recommended. Be sure that the stuffing box K, Fig. 1, is perfectly clean. Attach one end of the cord to the stick B, Fig. 4, and the other end to the other stick. The cord should then be drawn so tight as to be perfectly straight. It can be tightened by turning the stick B over and over. To center the string cut a stick a trifle over one-half the



diameter of the cylinder in length, and try the cord in the end of the cylinder, cutting off the caliper stick as occasion requires, until the cord is exactly in the center of the cylinder. Then get a shorter stick and try in the stuffing box, moving the end of the cord that is beyond the crank until the cord is centered in the stuffing box. Then go to the back end of the cylinder and try the again, and so on from one to the other until the line is exactly in the center in both ends of the cylinder. There is now a line to work from to bring everything straight with the cylinder.

The first thing is to find out if the guides are in line. Take a stick (Fig. 10) with one side straight. Bore a small hole in it and put in a second stick, as shown in the cut, so that it will be held snugly but will still be loose enough to be easily moved. Set this stick against the edge of the guides at I and J, Fig. 6, and move the small stick up to just touch the line. The end of this stick should be sharpened so as to bring a small surface to the line. If the guides are in line, the stick should just touch the line when tried at both ends. If they are not in line it will touch the line at only one end. If that is the case there is but one remedy, and that is to swing

the cylinder around and put in strips of brass at L, Fig. 1, as this is the place that the guides are usually out. This is quite a job and requires some time and considerable patience. It is occasionally necessary to shim the cylinder up on the other side. The line will now have to be set over again until it is once more straight with the cylinder and guides. Fig. 7 is a cross section of the guides through the line XX, Fig. 6. A plumb line suspended from point P will tell if the guides are perpendicular. If not, the bed should be swung over, or around, until they are. In case this cannot be done, either the cross-head will have to be changed in the shoes, or the shoes themselves changed so as to run straight in the guides, and at the same time bring the cross-head pin level. Knowing the style

of cross-head it would be easy to tell how to do this. It is a very good test for an engineer's judgment.

The next thing to consider is the crank. Cut a small stick that will just fit into the crank, and mark a line across the center. Bring the crank pin up under the line till it touches, and note whether the line crosses the mark on the stick, or how much of it is out; and then turn the crank around and bring the pin up under the line on the other side. Note how much it is out on that side, and if out, whether it is on the same side of the mark as before, or on the opposite. If on the same side, it shows that the center of the pin is not in line with the cylinder, and the shaft must be shoved endwise until the line crosses it at the middle.

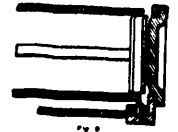
If the construction of the engine will not allow this with the means at hand, take off from the side of the crank-pin boxes the amount that the line shows that it is out. Then fit pieces of brass on the other side of the crank-pin boxes to make up what has been taken off. If the boxes can be recessed for these pieces, all the better; but if not, they can be fastened in with pins. If the line is on one side of the mark when the crank is on the center, and on the other side when on the other center, it shows that the shaft is not square with the cylinder, in which case the outer end of the shaft should be swung around to bring it straight with the line. If it should happen that the shaft could not be moved at that time, the distance that it must be moved can be calculated, and then it can be done any time afterwards.

Suppose that Fig. 8 is a shaft and crank. It is plain that as the distance from the angle to 1, in either direction, is the same, moving one of these points a certain distance will move the other one the same distance; but if we double the distance to one of them, carrying us to 2, then we should move 2 twice the distance that we should 1; so that to find the distance we should move the end of the shaft we must divide the length of the shaft up to the outer pillar block by the length of the crank (not the length of the stroke), and multiply the result by the distance that the line is out from the mark on the pin. For instance, if the mark on the pin is out 1-16, the shaft 2 1/2 feet long, and the crank one foot long, we multiply the 1-16 by 2 1/2, which makes 5-32 that the outside pillow must be moved. To find if the shaft is level, place the crank upright and suspend the plumb line down over the end of the pin, and then turn the crank down and note how much it is out. A similar calculation will give the amount the end of the shaft must be raised or lowered.

To determine if the crank pin is straight with the shaft would be an easy matter if the face of the crank was flat; but as a general thing, when the shaft is finished it is left uneven, as can be seen by putting

on a steel straight edge. Even if the face is flat it is possible that it is not square with the shaft. To determine, then, if the pin and shaft are parallel, take two thin blocks C, C, Fig. 2, and a straight edge D, and hold them in position by the stick E placed against any

handy support. The blocks C C should be placed against the end of the shaft the same distance from the center. The straight-edge D will then be at right angles to the shaft, and a square placed against the face of it and against the pin will show if the pin is straight one way. To determine if it is straight the other way, place the blocks C C and the straight-edge D in a horizontal position, suspend two plumb lines, F F, over the pin, as shown in Fig. 3, and run the square H along the straight edge to the lines, when it should touch both lines. Should the pin become loose in the hole, and it be necessary to bore out the hole before putting in another pin, the boring can be set in the same way.



It should be remembered that a crank-pin wears only on one side, and also that, if it has been out of line, one end may be worn more than the other. This can be ascertained by calipering, and if the pin is not straight the difference must be allowed for, according to the circumstances of the case in hand. When the brasses have been babbitted, there will be a small ring on each end of the pin that will not be worn. Pounding is sometimes caused by the piston running over the ports, as shown in Fig. 9. The piston may then be thrown to one side, or raised up from the bottom, even when the steam enters the top. When such is the case, nothing can be done except to make the piston fit the cylinder as well as possible. Fig. 11 is a caliper stick for setting the line, and can be whittled out of any handy piece of pine.

SPLIT PULLEYS.

HAS it ever occurred to you, says J. A. Allen in the Iron Trade Review, that there are some methods coming into vogue that are cheaper in the long run to use than to be without? Among these is the split pulley. It costs money, and big money, too, at times to cut a keyway in a shaft when a new pulley is to be located. Have you ever used a good split pulley? If not, do so. A short time since I fitted out a whole shop with pulleys and shafting, and used nothing but split wooden pulleys. Hold? Well, not at first. Each pulley was tightened as well as we could do the work at the start and then watched. At the first indication of a slip the wrench was put on again and that settled the matter for all time. I had those pulleys driving every conceivable kind of ironworking tool, from a light drill to a heavy hammer, and never had the slightest indication of trouble. Then, when new tools were bought and old ones had to be shifted, ten minutes sufficed to take down the pulley. But when I did that job, I didn't know as much as I do now. I allowed builders to sell me tight and loose pulleys on the counter-shafting, so that for every machine having a four-inch belt I had to buy a nine-inch split pulley. If I had the job to do again I would specify clutches. Of course the clutch would cost more than the extra paid for the double width split, and the addition of loose pulley, but not so very much. And then I would save weight on my main line; and room also.

WHEAT FOR FORTY-EIGHT YEARS.

	Lowest price per bu.	Highest price per bu.		Lowest price per bu.	Highest price per bu.
1840			1870	\$1.14	\$1.80
1847	\$0.68	\$1.27	1871	1.20	2.00
1848	1.05	2.90	1872	1.50	2.15
1849	.97	1.40	1873	1.55	2.25
1850	.95	1.18	1874	1.18	1.95
1851	.68	1.04	1875	1.24	1.60
1852	.84	1.15	1876	1.17	1.60
1853	1.00	1.66	1877	1.35	2.20
1854	1.37	2.13	1878	1.00	1.50
1855	1.67	2.70	1879	1.05	1.63
1856	1.25	1.75	1880	1.07	1.55
1857	1.10	1.85	1881	1.20	1.63
1858	1.00	1.33	1882	1.10	1.66
1859	1.12	1.95	1883	1.10	1.57
1860	1.12	1.48	1884	.77 1/2	1.10
1861	1.08	1.38	1885	.81	.91
1862	1.10	1.60	1886	.79 1/2	1.03
1863	1.20	1.95	1887	.70	.97 1/2
1864	2.40	3.20	1888	.83 1/2	1.17
1865	1.45	2.65	1889	.78	.95 1/2
1866	1.00	3.35	1890	.79	1.04 1/2
1867	2.00	3.55	1861	.92 1/2	1.22 1/2
1868	1.50	3.25	1862	.70 1/2	1.04 1/2
1869	1.20	2.30	1863	.65	.82 1/2



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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 or the grain and flour trade.

NOTICE OF REMOVAL.

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

WHY BRITISH FLOUR TRADE IS SLOW.

In a letter from Mr. David Plewes, an old Canadian miller, but for some years engaged in the trade at Liverpool, Eng., various reasons are advanced for the present depressed condition of the British flour market. The letter is of particular interest to Canadian millers, because of Mr. Plewes' old-time experience in the business here, and also for the reason that his operations in Great Britain have been altogether with Canadian flours. The letter will be found on another page of the MILLER.

We shall not retrace the references by Mr. Plewes to the general financial conditions, common to trade on both sides of the Atlantic, that have affected the flour market as they have affected commerce generally. Nor is it necessary to discuss, which is fully done in the letter in question, the changed conditions in Argentina and India, that have had a very direct bearing on the depression of flour in the United Kingdom.

There is one point, however, touched by Mr. Plewes, that whilst not left without consideration by Canadian millers, will bear repetition and renewed emphasis. Our reference is to the improved condition of British milling to-day, as compared with what it was not many years since. It is just as well to recognize the fact, that has been plainly stated in these columns more than once, that British millers are as well able to turn out first class flour to-day as are any of the mills in this country, or our neighbors to the south of us. To borrow Mr. Plewes own words: "No country in the world has better flour mills than Great Britain, especially England and Scotland." At the annual meeting of the Winter Wheat Millers' League of the United States, held within the past month, this matter was dwelt upon at some length in a special paper read before the association. To quote for a moment from this paper, the author says: "For a long time we felicitated ourselves in the belief that the American miller was ahead of all the rest of creation in the work he was doing. It is only necessary, in order to be disabused of this idea, for us to now go into one of the well-equipped mills in England or Scotland, and observe the substantial, modern machinery, and note the painstaking care in operating the same, to recognize that the British miller is up to date in his ideas and practice." And the conclusion arrived at by the American miller is much the same as that of Mr. Plewes, namely, that the only point in which we now have the advantage is in being able to obtain our wheat from first hands, free from admixture or adulteration. Unfortunately, in Canada we are losing the strength of

this advantage in the unfair difference between the freight rates of flour and wheat, when exported to Great Britain. What Mr. Plewes says on this point is very plain and clear, and ought to serve as a powerful lever with Canadian millers in their present fight against the railways.

OUR TRADE WITH THE INDIES.

CORRESPONDENCE, that we publish on another page, relative to flour trade with the West Indies, ought to call for serious thought from Canadian millers generally, and certainly from those who are aiming to develop an export trade in flour. It is quite unnecessary to point out here, for we have never been negligent in this respect, how necessary to the success of flour milling in Canada, is a prosperous export trade. With the number and capacity of Canadian flour mills, we are obliged to seek other than a local market for the output of these mills.

What we want to feel sure of when a market opens out, is that no effort be spared by millers to cater in the most perfect manner to the requirements of that market. The correspondence to which we have made reference would indicate that the trade had been somewhat lacking in this respect. There had been difficulty at one time in shipments to the West Indies because of the nature of the packages in which the flour was sent. But so soon as attention was drawn to the matter the remedy was promptly applied. The letter, and analysis of the government analyst of Demerara which accompanies it, tells distinctly that Canadian flour is not at the top among flours that are exported to that country. It may be said that we stand two in the procession, but why do we not stand number one? The result of Commissioner Adam Brown's investigations and experiments in Jamaica, at the time of the exposition there, showed that Canada had the flour that was specially adapted to that country. The fault may be that we are not following as closely as we might, the advice given by Mr. Brown at the time, to make sure that proper flours are sent to the Indies.

If our wheat is at fault, or if it is the case that certain wheats must be used to make such flour as is required in the Indies, whilst other wheats, though good, will not answer the purpose, we would like to have this information. And yet one can hardly suppose that any blame is attachable to the quality of wheat used. Does not Canada grow the best milling wheat in the world? Elsewhere we remark that a deputation of English millers is about to visit Canada to study our methods of cultivation of wheat and arrange for a direct supply of Manitoba wheats for milling purposes. Is our milling at fault? Can it be that Canadian millers are dropping behind in the art of fine milling? Some one or something is to blame. There is fault somewhere. Will our readers say where?

DEEPEN THE CANALS.

No apology is needed for referring again to the question of deepening our canals. The attention that is being given to the question by press, and people, in all parts of the Dominion, shows the importance that is attached everywhere to this transportation problem.

A Buffalo paper is urging the deepening of the Erie canal, and takes the ground that New York state must stand by this carrying route. Somewhat narrowly, commenting on the agitation here to deepen the Welland and St. Lawrence canals, this Bison City journal says it can see no advantage in the step to this country, "so long as Canada could do nothing further than to sit down and see the ships go by." The Star generously replies to this criticism by saying, that in Canada we are able to take a broader view of the question. This country has the natural waterway outlet for large quantities of products, both of Canada and the States; and any plan that will develop and strengthen the carrying facilities alike of these two countries, is going to prove a gain to commerce as a whole, by which Canada individually will be benefited, and may be proud in having helped.

The direct help that will accrue to the development of Manitoba and the Northwest, in the handling of its large wheat output, by the solving of this transportation

problem, has already been made clear in a late issue of this journal.

The question of expense seems to be the great bugbear. The project, however, is not unlikely to take some practical shape, as already a committee of business men is commencing to move in the direction of securing the deepening of the canals to permit at least ocean vessels coming to Toronto, and also the building of a railway to connect Toronto with Hudson Bay.

We shall be glad to find our readers taking an active interest in the discussion, and any expression of opinion received will be given space in these columns. It is a timely question for all interested in the shipping of wheat and flour.

EDITORIAL NOTES.

It is a compliment to the fine quality of Manitoba wheat that a committee of British millers is to visit Canada this summer for the purpose of studying methods of cultivation of wheat by our farmers, and to endeavor to arrange for a regular and direct supply of Manitoba wheat for milling purposes. Information of this visit has been communicated to the Hon. Mr. Bowell, Minister of Trade and Commerce. This is just another circumstance that draws attention to the necessity of improving our water-ways. If Manitoba is to export wheat in large quantities to Britain, New York ought not to be the line of connection.

IN former agitations for the building of the Huron-ontario ship railway, illustration has always been made of the Chignecto ship railway, extending from the Gulf of St. Lawrence to the Bay of Fundy, as evidence that this method of carrying is quite practicable. Not because of its impracticability, however, but for the reason that there does not appear to be a sufficient volume of traffic to keep the line busy for a large portion of the year, it is understood that at the annual meeting of the Chignecto ship railway, which is to be held in London, Eng., this month, the report will be of a decidedly unfavorable character, and will probably have some bearing on the continuance of the railway.

ACCORDING to statements that have reached us from the Maritime provinces, trade there in Ontario flours, especially in Nova Scotia, is being facilitated considerably through the agency of the "Seely Packet Line," running in conjunction with the great railways. The Sun, of St. John, N. B., says that from inquiries made it learns that this trade is steadily growing in volume. Shipments of flour have been delivered from Ontario via C. P. R. and Carleton, to Canning, N. S. in 7 days. The time via Boston is 3 to 6 weeks. The Sun tells of a Nova Scotia merchant who says he had a car of flour from Boston delayed over 5 weeks. The advantages of this method of shipping are worth careful enquiry by Canadian millers. With so decided an advantage in time, as contrasted with Boston shipments, trade from there ought to show a marked development.

AN interview of the grain men of the Northwest with President Van Horne, of the Canadian Pacific Railway, at the time of his recent visit to Winnipeg, has not been productive of any important relief on the score of freight rates. Mr. Van Horne stated quite distinctly that the cost of carrying the grain over the road at present rates would not permit of any further decrease. The request made to the railway was to make a reduction to 12c per 100 lbs. on wheat and other grains from Winnipeg to Lake Superior points, with a proportionate reduction from points west of Winnipeg. The present rate from Winnipeg to Lake Superior is 17c per 100 lbs. for grain and mill stuffs, as against 21c a year ago. The transportation question, viewed from several standpoints, is a live one with our friends in Manitoba. Mr. Van Horne has stated that he will take into consideration the question of a reduction in elevator rates.

A German officer has invented a motor in which a fine stream of coal dust is utilized to drive a piston by explosion in the same manner as the gas in the gas engine.



RUNNING across one of the best informed members of the milling trade the other day, I incidentally mentioned to him the criticism that has been passed on Canadian flours going to the West Indies, as per certain correspondence through Mr. N. Weatherston. He had been shown the correspondence. I asked him, what was the matter that Canadian millers had fallen so far short of meeting West India requirements? "I am just interested enough," he said, "in the outcome of trade with the Indies, having given considerable thought and study to it, to be quite anxious to see how Ontario millers will explain this matter." Informing him that Mr. Weatherston had handed the correspondence to the CANADIAN MILLER for publication, he said, "I am real glad of it, and hope the result will be that our millers will rise and explain. An explanation is certainly required."

One of the discouraging signs of the times at present is the shrinkage in shipments from Canadian ports to Great Britain. Talking a few days ago with a gentleman who had just come up from Montreal, I asked the question, if there was any marked activity in shipping matters there, and his reply was that everything appeared to be dull. Glancing through the columns of a Montreal newspaper, I notice that a similar statement is made, putting the case as strong as to say that the freight market is demoralized and ship agents have found the greatest difficulty in filling their tonnage. So far as grain is concerned freight rates are only nominal.

Mr. S. A. McGaw, manager of the Lake of the Woods Milling Company, and president of the Winnipeg Grain and Produce Exchange, when in Montreal a few days ago, said to an interviewer: "With the exception of the Red River valley and 75 miles west of the main line of Winnipeg the crops will be in ten days or two weeks earlier than last year. The reports are that the crops are looking very well, and there has just been a little complaint about the dry weather." "About the farmers?" "Well," Mr. McGaw said, "the very low price of wheat is making the farmers think of trying the experiment of mixed farming, and in the southwestern part of Manitoba, with good results." "What are the immigration prospects?" he was asked. "There has been considerable immigration from Dakota and Minnesota, whole families moving to Alberta, and I think there would be a good deal more if they had money enough to get out. Among those immigrating are many Canadians returning to their own country." "No, I have not heard any complaints from immigrants who settled in the Northwest last year; they all appear to be well satisfied with their new homes."

"Some decided changes have taken place in the flour trade," remarked a prominent officer of the Dominion Millers' Association, the other day. "And do you know," he continued, "I noticed the change in the packages about as much as anything else. A few years ago it was almost impossible to ship flour in anything but barrels. Flour sent to the Maritime Provinces often had to travel up and down the coast in small open sailing vessels, and nothing but barrels would protect it from rain and rough weather. But when the merchants of Lower Provinces began to buy Manitoba flour they had to put up with sacks. For, with the exception of the flour made by the Lake of the Woods Milling Co., the Manitoba product is put up entirely in sacks. An increased use of railway facilities had also rendered any extreme protection from the weather unnecessary. It is the same with the trade to the lumber camps. Formerly flour sent there had to be packed in barrels, but now they, too, are taking sacks. So it may be said that the only trade at present demanding barrels, is that with

the West Indies. And here our barrels are not, from all accounts, giving satisfaction."

"If silver continues to fall there is no reason why wheat should not cheapen indefinitely?" said Henry Chaplin, in an address before a convention of Scottish Chambers of Husbandry. Mr. Chaplin was President of the Board of Agriculture in Lord Salisbury's ministry. "We propose as a remedy," he continued, "an international agreement to revert to the system which prevailed prior to 1873. The fall of wheat from 1873 to 1891 was 40 per cent. The British commissioners studied the price of wheat in America in 1879, and believed it could never be exported cheaper than forty shillings per quarter. But superior Indian wheat was sold last week in Hull for 19s 3d per quarter. Most farmers believe the fall in prices is due to foreign competition, and that the remedy is protection. But half the countries of the continent and the United States, while imposing the heaviest duties upon imported produce, complain of agricultural depression. American farmers are becoming bankrupt even faster than the British farmers. Others contend that over-production is responsible for the fall in prices, but statistics show that the production of wheat has decreased, although the prices have fallen. The real cause was the demoralization of silver in 1873, and the subsequent divergence of the relative values of metals, which enabled silver-using countries like India to export wheat at the present low price."

"Among other matters that will, no doubt, be discussed at the meeting of the executive of the Dominion Millers' Association on the 12th inst.," said Mr. C. B. Watts, in talking with him the other day, "will be the time and programme for the coming annual meeting." Different views prevail as to what is the best time to hold the meeting, and also the programme to be carried out. Usually the meeting has been held early in August. "But some are of the opinion," said Mr. Watts, "that September, say the first week of exhibition, would be a better date. Then there is the plan as to the nature of the social gathering at the close of the business of the convention. Last year, as you will remember, we took a trip to the Falls, and it was certainly a delightful trip in every way. Can we repeat this, or take a similar step with the same success, this year? It has been suggested that we go by the American side this year, and lunch there, for a change. On the other hand, it is thought that to have a banquet follow the annual meeting in September, would be a good move for various reasons." "You see," continued Mr. Watts, "it has to be remembered that money is scarce this year, and in any programme mapped out this factor needs to be considered." With somewhat of a faint heart, I asked the secretary, if the flour trade continued just as dull as ever? He replied: "There is really no cessation to the dullness. Only ten days ago I received a letter from a flour merchant in the Lower Province, a shrewd and well-posted member of the trade, and his advice is in these words: 'Millers should all close down or make only for what orders they get, and make no more.' American millers are cutting terribly into price, and as a result are commanding the larger part of the Newfoundland trade. In the opinion of this Lower Province flour handler, wheat will have to drop to about 50c. before there will be any encouragement to do trade; or else flour is to go up, which does not seem very likely. The position is no better in the English markets. This must also be remembered, that within a few weeks offal will be down equal to 3c. per bushel on wheat. All this seems very doleful, and yet it is the one story that I meet as I rub against millers everywhere. They are all hoping for the turn of the lane, but it is not yet in sight."

W. E. Redway discussing the question of transportation, which he views as the question of the hour, asks: "Where is the man who will establish a whaleback line for the purpose of carrying Ontario flour east and bringing back Maritime Province coal for return cargo? Taking into consideration the fact that the deepening of the last two sections of the lower canals is now under construction, and that it is expected (?) they will be completed within two, or at the latest, three years at the outside, it will not pay to build whalebacks to fit the ex-

isting condition of the canals, costing over \$70,000 each, when they would become obsolete in such a short time. What appears to me to be the wisest policy is for every member of the Dominion Parliament from Ontario and the Northwest Territories, and every newspaper irrespective of party politics, to unite in a determination to have the lower canals completed to 14 feet, the locks to be made to the full Welland canal size, and all necessary approaches dredged without any delay, the work to be carried on night and day. Nothing should be allowed to obstruct the most vigorous policy possible in this direction, so that within two years, or one if possible, Canadian steamers, whalebacks and others within the dimensions of 260 feet long, 43 feet beam, and 14 feet shaft, carrying 60,000 bushels each, and returning with 2,000 tons of soft coal, should be able to proceed to and from the head of Lake Superior to salt water without transhipment of cargo. On arrival at Montreal or Quebec, whichever may be chosen as a terminus of the route, the 14 feet draught steamers could each in a few hours transfer its cargo to an ocean whaleback of 20 to 24 feet draught, large enough to contain the output of two, three or four of the inland water boats, or to suitable elevators erected for the same purpose, whichever may be found to be most practicable, and thus the great transportation question (of grain especially) would be put upon a solid and paying foundation. The moment this undertaking is completed Canada can control the situation as regards handling the products of the United States and our own Northwest territories. The deepening of the canals to 20 feet, so ably championed by our Toronto members, can for all practical business purposes for the immediate present be left to the treatment of a wise and progressive statesmanship, and whether the solution of the problem shall eventually partake of an Imperial or international character, or whether it shall become a question for the Dominion alone, it is nevertheless one of secondary importance to the commercial interests of to-day.

A week ago I had the opportunity of meeting Mr. N. Weatherston, the energetic and genial manager here, of the Intercolonial railway. Mr. Weatherston tells me that there has been considerable shipments of flour during the past year to the West Indies, though from correspondence, which he placed in the MILLER'S hands, and which appears on another page, it would look as though millers were not doing everything in their power to develop this trade. I am in hopes that our tailing friends will read carefully what is said elsewhere on this question and put themselves in position to compete with foreign brands whenever they may come from. It was encouraging to learn from Mr. Weatherston, and he kindly showed me correspondence on the subject, that a start has been made in shipping flour to South America, and that some 1500 or 2000 barrels have gone forward to Hayti. A letter that I saw in regard to this trade would indicate that there is a fair field there for Canadian flours, providing, however, that millers lay themselves out for the needs of that trade. Among the West India shippers are D. Goldie, Ayr; James Goldie, Guelph; J. & P. R. Howard, Hagersville; The Ogilvie Co., Seaford; J. Martyn & Co., Alvington; Todd Milling Co., Galt; H. A. Mulhern, Peterboro; Robt. Noble, Norval; Rathbun Co., Deseronto; Saddle, Flavell & Dundas Co., Lindsay; N. H. Stevens, Chatham; E. D. Tiltson, Tilsburg; R. A. Thompson, London; and J. A. Williams, Zurich. These shippers go along the C. T. R. or the C. P. R. as the case may be, on to the I. C. R. to Halifax, and thence by the steamships of the Puckford & Black Line. As with the ramifications of trade at any time the extension of an export flour trade in this manner means direct business to the millers shipping to these points; the market, already glutted, is relieved to that extent and increased business is brought to our railways and steamship companies. We ought all to be able to enthuse on the matter.

Floods caused by the recent heavy rainfall carried away the dam and sluices of Mr. Narcisse Ganeply's flour mill at Baie St. Paul, Que. The ground on which his buildings stand was also greatly damaged by the torrent. The dam of Messrs. Bovin & Glasgow's flour mill was also greatly damaged.

COOPERAGE D'PT.

There is a close affinity between the work of the cooper and the business of milling. The miller is either his own cooper, having a cooperage as an adjunct to his mill, or else he resorts 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.

THERE is every indication that business is now opening up in the cooperage stock line, as although shipments of flour barrel stock are still not very large in Ontario, still, a great many enquiries are being received by manufacturers, and some very fair lines are being placed.

Owing to the extremely low price of wheat in the United States, millers are experiencing difficulty at present in shipping from Canada to the West Indies, and compete with the American manufacturers of flour, consequently, the demand for barrels for the West India trade has fallen off very considerably.

The corn meal trade is also very light, and while the most of the corn meal that is made, is being put into barrels, still the demand is very small. In the United States the demand for flour barrel stock has been very good lately, especially for Minneapolis, Duluth and Superior.

The quantity of barrels used in Minneapolis alone, for the month of May, being close on 300,000 or a little over 100,000 more barrels than was used in the corresponding month last year.

While the price of cooperage stock remains practically the same as last month, some of the smaller mills are offering stock a little lower than the prices given below, as they are short of money and want to realize on what stock they have on hand in shipping condition; the large dealers are not inclined to sell any lower than these quotations, as the quantity of staves and hoops on hand is much below what is generally in sight at this time of year, while a great many mills have had to close down owing to lack of logs.

For the past month there has been little else but rain, which makes the woods simply impassable, and no logs can be taken out to keep the mills running, that did not get a supply of logs during the winter months to keep them running up to date.

The reports from nearly all the centres, where apples are grown, show prospects of a large crop; the only places where apples are hurt, are in Missouri, and some parts of Michigan, with possibly one or two places in New York state. Ontario seems to have escaped altogether the results of the cold weather, and apples are showing up first-class.

Large quantities of apple barrel material are now being placed by all the manufacturers, and inside of two months, we expect stock will materially advance.

The following are the present quotations for cooperage stock, f. o. b. cars Toronto, in carload lots, for stock made at first-class mills.

	Per net 1,000
No. 1, 30" jointed elm flour barrel staves	\$5 85
M. R., 30" " " " " "	\$5 50
No. 2, 30" " " " " " "	\$3 85
Special M. R. apple barrel stock	\$4 90
No. 1, 24" jointed elm staves	\$4 65
No. 1, 5 1/2 ft. patent cullied elm hoops	\$6 05
No. 1, 6 1/2 ft. " " " " "	\$6 65
	Per set
No. 1, 17 1/2" kiln dried basswood heading	43c
M. R., 17 1/2" " " " " "	40c
No. 2, 17 1/2" " " " " "	35c
No. 1, 14" half barrel heading	31c
Flat rickled ash hoops, 6 1/2 ft. long (per 100)	\$3 25

For less than carload lots, the difference in rate of freight has to be added, although in most cases, manufacturers sell stock in less than carload lots, f. o. b. cars at the mills, of which the following are the figures:

	Per net 1,000
No. 1, 30" jointed elm staves	\$5 00
M. R., 30" " " " " "	\$4 65
No. 2, 30" " " " " " "	\$3 00
No. 1, 24" " " " " " "	\$4 00
	Per set.
No. 1, 17 1/2" kiln dried bass wood heading	40c
M. R., 17 1/2" " " " " "	34c
No. 2, 17 1/2" " " " " "	30c
No. 1, 14" half barrel heading	34c

The one-stave barrel, which has had so many ups and downs of late years, is said to be a success when the venter "stave" is made of cottonwood.

UNITED STATES MARKETS.

At Minneapolis the call for barrels, we are told, during the past two months has been very much larger than for the same time either of last year or the year before, and the drain on barrel stock has been large. It has been understood for some time that the stocks of heading on hand at the various heading factories throughout Minnesota and Wisconsin was larger than the manufacturers wanted to carry, and as a consequence the price for heading has been pushed down to the lowest notch. The association price has remained at 4 1/4 cents per set, but there has been a large amount of cutting. At the meeting of the heading association of the manufacturers of Wisconsin and Minnesota, held in St. Paul, the fact came out that the stocks were quite low, and while it did not have the effect of raising the price, it made the members of the association agree to all sell at the same price. It was thought, that at the quarterly meeting held in February the price established was a little higher than the state of trade would warrant, and for this reason the association price was changed to four cents per set. There is a very small margin of profit in heading at that price, but if it is maintained until times are better an advance can then be made to a point where more money can be made. Prices on other articles of cooper stock remain the same as have been quoted for some time, and there is no immediate prospect of any change. The coopers still hold to their determination not to buy barrel stock to lay away, and are only purchasing what they need from week to week to keep their shops running.

About the Chicago market no improvement takes place. Tierces are slow of sale at 92 1/2c., and barrels are quiet at 72 1/2 or 75c. Continued light receipts of hogs are the cause of the depression. Tierce hoops are scarce, and, in consequence, there is a trifle better demand, but prices are no higher. Staves are easy at quotations. Pork staves are not in heavy supply, but there is not much inquiry. There is no improvement in the demand for flour barrel stock, and prices are only nominal.

COOPERAGE.

IN THE CANADIAN MILLER of April we published a short sketch of cooperage past and present, giving some interesting facts in relation to the early development of the business. The writer of that paper, Mr. F. B. Pratt, follows up the subject in a later issue of the Wood Worker. An original method of making large quantities of split staves and heading, at or near the small rivers, is described thus:

"Large operators in staves would usually give stave contracts to merchants or stave makers, who would go into the mountains and hill country where timber was abundant, and with large gangs of woodsmen would cut the trees down and saw the trunks if sufficiently sound for staves, and, by the way, this is not always certain; a tree may look very sound and be a lovely specimen of giant oak, but when the tree is fallen it is discovered that it has many faults, making it worthless for the stave maker. If found sound, the sawyers cut the trunk into stave lengths, thirty-four inches long, but more frequently thirty-five inches. The staves are then made by men who follow the sawyers with maul, wedges and froe. The timber is first quartered and the hearts are rived out when too narrow for staves. The hearts, knotty staves and staves with a scar known as "cat face," or wind shakes, and staves with streaks, are all thrown out as culls; and as the inspection proceeds each stave or piece of heading, as the case may be, branded with a branding iron, made like a hammer and used to strike the stave in the end, making the initial of the owner where it strikes.

"A stave to be standard must be, when shrunken or dry, not less than three-fourths of an inch in thickness on the heart edge, and not less than four inches wide, besides sap; the sap, narrow or wide, is never measured as of any value, although sound sap is always used in oil barrels -- or any barrel that is glued before filling. These particular staves we are describing are always called oil barrel staves; most of them, however, are used of late years for other purposes. For instance, a party for whom the staves are made owns a large cooper shop and makes all kinds of work. The country stave maker,

in order to have his stave heavy enough, will always give them a little extra heavy. The extra heavy of each lot are always kept separate and make high-grade work. So, when reclassified for use at the shop, they answer the purpose for other branches of work requiring a heavier stave, about which we will have more to say later.

"Now as to heading. Large trees are generally worked into split heading, especially the butt cuts, which are made twenty-two inches long, in a similar manner to staves, only the bolts are wider; this saves timber, using the hearts closer to the center of the tree. Bolts for the heading are rived so the heading can have say eight-inch widths, for what is known as three piece heading, which must be three-fourths of an inch thick on the heart edge of the middles and one-half inch thick for cants. It is customary in handling, buying or selling heading of these dimensions to give or take three pieces of heading for two). Now two-piece heading is the most profitable to make when working large timber. The bolts must be rived so as to get out heading eleven inches wide inside of sap, one-half inch thick on the heart edge, twenty-two inches long. This sized heading, unless the timber is very straight and rived perfectly, is difficult to make perfect.

"Heading is classified and culled for the same defects and in like manner as staves. The defects of timber are so numerous that men unacquainted with stave making, either by riving or cutting with stave and heading saws, are greatly disappointed in the results of working. Many trees, after they are cut, are found unfit for use: it takes good timber to average 1,000 first-class staves to the acre of white oak timber. If a man sells his staves by the thousand in the tree he ought to know what he is doing when he makes a price by the thousand.

"We now come to the work preparatory to moving staves out of the woods, over mountains and craggy places, and the difficulties attending running staves by floods or freshets, by the use of "splash dams."

"After a quantity of split staves is made and piled up in pens a few months, they are loaded on sleds and hauled (usually with oxen, one yoke on such rough ground is a full team) to the creek bank and piled in racks sufficiently near the water's edge that they can be easily dumped into the stream when the tide or high water comes. Temporary dams are now constructed so that low water barely passes through. When the stream begins to rise after a hard rain, which is anxiously looked for in the Fall of the year, our country stave man gets a crowd of helpers and with a small amount of work soon obstructs the stream so that it will rise with great rapidity; a number of such dams are constructed for the full length of the stream, and as fast as one dam is completed the forces go below to number two, three and four, and prepare them to hold water. While this is going on another gang of workers is throwing into the stream all the staves on the creek bank, commencing above dam number one, and as fast as one dam overflows another is reached, and aided in breaking the obstruction to the run out. Thus in a few hours often millions of staves are sent adrift, the stream growing in magnitude as one dam after another overflow.

"The only difficulty now is to keep the mass of floating timber in the stream. Men follow with small boats, and when a drift has formed they shake the pieces loose and keep the drift and its contents going with the tide. At the junction of the small stream and the river it empties into, a barge or perhaps half a dozen large-sized boats are moored as a boom to hold it from passing out; higher up the stream, in the back water, is a boom constructed of logs -- not abruptly or straight across the rapid river, but running diagonally across from a point, so the pressure will, when the greatest weight is all against it, not to be so much against the boom, but its bearing will be more against the lower shore where the boom is fastened.

"Now our staves are run to a water course that is navigable for barges. The boom is gradually opened and the staves and heading are caught and loaded into the barges. They present an unsightly appearance, but this is no disadvantage compared with the cheap transportation afforded by the high water when everything works well; it seldom fails to be a success with good

management and a good industrious man to push the work, 5 per cent. often covering the loss by strangling timber, adverse currents and sinking in the mud. Staves costing about \$8.50 to \$9 per 1,000 are, when loaded in the barges, worth double that amount, and, in fact, the best of them three-fold the actual cost; but there are sometimes such difficulties as breaking of the booms, and then troubles begin in earnest. Great run-outs are sometimes so protracted, on account of the wonderful amount of rainfall, that booms break, letting several lots of staves out into the main river, some staves marked some not marked; some are caught, but it is a great harvest for the river pirates (men who watch along the shore with skiffs and haul the staves ashore, hundreds in a drift, at one stroke.)

"Parties interested follow the staves with boats and catch them in the hands of men who demand the lion's share, for salvage; some of them take the chances of prosecution for criminal offence and ship them by the first rapid transit to market." Such staves have been followed into the yards, where they were found being worked up at lightning speed, as they are always bought cheap. Some parties who buy drifted staves haul them to their yards, cut the branded end off, and in a few hours have the staves bucked and all chances of identity obliterated. We have known men who brought staves and run them in as a business, to buy a few branded staves in a lot of unbranded, run the whole into market, and so soon as the boat load was lauded parties owning about one-fortieth part (namely, the branded staves) would replevy the whole load. The result was litigation, of course, and the man who owned the staves lost all, because he was caught in bad company. People often take great risks, and like the dog swimming the river with his bone, seeing the shadow of it in the water, undertook to catch the shadow and lost the substance.

"Now railroads are being constructed through the forests, and the old way of taking great risks at drifting timber is gradually playing out; timber is being shipped direct, and stove factories in mountains are frequently visible now, where it was impracticable before means of transportation had been furnished. This is where the cylinder saw for cutting staves and the heading saw for making heading is now doing a vast amount of stove and heading making about which and all other machinery used to make barrels, we shall talk in our next number."

COOPERS' CHIPS.

Wood & Co., of Nixon, Ont., are quitting the cooperage stock manufacturing and selling off their stock.

C. W. Smith, of Strathroy, has sold his cooperage business to Chas. Scott, and has entered into business at London, Ont.

In view of the bright prospects for a large demand for apple barrels, C. W. Smith, of London, Ont., reports selling a large number of barrel heaters.

D. W. Wylie, of Arkona, Ont. has taken his brother into partnership. The new firm are putting in hoop machinery, and will make full lines of staves, hoops and heading from now on.

A call for 25 lb. kegs of flour for the Newfoundland trade, E. D. Tillson, of Tilsonburg, shipping in this manner, and of ¼ kegs for South America trade are recent developments in cooperage business.

A new idea about making metal barrels to be used for the same purposes as wooden barrels, is to form hot sheets of steel into half-barrel shapes by hydraulic presses, and then weld the halves together by electrical process.

Washington spruce is said to answer well the requirements of tub and box makers who must use a wood that will not impart its flavor to the contents of the package. This wood has no taste whatever, and the most delicate compound is free from taint if packed in a Washington spruce package. It is especially recommended for butter packages.—Woodworker.

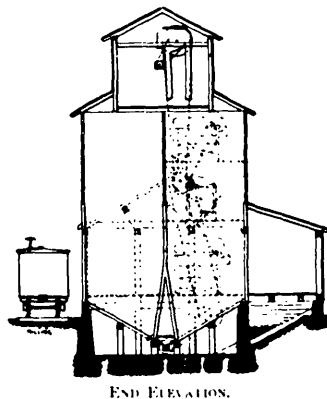
One of the very largest manufacturers of butter tubs informed us recently that spruce of the Washington or any other variety, was not considered desirable for butter packages.—Coopers' Journal.

Subscribe for the CANADIAN MILLER. \$1 per year.

DESIGN FOR A SMALL ELEVATOR.

THERE is scarcely a town or village, remarks Milling, surrounded by fields of waving grain, which does not possess an elevator or a flouring mill. No community prospers as it should without either one of the other. A small town located in an agricultural district depends largely on the farmers' trade, and every possible inducement should be offered to attract the tiller or the soil. Of all the products of the farm which are brought to town and turned in for groceries, dry goods, etc.; of all the edible grains brought to market, including corn, oats, rye, barley and wheat, wheat is pre-eminently the first in importance, has become the chief article of diet of the human race in general, and has most properly gained for itself the title "staff of life." Wheat may therefore be considered the staple article which governs the advancement of a small country town, and it, in turn, largely influences the good fortune of our large cities.

In years gone by, when the price of wheat was held at a reasonably high standard, and when the farmer could enjoy a good night's sleep without worrying as to what the price of wheat might be the following morning; also when a fluctuation of a few cents did not concern him much, and when the distance to the mill was much greater than it is now, and roads in bad condition a large portion of the year, it was customary for him to have his warehouse or granary on his own farm. While this is still the case with many of our wealthy farmers, there are a great many who cannot afford to hold their grain from one season to another for the purpose of



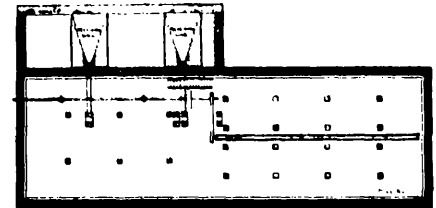
seizing a favorable opportunity to sell. It is this condition of affairs that has brought about the erection of small elevators in country towns. If we look back fifteen or twenty years we are reminded that the small elevator was then scarcely known. In these times the average farmer can better afford to store his grain in the nearest elevator than build warehouses of his own away from the purchasing point. He will get just as big prices for it, and is freed from the trouble of seeking customers. If elevator men do not buy, the cost is very small to keep it in store until somebody comes along and pays what is asked for it. The chances are, also, that about the time when a price may be offered, such as would suit the farmer, he would not be aware of it, or perhaps the roads would be in such a condition as to make it a cumbersome task to get to town. Hence, elevators are necessary in every community surrounded by farms, if for nothing else, for their convenience and security. The town merchants will also receive their share of gain, and to see farmers' teams tied to the railing surrounding the town square is encouragement to them.

But the building of small elevators has not become the science that mill building has in these days, perhaps because they are not looked upon as of equal importance. In fact it is as much of a difficult undertaking to construct an elevator, large or small, that will work satisfactorily, as to put up a mill and make it run smoothly. It cannot be hewn out with a hatchet and erected by the eye. A design, a plan and practical superintendence are essential in its construction.

Elevators, even though they be of small design, are

built in great variety. There are always numerous circumstances, of course, which have a tendency to govern the principle features and general design of an elevator. Among them are the following:

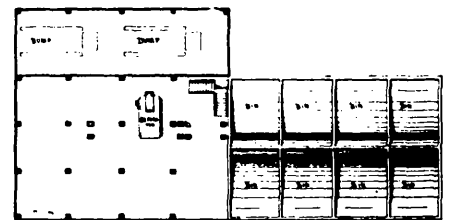
- Relative position as to street and railway.
- The kind of power used.
- The manner in which it is applied.
- The nature of the soil on which the structure is to be built.
- The different kinds of grain to be handled.
- To what extent the grain is to be cleaned.
- Whether grain will be received from cars as well as from wagons, etc.
- The accompanying drawings represent an elevator which can easily be adapted to the handling of various



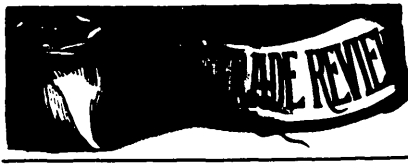
kinds of grain. In this particular design we avoid extreme height as much as possible, which is frequently a desirable feature, particularly in windy countries. By having the cleaning machinery centrally located, the handling of the grain is very much facilitated. A fair idea as to the general arrangement is shown in the side and end elevations. The main storage bins are the full height of the building. The crib work is composed of 2x6 and 2x4 studding. We desire to call particular attention to the manner of constructing the passage way. This is done by locating the studding on edge, and is very much simplified by thus doing away with the abrupt jog at the top and, if anything, is made considerable stronger. The hopping can also be laid on edge, which will do away with the necessity of flooring. The hopping will also naturally clean itself better by having the wheat to follow the grain of the wood in being discharged. Besides it will also thus act as a brace and will very materially add to the strength. This same style of hopping may be applied to the shipping bins and to the other bins located above the main working floor. The construction of the latter two series of bins are shown in the end elevation by dotted lines.

By having the machines located as shown they can be reached easily and quickly from the main working floor. A friction clutch is provided for the purpose of disengaging the cleaners when desired not to run them and still operate the elevators and conveyors for receiving or delivering. The connecting machinery is reduced to a very small amount.

The receiving of wheat from either wagons or cars need not interfere in the least with the delivery of wheat



to the shipping bins. It would hardly be practicable to have large hopper scales for the purpose of weighing in or out and wagon and track scales would have to be resorted to. A large hopper scale might be introduced and located in the space occupied by one of the smaller bins, or a small one could be used on the grinding floor. It seldom occurs in a small elevator, however, that any weighing is to be done in transferring from one bin into another, in fact the principal part of the work consists in receiving and delivering.



Office of the CANADIAN MILLER,
June 8, 1894.

THE GENERAL SURVEY.

LITTLE, if anything, in the way of novelty can be written of market conditions during the month. We continue to reach the lowest point for wheat yet touched. A while ago we were supposed to have got there, but the unexpected continues to happen, and there are those who feel they have good ground for the prediction that wheat will yet touch 50c. Through the visible supply of wheat in Canada and the United States has decreased somewhat, as compared with the same period a year ago, there is not much consolation in the fact, when we take a look at the condition of the market generally, and the probabilities becoming more certain that the crop this year will be a heavy one.

Present indications point to a fine crop of fall wheat in Ontario. We have heard of one section where a member of the trade has said the figures will run 50 bushels to the acre. This is likely a somewhat roseate view, but it is not unusual to hear of 30 bushels. Equally cheering reports, if these can be called cheering from the grain dealer's point of view, come from the States, the present prospect being hopeful. With few exceptions, indeed, the outlook for a large crop the world over is bright. So, whatever may be the influence of the visible supply on the markets, it appears altogether certain that we may count on a very considerable invisible supply.

In wheat calculations, however, in the present day, one can hardly look upon a large crop in the United States and Canada as being the all-important factor in fixing prices. The Trade Bulletin, of Montreal, has rather aptly termed Argentina the dark horse, that has upset all calculations in the wheat trade, and proven more than a match for the clever manipulators of the Chicago wheat pit. We have been talking of a crop of 65,000,000 to 70,000,000 bushels as recently harvested in the Argentine country. This is to be remarked that the amount of wheat afloat from that country for Europe at present is about 16,000,000 bushels, a larger amount than is on the way from any other country. But astonishing as have been these figures to most men of the trade, and important as has been the effect of this crop upon European markets, what are we to think of the word that comes from that country to-day saying that preparations for another crop are being made on a magnificent scale, and that the yield may be expected to be about 260,000,000 bushels?

We have taken occasion before to note the fact that Argentina wheat is said by British millers to be faulty in quality and that some are fighting shy of it. This practice, however, would not look to be very general, for there is no mistaking the information that England is taking large quantities of Argentina wheat. Mr. David Plewes mentions this fact in his interesting letter on another page of the MILLER. Great Britain is encouraged to buy wheat from River Platte from the fact that the vessels bringing the wheat are able to take back good cargoes to South America. As much cannot be said for shipments from this side of the Atlantic. Then there is the difference in cost of labor and living in that country, on which Mr. Plewes places a good deal of stress.

Alexander Bingham, of Liverpool, Eng., who has lately spent some time in New York, has furnished the Journal of Commerce and Commercial Bulletin of that city some interesting figures touching purchases in Europe of Argentina wheat. He points out the fact that in the 17 weeks from Jan. 1 to April 15, the imports of Argentine wheat in Great Britain and for orders aggregated 2,344,500 qrs, against 2,867,100 qrs for the whole of the preceding year, while the continent, in the 17 weeks named, had received 657,500 qrs, against 1,066,000 qrs in the whole of 1893.

"These figures," said he, "show that the United

Kingdom is getting 1,000,000 qrs or 8,000,000 bus per month from a country that last year gave us 550,000 qrs per month, and nothing at all a few years ago, while she has yet 5,000,000 qrs or 40,000,000 bus to give us on this crop."

Continuing, Mr. Bingham said "Nor is this all. There is no premium on forward shipments from that country; so that Europe can contract for her supplies as far ahead as the current crop deliveries run, at the same price as spot wheat, and thus save the carrying charges which are added in America to the price of cash wheat. This is the power that has kept the Liverpool market down, and with it the American markets; for it enables European importers to buy Argentine wheat to suit their wants ahead for the crop year, and not only to get it carried for nothing, but also to sell the future months here at the premium, or carrying charge, against its Argentine purchases, and thus insure them against any losses on a declining market. In this way the United States has not only to carry its own wheat for nothing in the end and stand its losses on its own crop on a declining market, but it has also to pay the losses on the surplus crop of Argentina, and, in fact all other exporting countries where the option system is not in operation."

"Further," said he, "if today's quotations in Liverpool for fair average quality of Argentine wheat is correct, namely, 45 per 100 lbs delivered in Liverpool, with no premium for several months ahead, the inducement to buy Argentine instead of American wheat is still greater. Say Argentine wheat is worth 45 for September delivery in Liverpool, and taking September delivery of wheat in New York at current quotations and ocean freight at the present exceedingly low figure of 1d per bu, the American wheat would cost 45 4/8d in Liverpool, against 45 for the Argentine, which, a fortnight ago, was bringing as much on the spot in that market as American contract No. 2 red."

We will continue to hope for better wheat prices in the future, but evidently more than one serious contingency has to be counted on.

CURRENT PRICES OF BREADSTUFFS.

WHEAT—Toronto—Winter wheat, 59c. to 60c.; spring, east, 60c. to 62c.; Manitoba, 70c. to 71c. west for No. 1 hard. Trade Bulletin of Dominion Millers' Association says: "Car wheat worth 61c. to 62c. on track. Manitoba wheat No. 1 hard, 69c. west and 69c. to 71c. east. Via North Bay, hardly anything offering. Via Sarnia none. Montreal, No. 1 hard Manitoba wheat, 76c. to 78c.; No. 2, 73c. to 75c." Chicago: A dispatch of the 6th says, "wheat rushed up at a dizzy gait to-day finishing with 3 1/2c. gain." Extremely bullish crop reports explain this. Quotations are as follows: No. 2 spring wheat, 57 1/4c. to 57 3/4c.; No. 3 spring wheat, 57c.; No. 2 red, 57 1/4c. to 57 3/4c. Buffalo: Spring wheat, No. 1 hard, 67 1/2c. to 67 3/4c.; Northern, 66 1/2c. to 66 3/4c.; No. 2 red 60c.; No. 1 white, 62c. Duluth: No. 1 northern, 60 1/2c. for September; No. 1 hard, 67 1/4c. for July; No. 1 northern 60 1/4c. St. Louis: 53c. for cash; 56 1/4c. for July; 55 1/4c. for August; 57 1/4c. for September. Toledo: 57 1/4c. for cash; 58 1/4c. for July; 59 1/4c. for August; 61c. for September.

BARLEY—Toronto—Very little doing though a light demand for feed. Quotations about 38c. and 39c. Oswego: The market for Canadian barley very quiet. Light receipts and shipments.

OATS—Toronto—It is thought by some that there are large quantities of oats in some parts of the country and that later prices will drop. At present, however, prices remain firm; sales effected at 37 1/4c. and 38c.; 33 1/4c. and 34c. for white. Montreal, No. 2 oats in store, 39c. to 40c.

PEAS—Toronto—Not many transactions. Prices run from 65c. to 70c. Montreal 69c. to 70c.

RYE—Toronto—Practically nothing doing. Montreal quotes 51c. to 52c.

THE FLOUR MARKET.

THAT it might be different is the wish of flour millers. But the story must still be written that trade is as dull as ever. Locally a hand-to-mouth trade continues. It is very little export business that is doing and when done it is too often of an unprofitable character. The following extract from a letter of a miller, west of Toronto, to

a Montreal concern, and dated May 26th, shows just how millers are disposed to look at the export business. The letter reads: "The offer you make me for the two cargoes is altogether too low, as it would not, I assure you, cover first cost; but if you would take the whole lot I might consider it, as it is not always a case of profit in these hard times so much as keeping things running." The price offered for the two cargoes of rollers, it is said, was equal to \$2 85 laid down in Montreal. It is quite unnecessary to point out the demoralizing character of business along these lines. No better encouragement is found for export of flour to Great Britain. Everything there is flat.

PRICES OF FLOUR AND MEALS.

TORONTO Flour: (Toronto freights). Car prices are, Manitoba patents \$3.70 to \$3.75; Manitoba strong bakers' \$3.45 to \$3.50; Ontario patents \$2.90 to \$3.00; straight rollers \$2.60 to \$2.70; extras \$2.40 to \$2.50; low grades, per bag 85c. to \$1.00 Bran \$1.40. Shorts \$17.00. Trade Bulletin Dominion Millers' Association, says of Ontario flour, bran, etc.: "Sales of straight roller \$2.60 and 90 patent at \$2.65 and \$2.75 f. o. b. for Lower Province; bran \$1.40 and \$1.50 middle freights west; shorts \$15.00 and \$16.00 f. o. b."

MONTREAL The flour market is a little active. We quote patent Spring \$3.50 to \$3.75; superfine \$2.35 to \$2.45; extra \$2.40 to \$2.50; straight roller \$3.00 to \$3.05; strong bakers, Manitoba \$3.40 to \$3.50. Meals: granulated in bbls. \$4.20 to \$4.35; granulated in bags, \$2.10 to \$2.20; standard in bbls. \$3.95 to \$4.00; standard in bags \$1.00 to \$2.00. Feed: bran \$17.50 to \$18.00. Shorts \$18.50 to \$19.00.

FLOUR IN MONTREAL MARKETS.

COMPLAINTS are rife, says the Montreal Trade Bulletin, of the demoralized state of the flour trade, for instead of low prices bringing increased consumption, millers, both here and in the West are asking dealers the question: "What are people living on?" A miller stated on "Change a few days ago, that orders were coming in very slowly from outside points, causing him to wonder what the reason was. Another party stated that "the Newfoundland trade was being supplied almost exclusively by American flour, which could be bought at lower prices than Ontario millers were willing to sell at." For instance, American choice extra flour is offered at \$2.15 laid down here, and American straight roller flour at \$2.70. Although these grades may not be fully as good as Canadian of the same descriptions, they appear to answer the same purpose, and this is no doubt one reason why Ontario millers find the demand very slack, as 25c. to 30c. per bbl. will hide a good many small faults. Michigan patents have also been offered at \$3.25 laid down here, said to be of very good quality, and if this great difference in price between Canadian and American grades continues, little if any Newfoundland trade may be expected in the former. There has been some business in Ontario patents for Liverpool and Glasgow account, but at very diminutive rates, which, notwithstanding, keep on diminishing. Of course the high price of mill feed has helped to make amends to millers for the low value of flour; but even allowing an ample margin therefor, the flour milling industry has had a long list of unfavorable circumstances to contend against, second only to the extended depression in wheat.

TRADE PAPERS AS AN ADVERTISING MEDIUM.

THERE are scores of business men, says the Journal of Building, who, when told that the circulation of a trade paper is 3,000 to 4,000, are inclined to ridicule its claims as an advertising medium, not knowing that a single edition of a trade paper, a circulation of 1,000 copies, reaches more persons whom they wish to reach than the issue of a daily paper of 100,000 copies. Those who may be surprised at this statement and imagine that the figures are incorrect may easily convince themselves of their error by referring to the commercial agency reports. To reach the consumer of general merchandise the daily papers are a valuable medium; to reach those particularly interested in trade, the trade papers alone cover the field.

PRICE OF WHEAT.

PURSUING at further length the subject discussed in the April CANADIAN MILLER, Mr. James B. Campbell, of Montreal, has written a second letter to the Globe, the main arguments of which are here reproduced. It is hardly likely everyone will agree completely with the conclusions reached by this writer. Already these have provoked some discussion in these columns, pro and con. The broad question itself, however, handled by Mr. Campbell, is full of promise to the commercial interests of Canada, and will bear, and ought to receive, the fullest consideration.

Events of the past year have shown unmistakably how seriously the entire commerce of the country becomes depressed when the products of the farm are depressed. Whatever steps can be taken to give improved markets to these products, and especially to wheat, as the leading product, will act with a rebound on all the arteries of the body-commerce, and the pulse of trade will beat with vigor and healthfulness. Mr. Campbell believes he sees in enlarged transportation methods, a solution, in a large extent, to this problem. Millers have a vital interest in the question and we shall be glad to have the thoughts and opinions of our readers on the subject. The following are Mr. Campbell's views:

The trade in wheat is demoralized. Over production, the development of wheat-growing in cheap labor countries and cheap transportation have had much to do with it, but the system of trading carried on in America has materially assisted in the downward run. The rule on the New York as well as on the Chicago Board of Trade is that either winter or spring wheat may be delivered "regular" on contracts. That is, that when a buyer contracts for a given lot of No. 2 wheat for delivery in a future month, the seller shall have the right, under the rules of two boards, of delivering either winter or spring wheat in fulfillment of contract. I was in business on the Chicago Board of Trade when that rule was passed. There was a great cry raised about making Chicago a winter wheat market, and doubtless some receivers looked forward to an increased business: but the majority voted for it, because with winter wheat "regular," the difficulty of running a "corner" was immensely increased, and to just that extent was the security in short-selling increased. The majority of men on the Chicago Board of Trade are "bears"; they wish to get prices down; they desire to sell what they have not got and what they know they never will have, except to offset a contract already made, and they bear the market with unlimited amounts, subject only to their ability to margin. No man can run a wheat "corner" unless a number of men have contracted to deliver vast quantities of wheat which they never possessed. As a venture no one will "corner" the real article alone, there must be some "shorts" to be squeezed. Any system or rule which permits men to sell or contract to deliver practically unlimited quantities of any article will assuredly depreciate the value of the real property, unless there is a controlling influence to limit their operations. The spring wheat crop of to-day is, to a certain extent, a limited crop, and under the present system it is handicapped with the winter wheat crop which may be offered for future delivery, backed by the "bears" and the buyers have not the right of choice. In the Chicago elevators to-day there are 6,000,000 bushels of red winter wheat which no one wants. It has been held their for speculative purposes too long a time. A shipper of spring wheat cannot afford to buy regular wheat at the market price, for he is almost certain to get this winter wheat delivered him. Generally speaking, he will have to go to Armour or some other elevator man, and at the present moment he will have to pay a premium of from one to three cents, according to the quality, for the particular wheat he wishes. The elevator men can afford to carry the wheat for the present carrying charges, and charge the buyer a premium for the stuff for shipment.

I shall now drop Board of Trade jargon and take up the broader question of wheat in general.

In round figures the winter wheat crop of the United States is 300 to 350 millions; the spring wheat crop 120 to 150 millions. Could the spring wheat States disassociate themselves in trade—so far as their wheat is concerned—from the winter wheat States, they would get more money for their product. It will come to that in

the long run. The evil will cure itself. Chicago will become more and more a winter wheat market, and Duluth will gradually capture the spring wheat trade. In other words Lake Superior instead of Lake Michigan will represent the transportation route for American spring wheat. The fine wheat of Manitoba and the extreme Northwestern States is far above the level of wheat produced in cheap labor countries, but the red winter, inasmuch as it is a softer wheat, does come in on the lower level, and the system of trading in the United States tends to drag the spring wheat down to the winter wheat price.

Last year there was a currency famine in the United States. It is well known that long after the pressure had eased off in the money centres stringency still existed in the country districts. Under this pressure farmers were forced to rush their product into market irrespective of price, and the Northwestern States were no exception to the general rule. It was under these conditions in the neighboring States that Manitoba had to market her crop. "Market" is a misnomer, "slaughter" would be a more appropriate term, for it is a fact that Manitoba farmers were left in the lurch, to receive prices based on the demoralized condition of business existing south of the line, and to tender mercy of New York capital.

They received 45 cents for their wheat at the very time that English millers were ready to pay 87½ cents for it, delivered in England. The difference between the Manitoba price and the English price represents the margin for the buying, the elevator, the freight and the selling. It is far too great, and represents a much larger tax than the producer in Manitoba should be called upon to pay. That there may be no mistake about this assertion I will make it perfectly clear upon what grounds I base it. I quote the following sales from the Mark Lane Express of April 9: "Californian, 25s 6d; Australian, 25s 3d arrived; No. 1 Northern Spring, 25s 6d; Finest Manitoba, 26s 9d; ordinary No. 2 Red Winter, 23s 6d, and a sale of the best Duluth is reported at 27s prompt shipment." Going back to October 2, when our wheat was coming to the elevators, Mark Lane says: "Sales of Red Winter, 26s 3d; Hard Manitoba, 27s; California, 28s 6d arrived Nov. 6; No. 2 Hard Manitoba, 27s 3d; California, 28s, nearly due." I have in another letter quoted sales for end of November and December. It will be noted that the first sale of Manitoba was 9d above the price of Red Winter. By April 9 it was selling at 3s 3d above that wheat. Strange to say, it was only after navigation had closed on the lakes that the quality of our wheat begun to be appreciated on the other side of the water. By April 9 they paid 1s 9d more for Manitoba Hard than for California wheat. There is no reason to suppose that had our wheat had a fair chance English millers would have been paying a less premium for it over Californian in October and November than they were in March and April. Both wheats were of the same crop. Manitoban wheat has stood at a premium above Californian all winter. At 28s 6d for the latter, say 29s 9d for 45½ pounds of any wheat, is as near as possible at current rates of exchange, 87½ cents for 60 pounds.

What I complain of is that there is no system of trade or transportation in our country to meet the conditions which exist. We have taxed ourselves heavily to open up a great country. Manitoba is at the head of a great chain of lakes, which represent the cheapest natural outlet to Europe. Her harvest is followed in about ten or twelve weeks by our Canadian winter, which closes the St. Lawrence as well as the Erie. It is impossible to move this dead weight of grain by rail and leave anything for the farmer at present low prices. While it would be an exaggeration to say that English millers are absolutely dependent on our wheat, yet the results gained in mixing with the wheat of Australia and California are such that they do pay a higher price for it than for any other wheat in their market. I believe that the wheat is worth more to English millers than to our millers in Manitoba. The difference in the price surely indicates something of the kind. These English millers want our wheat, and had we a trade ourselves not one bushel could have gone to New York except on an English basis. Where all the wheats of the world come together in competition milling is a fine art, and

the vast quantities of soft, low grade wheat which they get from cheap labor countries make it more than ever necessary for those English millers to use our hard high grade wheat to bring their flour up to grade, and that is why they pay a higher price for it. It cannot be too widely known that in England our No. 1 Manitoba and the grade of the same wheat known as No. 1 Duluth, outsell every wheat in the world. If the obstructions which prevent our producers in Manitoba coming in touch with English millers are not questions for investigation by our rulers, then I fail to see what question is worthy of the attention of the representatives of our people.

Manitoba is a bottled-up country. If she sends her wheat to New York she pays a vast amount of unnecessary mileage, and her product is bound to be slaughtered, while the system of trade and transportation in our own country leaves her in the lurch at the approach of a long winter, and her best wheat is gently squeezed out of her during the freeze-up. However, she has her revenge. Every Canadian in Ontario, Quebec and the Maritime Provinces is paying taxes, direct and indirect, with the result that a handful of men and New York dealers are getting the cream of Manitoba wheat.

There has been a somewhat sudden development of this Canadian water route for the shipment of this Manitoba grain. A good round lot is coming down this way. The stuff is part and parcel of a New York syndicate wheat. Canadians generally, and the port of Montreal in particular, are to be congratulated that although freights were flat and lower in New York, yet New York is waking up to the advantages of the Canadian route. One explanation is, that it was to the advantage of the clique to bring this very cheap fine wheat to New York in the fall of the year, in order to have it to deal out to the millers of Europe during the winter, and now that they wish to get it to Europe direct, they choose the route by which its identity can be best protected. Any little accidental mixing would upset a sale made for delivery.

Transportation is the problem before us. Our best interest is to bring the Manitoba farmer and the English miller closer together. I have in another letter traced the wheat from Manitoba to England via New York. Let us put the extra money into the pockets of those who work for it, and Canadian trade throughout the whole Dominion would vibrate with the new life infused into Manitoba. Ontario and Montreal instead of New York State and City would be the highway for everything represented by Lake Superior. The spring wheat states of the north would not be long in finding out that their interests lay in the spring wheat route of the north, but to do this successfully we must have more tonnage at this port. It is all blocked here. Buffalo did 200,000,000 of bushels last year. We did about 25,000,000 bushels grain and flour. A low tariff the Finance Minister presumptive says he can do it figured out to discourage English trade, would be a marked step in the true path. If we are to market this Manitoba stuff, how are we to do it without the necessary tonnage?

On the 25th of last month our Manitoba wheat sold for export in New York for 11½ cents premium over No. 2 American for May delivery. This represents the highest price for wheat in America to-day, and the New Yorkers have got what there was in it. The Americans cannot match our wheat in their own markets.

I am placing this whole question on high national grounds, and I insist that with our wheat crowned lord of all in the chief markets of the world, we need not fear the competition of Christendom or heathendom. In insisting that English millers are our best customers I believe that I have got a hold of the jug by the handle, and it does not take a vast amount of presumption to declare that transportation is the problem to be solved. Better prices north of the line instead of the south of it would soon fill our country up. The trade of say three millions of people in Manitoba instead of three hundred thousand would be felt in every homestead in the Dominion, but if the cream is to go into the hands of a New York syndicate and down to that port, of what good is Manitoba to the country in general? and there is nothing left for herself.

CORRESPONDENCE

Letters are invited from our readers on matters of practical and timely interest in 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.

THE TRANSPORTATION PROBLEM.

To the Editor of the CANADIAN MILLER.

Sir, With more than ordinary interest I have read the several articles and papers that have appeared in your columns on the transportation problem. This appears to me, beyond any doubt, to be one of the greatest questions that, as Canadians, we need to solve. To the miller and farmer, and when you touch these you put your finger almost on the pulse of the country's commerce, it means more than can be imagined that this question be settled right, and my hope is that the effort the MILLER is throwing into the subject, together with what is appearing generally throughout the press, will be a means of enabling us to get somewhere on the question. Without at this time entering upon a discussion of the question myself, I have this to say, so far as I have studied Mr. James B. Campbell's views, that he has got hold of the right end of the problem.

Respectfully yours,

PROGRESS

WANTS PRACTICAL INFORMATION

To the Editor of the CANADIAN MILLER.

Sir, Let me express my pleasure at the added interest that is being given to your journal through its correspondence column. What I would like to see from your readers would be letters occasionally on subjects of practical milling. And as an operative miller it is not likely I stand alone here. Along this line I would like to get information in regard to the "gentle bolter." Some tell us that this is a superior bolting machine, but there are not a few points in connection with it that are somewhat of a puzzle to me. I would like some miller who knows all about the matter to tell me how these reels draw all the material to the buckets in the way that is claimed. I have noticed what seemed to me an intelligent criticism of this machine by a writer in an American milling journal. He says, if a sliding or falling action is the principle for a flour dresser, how is it that, according to illustrations of these machines, the material in these reels show such an utter contempt for the laws of gravity? Again, if the centrifugal force was such when the material left the bottom of the reel, as to hold it to the cloth, what keeps it from flying out of the buckets as it gets higher up in the reel? Who will give us some light on these questions?

Truly yours,

OPERATIVE MILLER

A VOICE FROM MANITOBA.

To the Editor of the CANADIAN MILLER.

Sir, Reports that we get from the east would seem to indicate that there is a fairly unanimous opinion in Canada against reciprocity in breadstuffs, but it is a mistake to suppose that in these opinions is reflected the view of the entire Dominion. Ontario millers may consider it a disadvantage to have competition with the United States in mill products. We do not all think so here. I believe I voice a very general opinion in these Northwest provinces in saying that free trade in breadstuffs would be a good thing for this country. Our wheat has established for itself a character that makes it a desirable article in not a few states of the American union. Minneapolis millers know the worth of our wheat for milling purposes, and if this market were thrown open to us, it would enhance prices here. Nor have our people here any large fears of what competition in flour would mean. They believe that the flour from Manitoba wheat would quickly obtain a market in the States that would hold its own with anything that would be produced in United States mills. Were I disposed to enter upon the trade question in a broader light, it seems to me I would find a strong argument for reciprocity generally through the position of all our provinces in one respect or another finding the United States the natural market for one or other of their products and manufactures.

Yours, etc.,

FRANK CITY

WINNIPEG, MAN., May 17, 1894

WHEAT FOR FEED.

To the Editor of the CANADIAN MILLER.

Sir, If it is the case, judging from what I read in the papers, that farmers are feeding a good deal of wheat this season to cattle, why should not we, as millers, encourage this line of policy? Flour is a drug in the market in sympathy with the low price of wheat. Let the wheat market show additional strength and flour would strengthen accordingly. I cannot come to any other conclusion than that, all the world over, our wheat growing countries are expanding too widely, and whilst it may only be a drop in the bucket to curtail the yield, or in any case the sale of wheat for human food, it yet will be a move to some extent in the direction of helping the wheat market. The Dominion Millers' Association might profitably discuss at its forthcoming meeting the feeding of wheat to cattle. The subject, I think, is a practical and immediate one.

Yours, etc.,

OPPORTUNITY.

ONE-BREAK SYSTEMS.

WHEAT cleaning, thorough and systematic wheat cleaning, is of great importance in all systems of milling and in the one-break operation is of vital importance.

It has been maintained that with many breaks and with corrugated rolls much advance cleaning was not needed, the rolls themselves being good cleaning machines. This is in part true, as there is no doubt but that the action of the sharp corrugation does much scouring, but it is done in the wrong place, because while being scoured the wheat is also being broken and flour made, and with this flour the scourings become mingled, unite, as it were, to part no more. Then, too, the flour making portions not yet reduced to flour become exposed to and in contact with the same impurities and so vitiated that often absolute purification becomes impossible and the evil effects are felt to the end.

But be the effects of scouring with the rolls in the more lengthened system good or bad, it cannot be done in the one-break system, because there is not the corrugated surface to do it with, there being but one pair in small mills, and if the wheat be cleaned it must be so unassisted by the rolls; but cleaned it must be or no good results can be obtained.

The theory on which a one-break system is based is that first flour, if properly made, is the white flour of the process, no matter of what kind it may be, unless of the lengthened sort above referred to in which the flour is vitiated by the scourings. There being no vitiation of that kind, wheat broken down abruptly and at once is converted into flour that is almost pure white.

To do that corrugations are necessarily dull and differentials extreme, never being less than three to one, and it has been claimed that much greater difference is advantageous.

The principal claim is that with round or very dull corrugation: the great variation in the speeds of the two rolls has no abrasive action on the bran; does not cut it nor scrape it, but spreads it out in broad flakes, while gently scraping the flour from it.

While speaking of corrugations, it might be well to add that special and peculiar corrugations have been adapted to one break and other short methods that is said to be far more effective than the ordinary spiral corrugations, but whether such is true or not cannot be stated with certainty. There seems to be some evidence in favor of some of the special lines, but whether of a strictly unbiased kind, remains for those experimenting in such matters to find out. It can only be said here that it is well enough for every miller interested in the one-break system to investigate such so-called improvements in corrugations that can be viewed from standpoints of common sense and good logic; not that common sense establishes the practical utility of any mechanical device; practice alone can do that; but it will sometimes materially assist in arriving at conclusions as to what to experiment with.

There is no question but that whatever in the way of improving corrugations will in any way benefit the situation or will make broader bran and more flour with the breaking operation is what all one-break millers need, and what they should have if it is obtainable. When we

say more flour, we should also say whiter flour, because it is on making a large quantity of very white flour that the success of the one-break system depends. If that all important feature is left out of the process, there is but little left in it.

The aim of the one-break system is to approach the old method as nearly as possible, or if it be not it is certainly the effect, as by the old methods the first flour was the white flour and the best flour, it being actually a one-break system with burrs instead of with rolls. But the differences between the two are much in favor of the modern one-break system. The very best and best dressed burrs would cut the bran more or less, which had an injurious effect on the color of the flour, while the rolls, if the corrugations are right, have but little effect on the bran, other than to smoothly peel it off the flour portion, leaving that in good condition.

Then, too, by modern processes the middlings, a portion of which is always necessarily made, are better taken care of than formerly. They can now be purified and made into an excellent flour that can be mixed with the first flour, thus making a very good product of the whole.

The one-break system cannot, however, be safely figured on nor depended upon by those making or intending to make a strictly merchantable flour on a large scale. Its design is to benefit very small millers, who depend entirely upon local or near by trade, and as there are hundreds of small mills of that class scattered all over the south, many of them or the owners thereof, that cannot or do not wish to go at it on a more elaborate or liberal plan, should at least try the one-break, as all can do that if they wish and thereby greatly improve their condition. The Tradesman.

THEORY AND NATURE.

THERE are, says Power, a good many points where theory and nature have a falling out. The steam utilizes but a small proportion of the thermal value of the fuel it consumes, and its improvement appears to be open only in the direction of higher initial and lower rejection temperatures. The maximum efficiencies are obtained with fiercely hot furnaces, low uptake temperature, high pressures, and high grades of vacuum, giving the greatest available range in both boiler and engine. In the animal organism combustion is carried on at a moderate rate and low temperature, and there is apparently little available difference of temperature in the body, yet as a machine the mule is more efficient than the engine, and will do more work per pound of fuel consumed. The man who finds out the principle upon which this is done, and teaches us to apply it, will be a greater scientist than Faraday, a greater inventor than Watt.

THE POWER OF FLOWING STREAMS.

COMMON opinion respecting the energy or power of flowing streams is nearly always exaggerated, and greatly so. A current of large area conveys an idea of an almost irresistible force, when in fact it represents but a trifling power. The following table, taken from the Mechanical World, will serve to show how little

Velocity of Stream	Equivalent Head		Pressure	Total Energy
	Feet	Inches		
Miles per Hour	Feet per Second	Feet	Inches	Total Energy per Square Ft. per Second
1	1.47	1.61	1.61	0.0005
2	2.94	3.22	3.22	0.002
3	4.41	4.83	4.83	0.0045
4	5.88	6.44	6.44	0.008
5	7.35	8.05	8.05	0.0125
6	8.82	9.66	9.66	0.018

work is represented by the current of streams. The force that may be utilized, or the head seen in the third and fourth columns, is very slight, and is the height to which the water will rise when obstructed. This depends, in a measure, on the shape of the obstructing faces. A plain radial current wheel will give not more than two thirds the work that a well made Poncelet wheel will, because the water will rise higher on the curved floats of the latter named wheel. Current wheels are usually a disappointment, because falling short of their expected duty, and a habit they have of going off in floods.



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 Millers' Club 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 discussions 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 touching these important questions.

FLOUR FOR HAYTI.

FROM two different sources we have learned this month of particular methods called for in exporting flour to Hayti. A news item on the coverage page tells of a call from one of our coopers for 1/4 kegs for flour from a firm who are shipping to Hayti, and on the same page is mention of the manufacture of 1/4 kegs for flour going to Newfoundland. In an interview on the Scribe page with Mr. N. Weatherston, western freight agent of the I. C. R., the information is imparted that in shipping to South America, the flour must all be done up in 1/4 kegs.

It is gratifying to learn that a new field in the case of Hayti is being opened out and if our millers watch themselves there is reason to suppose that a certain portion of their surplus product will find a satisfactory market there. The field is a new one for Canadian millers and much will depend on the character of the flour and plan adopted in sending these early shipments, whether the trade will be continuous. It will not do for millers to take the ground, as was done at one time in regard to West India supplies, that whatever methods of packing were employed for local trade would do for this export trade. Not a little business was lost in educating our millers up to the necessity of sending their West India shipments in better packages than were used for trade here. However, that difficulty, we think, has been gotten over. To employ the language of an old adage: "When in Rome we must do as Romans do." It is not necessary to argue why the Hayti people want their flour in 1/4-keg packages, enough to know that this is what is called for and it will be a mistake if shipments are made out of the requirements of that export field.

FLOUR TRADE WITH THE WEST INDIES.

CORRESPONDENCE OF MILLS VALLEY TO CANADIAN MILLERS.

THE following correspondence, which has kindly been placed in our hands by Mr. N. Weatherston, western freight and passenger agent of the Intercolonial Railway of Canada, is largely self-explanatory, and ought to be helpful in showing Canadian millers, wherein, possibly, they have failed in securing as large a share of trade of the West Indies, as might have come their way. The "St. Lawrence" brand referred to in the government analysis is an American flour, which takes the lead in those colonies. In our editorial columns we take occasion to say something on the export flour trade as touching the Indies, Hayti and other points.

DEMRRARA, 12th May, 1894.

N. WEATHERSTON, Esq.

Intercolonial Railway of Canada, Toronto.

DEAR SIR, You will remember we wrote you in 1892 regarding Canadian flours, sending what particulars we could in answer to your request.

We have just been going into the matter again, as our people still complain of quality.

The enclosed analysis and report from our government chemist may interest you, and we shall be glad if the information now given, results in your millers sending down the right stuff for the West India markets.

We are, dear sir, yours truly,

SANBACH, PARKER & CO.

GOVERNMENT LABORATORY, GEORGETOWN.

DEMRRARA, May 8th, 1894.

DEAR SIRS, Enclosed please find the analysis of the samples of flour which you forwarded on April 25th.

The results of the analysis show that the sample marked "St. Lawrence," is superior to any of the others as a flour for the purposes of bread making. It is, however, closely followed in this particular by the sample marked "No. 2."

The value of the other samples for the purpose of bread making would probably be as numbered.

I do not think that the sample of the last of these was a fairly representative one, as it appears to be a sample of flour made from unripe grain. With the exception of the samples numbered 1, 2, 3, and perhaps 4, the samples are marked by the low proportion of gluten and other albuminoid constituents. This results in a want of "body" in the flours, i.e. the flours do not contain sufficient of the constituent albuminoid known as "gliadin" which gives to dough made from flour of good quality, such as "St. Lawrence," its characteristic adhesiveness and power of producing a spongy mass when submitted to fermentation. I should expect that with the exception of the "St. Lawrence" (Nos. 1, 2, 3 and 4), the samples would tend to yield in varying degrees, heavy, tenacious and saccharine loaves. As a necessary consequence more of these flours would be required to give an "equal sized" loaf with one produced by the "St. Lawrence" brand.

I am also of opinion that the majority of the samples contain a somewhat excessive quality of water. The proportion of this should not exceed thirteen per cent. and in proportion as it exceeds this the flour will exhibit a lack of "keeping" properties. The smaller the proportion of water present in a flour the better suited will it be for keeping in tropical climates.

I am, dear sirs,

Yours faithfully,
(Sgd.) J. B. HARRISON,
Government Analyst.

Messrs. SANBACH, PARKER & CO., Georgetown.

NOTE BY S. P. & CO.: In the original report Professor Harrison refers to the names of the different brands sent him for analysis. As a copy of this goes to several of our Canadian correspondents, we have thought it advisable to refer to the samples numerically, instead of naming them. Our correspondents will learn, from the analysis forwarded them, the relative merits of their brands as expressed in this report, and shown in the accompanying synopsis.

DEMRRARA, 12th May, 1894.

SAMPLES OF ANALYSES FLOUR	SYNOPSIS OF ANALYSES FLOUR									
	1	2	3	4	5	6	7	8	9	10
Water	11.20	13.37	14.12	14.52	14.72	14.72	14.57	14.57	13.75	13.66
Protein	10.93	12.25	12.98	13.65	13.91	13.91	13.71	13.71	12.75	12.75
Albuminoid	12.37	14.65	15.11	15.96	16.23	16.23	16.03	16.03	14.75	14.75
Other nitrogenous constituents	1.56	1.60	1.87	1.70	1.68	1.68	1.68	1.68	1.00	1.00
Starch, dextrin, etc.	70.00	62.31	61.61	60.11	61.11	61.11	61.11	61.11	64.25	64.25
Salts	5.00	4.71	4.51	4.61	4.51	4.51	4.51	4.51	4.75	4.75
Contains nitrogen	9.00	10.65	11.11	11.96	12.23	12.23	12.03	12.03	10.75	10.75
Contains nitrogen	11.57	12.85	13.31	14.16	14.43	14.43	14.23	14.23	12.95	12.95
Contains ash	1.75	1.45	1.35	1.45	1.45	1.45	1.45	1.45	1.75	1.75
Contains water	11.20	13.37	14.12	14.52	14.72	14.72	14.57	14.57	13.75	13.66
Lowest best	No. 1 is analysis of St. Lawrence flour									
Highest best	No. 2 is analysis of Canadian flour									
	E. WEATHERSTON, 12th May, 1894.									

The flour on which the rolls are located should be very firm and the machine securely fastened to the floor, so as to allow of no movement or vibration. If the roller machines are allowed to vibrate and swing back and forth, there is but little chance to do the best work. The very best grinding results can be obtained only when the rolls stand as firmly and immovable as the rocks in the hills.

Millers do not so much need a varied experience as do a thorough one. The fact that a miller worked in or had charge of a score or more of mills is not so much in his favor as if he had learned all he knows in two or three mills. The latter proves application and usually ability, while in the former case a lack of both application and ability may be the reason why the experience has been so varied.

BRITISH FLOUR CONDITIONS.

Special correspondence CANADIAN MILLER.

As I see in your April issue, articles on the cause of the low price of wheat, I thought I would drop you a line on the causes, and also on the cause of so little Ontario export flour trade. First, as to the cause of the wheat depression, and the great decline from a point this cereal should never have reached, at the time of the Russian war scare in 1891. At least the amount of wheat then in the world never warranted the prices of that year, and the terrific losses in 1892, on purchases made in autumn of 1891. These conditions so demoralized the trade, and so discouraged traders, there has been no life in business since. Then followed the money panic in United States in 1893, causing the people to force their breadstuffs on this market without any hold up whatever, irrespective of cost. This further depressed prices here. Added to this came an immense crop in the Argentine, forcing their product on an already overstocked market, where a dollar of our money would buy \$2 50 of theirs, and India with her silver currency, where one dollar and sixteen cents of gold here, would buy, say nearly two dollars of silver currency in India. Thus, very small prices here, gave those countries with a depreciated currency, a good price for their wheat. Of course the answer to this is, they have to pay more for the British goods they buy, but the difficulty is they scarcely buy any goods. In India, where they grow so much wheat, the cultivators of the soil live on a little rice.

Now the question arises, when will wheat advance? Hard to answer, but it will come when less is produced than consumption requires and not before. I confess, with most people connected with the bread-stuff trade, I thought consumption would overtake supply long ago, but we were all mistaken, and wheat during the past week has sold at less prices than ever, viz. quoting in your currency and your bushel: 65 cents for Argentine, 67 U. S. red winter, 69 1/2 Canadian white and 77 Manitoba No. 1 hard.

A word or two in respect to Canadian flour trade. Some of my Ontario friends write, why don't you send more orders? Well, I have sent out orders for thousands upon thousands of sacks, which have not been filled because price was too low, but nearly every one of those orders would have been filled if the freight on flour had been same per 100 lbs. as on wheat, and unless this can be obtained I cannot give much encouragement for export trade, even should markets advance. Ten or fifteen years ago Ontario did a large export trade in flour, because then our milling plant and facilities were superior to Great Britain, but this is all changed now, and no country in the world has better flour mills than Great Britain, especially England and Scotland. Hence we have now to be put on equal freight terms with British millers, or we cannot successfully compete. It is not a matter of low freights, I believe you have that now, but a matter of comparative freight. I know that the wheat freight is taken on large contracts, and as a rule very large contracts can be made at less freight than a few car loads, especially when freight is connected with ocean freight. A long while before I left Ontario I advocated a pooling arrangement on flour and oatmeal freights, arranging with some one man to make the contract, each miller lodging a deposit with the freight contractor that he will fill his share of the contract. There is still an opening here for your surplus flour if your millers are put on equal freight terms with those against whom they have to compete, and I think if the Ontario millers would make a united effort, they will get some relief from the unequal freight difficulty, against which they have to contend at present.

DAVID PEELIS

LIVERPOOL, Eng., May 12, 1894

Remember that as a general thing quality is of more importance than yield. If a miller has a reputation for the excellence of his brand of flour, and gets a price accordingly, he is in a position to make money and must at all times preserve the excellence of the flour regardless of the yield. If good yields and excellence can both be maintained it is well, but if not, sacrifice yield or else depend upon sacrificing business.

CURRENT COMMENT.

At a time when American millers are making a boast of their splendid milling system it is somewhat remarkable, that almost simultaneous with progress in this line complaints, continuous and well founded, are current of the deterioration of wheat. Millstone says on this point "The greatest problem in milling is the general improvement of our wheat. As the quality of our milling systems and machinery has improved the quality of our wheat has deteriorated. There is much truth in the boasts of old millers that good stone flour of a quarter of a century ago would compare favorably with the average of roller flour now. It is as true that the wheat of the present could not be handled at all now with the crude apparatus of the old system as that really good wheat produces much better flour now than good wheat did by the old process. In the older States the soil has become, or is becoming exhausted, the berry is not so plump nor its nutrient qualities so strong. American farming methods have been careless, and tons of the richest material have been taken off the lands where pounds have been put back into them. The principal reason why spring wheat flour is stronger in gluten is owing to the virgin richness of the soil. But even now deterioration is evident in the older spring wheat districts, and the time will surely come when the spring wheat will lose its pre-eminence for strength, as it has successively been lost by New York, Ohio, Indiana and Michigan. Climate may modify this somewhat, but it cannot prevent the final deterioration of wheat in all sections unless farmers become wiser, and apply measures that will keep up the soils. Improvement is noticeable in many sections, and it is also noticeable that the mills in these sections are the ones that produce the best flour at the least expense."

Commenting on the discussion that has been going on in these columns regarding reciprocity in flour, the Commercial, of Winnipeg, says: "The principal interest in this reciprocity clause centres in wheat. In Manitoba the farmers would be in favor of reciprocity in wheat, as they could sell to Minneapolis millers. Some of the grain shippers are also in favor of free wheat, as they could sell in or ship through the United States with less trouble from customs regulations than at present. While Manitoba would be able to sell wheat to Minneapolis millers, reciprocity in this grain would also enable eastern Canada millers to buy Duluth hard wheat, so that while some advantage would be gained, the present monopoly which Manitoba hard wheat has in Ontario would be lost. Eastern Canada millers are now obliged to use a certain quantity of Manitoba hard wheat, and in some seasons they have had to pay a sharp premium for it, which has been a benefit to the western producer. If they were able to go to Duluth and buy, it might cut off some demand for Manitoba hard. As a general rule however, the markets are relatively the same on each side of the boundary. Reciprocity, however, would probably increase the competition in Manitoba for wheat, and the advantage to the farmer would be in favor of accepting the offer. Western millers would find their eastern flour trade cut into by Minneapolis and other hard wheat millers, but they would have free access to the larger markets in the eastern States, in competition of course with Minnesota and Dakota hard wheat millers."

Novorossisk, the new Black Sea port of Russia is frequently spoken of, says a writer in the Pall Mall Gazette, as the "Chicago of Russia," and contains three immense elevators, with a capacity for 3,000,000, 4,760,000, and 3,200,000 pounds of grain respectively. (One pound equal to about 36 lbs av.) Much of the success of the port is due to the energetic management of the Novorossisk and Vladikavkaz Railway line, which brings the port into communication with the rich grain-producing districts of the Caucasus and connects with lines from other grain producing districts of Russia. It is anticipated that before long a large amount of grain from South-western Siberia and from Central Asia will reach European markets by means of this railway. The line at present carries annually some 60,000,000 pounds, and at stations on it eight elevators have been erected for storage and cleaning purposes, each with a capacity

of from one to two million pounds of grain. All things considered, the growth of Novorossisk, which five years ago was but a sleepy little fishing village, and now is second only in importance as a grain port to Odessa, is one of the most remarkable events in the history of European commerce.

The United States is not in it, when the carrying trade by water is considered. The amount of grain exported from the port of New York during the year 1893 was 55,768,726 bushels. Of this 23,400,046 bushels were wheat, corn, rye, oats and barley, the balance being buckwheat, flax seed and peas. This quantity was less than that of the preceding year by 18,061,780 bushels. Of this grain three cargoes were sent out in sailing vessels, 171,427 bushels; one (British) carried 107,765 bushels, and two (German) carried 63,662 bushels; not one American. By steamers there were sent off 55,597,299 bushels, in 1,022 cargoes, in 324 vessels. Of these there was one American the Chester, which took 16,357 bushels of wheat to Southampton. But there were 217 British vessels employed, which carried 604 cargoes, amounting to 34,259,656 bushels, a great deal more than half the export. Next came the Germans with 40 vessels, which carried 4,292,737 bushels in 128 cargoes. The Dutch had 11 vessels and took 92 cargoes amounting to 4,651,111 bushels. The Belgians had 12 vessels and took 76 cargoes, or 5,240,242 bushels. The French had 15 vessels employed, which took 2,400,469 bushels in 43 cargoes. The Portuguese had 6 vessels and took 29 cargoes, in all 2,213,108 bushels. Four Norwegian vessels took 124,592 bushels, 7 Spanish took 597,149 bushels and 6 Italian 813,516 bushels.

EXHAUST STEAM.

THE use of exhaust steam is the more profitable as the percentage of the steam utilized is increased, and as the back pressure produced by its use is reduced, if we add back pressure to an engine we increase the mean pressure required upon the piston in order to maintain a given mean effective pressure: that is, we increase the horse power of the engine, so far as the boiler is concerned, by an amount equal to the horse power constant multiplied by the back pressure added, and require a proportionately greater supply of steam. The condensing engine may be considered in the same way. Suppose we have an engine which develops one-horse power for each pound of mean effective pressure running on a mean effective of fifty pounds, an absolute back pressure of five pounds, and a steam consumption of twenty pounds per hourly horse power. If we cut off the condenser, and exhaust at atmospheric pressure, we shall have added ten horse power to the work of the engine, requiring two hundred pounds of steam additional per hour. As this additional horse power is used in overcoming the increased back pressure, the effective horse power remains at fifty, and the steam consumed per effective or indicated horse power per hour is increased twenty-five per cent. Now if we have an application of as much or more heat as would be furnished by two hundred pounds of boiler steam we can take it profitably from the exhaust. If not, it would be better to use steam direct from the boiler.

POSSIBILITIES OF SPEED BY STEAM.

IN his recent inaugural address, the president of the French society of civil engineers, M. du Bosquet, pointed out that express trains daily attain seventy-five miles an hour on down grades, providing that such speeds are not dangerous. But the engines are not sufficiently powerful to maintain such speeds on a level. A draw-bar pull which would give seventy-five miles an hour on a down grade of one in 200 would give only fifty-seven and a half miles on a level, and thirty-one and a fourth miles on up grade of one in 200. A slight increase in the average speed greatly increases the power required. If 322 horse-power will draw a train at fifty miles an hour up an incline of one in 200, for a speed of 125 miles 2,960 horse-power would be necessary. High speeds, moreover, increase the weight of the engines per horse-power and there is a limit beyond which the engines could not move themselves. At their maximum power, the modern French locomotives weigh about 158 pounds per

indicated horse power; but a similar engine of 150 tons, generating 2,000 horse-power, would be required to draw a train of 100 tons up a slope of one in 200. The highest possible speed for such an engine and train up the slope would be eighty-seven and a half miles an hour, and for this the engine would weigh 670 tons and would generate 8,932 indicated horse-power.

THE GOOD OLD TIMES.

A MONTREAL wheat bull, as he thought of the condition of the wheat market, sighed: "Oh! for the good old times when old Hutch sent up September wheat from \$1.25 to \$2.00 within about a couple of weeks. The old boy would walk on to the floor of the Chicago Board of Trade with a slouch hat on, give the wink to his brokers, and up would spin prices at the rate of 3c. to 5c. in a single forenoon, and there they would remain until the next advance set in on the same afternoon or the day following. In these times, however, if the market moves up $\frac{1}{2}$ a cent or a cent the cry goes forth, "she's booming," and then the boys stand drinks all round."

WHY PULLEYS RUN UNSTRAID.

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 centre of gravity. A wheel is generally looked upon as so much weight, and, if held off its centre, must go switching about like a heavy stone in a short arm sling, tending to pull the machinery to pieces. This may be well enough for a start, while the wheel is getting up to speed, but the time soon comes when the wheel will turn to its own centre and let the shaft swing 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 with 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 switched about by holding it off to one side of centre, but as the speed increases, it gradually brings the point of support near the centre, till at last it is allowed to spin on its own centre 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 but the inertia of the plate.

THE REASON WHY.

AN engineer observed his steam gauge indicating a higher pressure than his safety valve spring was set for. He slackened the spring, but the gauge kept rising and the steam did not blow off. When the pressure rose to 200 pounds he became alarmed; and as he could not start the engine he started the injector and opened the water blow-off cock. The damper being closed, this had the effect to prevent further increase of pressure. On examining the safety valve it appeared that the brass seat of the valve was a bushing put into an iron casting, that it had become loose, and that the steam had pressed it up against the valve. As the valve rose the seat followed it, and there could not have been a release of steam until the bushing was pushed out of its hole.

CAUSES OF EXPLOSIONS.

THE causes of explosions may be summed up in one sentence, namely, lack of strength to withstand the pressure. This want of strength may be due to faulty construction, but as a rule it is due to some acquired weakness, unknown simply because unlooked for. Weakness results from unequal heating, which produces unequal expansion, from corrosion, improper setting, scale, low water and want of circulation. It may not always be possible to avoid unequal heating, as for example, in getting up steam man: boilers will be hotter in some parts than in others, but scale can be prevented by "boiler compounds," and low water by a little care. In some types of boilers no provision is made for water circulation, and unequal heating is bound to occur. A thorough inspection from time to time will inform the engineer if his boiler is weakened by it, but the best plan is to use some other type. To sum up, the engineer must understand and act upon the motto, "eternal vigilance is the price of safety."—Safety-Valve.

THE NEWS.

CANADA.

A grain elevator is to be erected at Wyoming, Ont.

—Mr. T. E. Argue will erect a grain elevator at Carp, Ont.

A new roller flour mill is being erected at Ruther Glen, N. B.

—At St. Henri Mission, N. W. T., a new flour mill is being erected.

—The roller flour mill at Ashburnham, Ont., will shortly resume operations.

—The Assiniboia roller mills at Moosomin, N. W. T., are being offered for sale.

—Messrs. Dow & Curry have completed their new oatmeal mill at Pilot Mound, Man.

—The business of the Macfarlane Milling Co., Magog, Que., has been purchased by Messrs. Dastous & Co.

—Mr. D. C. Fleming, flour and feed dealer, Shoal Lake, Man., has removed to Binacarth.

—The flour mill at Weston, Ont., was damaged by a recent flood to the extent of about \$3,000.

—The grist mill at East Toronto has been compelled to close down temporarily for lack of fuel.

—Mr. W. P. Niles is building a grain elevator at Wellington, Ont. The building will be fireproof.

—It is estimated that about 2,000,000 bushels of wheat is held by farmers in Manitoba and the North-West Territories.

—Mr. J. K. Blain's grist mill at Stirling Falls, Ont., was destroyed by fire recently. Loss, \$3,000. Partially insured.

—Mr. E. D. Tillman, of Tilsonburg, Ont., has received an order from Hanover, Germany, for a carload of his celebrated oatmeal.

—The Ogilvie Milling Company, of Winnipeg, has donated five tons of flour to the sufferers by the recent floods in British Columbia.

—Doherty's lumber, carding and grist mills at Campbellton, Ont., were burned about a fortnight ago. Loss, \$12,000. No insurance.

—Messrs. Moody & Son, of Orangeville, will operate a grist mill in Dundas, having taken over the old property formerly owned by the late John Wilson.

—Free water and exemption from taxes for two years will be offered Messrs. Cargill & Co. for the erection and operation of a 150-barrel flour mill in Vancouver.

—Bectouche N. B., rejoices in an establishment in which is combined a butter and cheese factory, carding mill, grist mill, wood turning and fruit canning establishment.

—A report is current that a Minneapolis and Duluth Syndicate will erect a large elevator at Owen Sound, and operate a large line between the head of Lake Superior and that place.

—Mr. James Ireland has disposed of his oatmeal mill at Wroaxeter, Ont., to Messrs. Robert Black and John Barnard, who will carry on the business under the style of Black & Barnard.

—The flour mill at Marquette, Man., which was recently destroyed by a boiler explosion, has been rebuilt. New machinery is being added, and operations will be begun at an early date.

—Messrs. Joyner & Elkington, of the Qu'Appelle Valley, Assa., flour mills, have recently put in a new steam plant and increased their capacity to 120 barrels per day. They contemplate building an elevator.

—Messrs. Bennett & Constable, Spencerville, Ont., are placing in their flour mill a new 65 horse-power Corliss engine and a 70 horse-power boiler, built by Cowan & Co., Galt, Ont., as an auxiliary to their water power.

—James A. Band, a miller in the employ of the Norris estate, at Thorold, Ont., and who, with his father, had charge of the mill for some time, was found dead in the mill office a few days ago. It is supposed he committed suicide.

—The flouring mills at Smithville, Ont., have been leased by Messrs. Heslop Bros., who will control them in addition to their roller mills at Fort Robinson and Wellandport. Mr. R. T. Heslop will manage the mill at the former place.

—Messrs. Ross & Muir are erecting a grist mill at Mattawa, Ont. It is also their intention to install an electric light plant in their mill if satisfactory arrangements can be made for lighting the town. According to their agreement with the town, the mill is to be not less than 50 barrels capacity per day, and is to be completed by the 16th of October next.

—Application will be made to Parliament for the incorporation of the Virden Milling Co. The incorporators are: J. F. Frame, W. J. Kennedy, J. J. Caulfield, W. J. Wilcox, H.

Catcott, Simpson, J. Saunders and Robert Trumbell, all of Virden, Man. The object is to build and operate a flour mill and grain elevator at that place. The capital stock will be \$12,500, divided into 500 shares of \$25 each.

A recent issue of the Winnipeg Commercial says: Hon. Mr. Bowell has been advised that two British millers, Messrs. Wilson Marriage, of Colechester, and Wm. Neave, of Fording Bridge, Hampshire, England, are coming to Canada this summer for the purpose of seeing the methods of cultivation adopted by the farmers, and also investigating into the system of storing and forwarding wheat and the way in which business generally is conducted. They have formed a favorable opinion of the value of Manitoba wheat for milling purposes, and wish to make arrangements if possible by which they can rely upon a regular and direct supply.

GENERAL.

The quantity of wheat in Chicago a fortnight ago was estimated at 19,205,000 bushels.

A new disease, a white microbe, has attacked the wheat crop in the districts of Vendee, Brittany and Anjou, France, and is inflicting great damage upon the growing grain.

A REVOLUTION AVERTED.

THERE was quiet in the mill. The hum of industry had gone out for the night and the darkness, like a hat, was felt. But anon a still, small voice came from the coal pile and it was heard to say to the machinery: "You fellows have been making so much noise all day that I couldn't get in a word edgewise, but I want to tell you now that it's a burning shame for me to be called upon to supply the mill with heat and power, and then get all used up, when all you have to do is to lie still and trust to me to start you moving. I think you fellows ought to chip in and do something to make my life easier. It's all very well for you to work me to death and then say, 'peace to his ashes,' but the trouble is that I'm dying all the time, and there'll be so many ashes after awhile that the mill's graveyard won't be big enough to hold them, and part of my remains will be brought in here and choke you fellows up, so I think in self-defence you should let up a little on my energy and give me a chance to recuperate."

"I'm rather dizzy from turning around so much," said the engine band wheel in reply, as he slipped his belt, but I would like to state to our friend coal that we all do just as much work as he," though in a different way, and that he has no especial cause for complaint. My work, for instance, is most monotonous, yet you are all thankful to me for keeping you in balance or should be and if I were to stop all would lose their jobs. Now, however, I would like to hear from all those present whether they have any kicks to make. Let each one take his turn."

Whereupon, the crank remarked that he was always supposed to be off his base and as his opinions would be disregarded anyway he saw no use in expressing them. The pulleys said that, like the wheel, they sometimes got dizzy but had not especial complaint unless it was that the oil did not always make it smooth for them, and the shafting said that they always stood in with the pulley, and were bound to go with them unless the belts got tight and couldn't work, which remark was resented by the belts in a body, who said they didn't have any loose ways and didn't propose to take slack from anyone. Here the whistle got in his voice and said he'd be blown if he'd stand so much pressure from the steam any longer, and the steam replied that he wasn't feeling very strong just then, but that in the morning he'd attend to the whistle and if the latter didn't like it he'd give him the worst blowing up he ever had, even if he exhausted himself in the effort. Whereupon, the governor endeavored to control the angry passions that had been aroused and the lubricators attempted to pour oil on troubled water: of discussion, but lo! their efforts were unavailing and even the piston rod made a blow at the cylinder, and the shafting got in a row, so that instead of considering their own grievances, if any they had, they turned against each other and would no doubt have wrecked the mill had not the watchman awakened and bade them all be still and not disturb his sleep. Whereupon, they obeyed, for they felt the power of man—even a nightwatchman who sleeps.

Moral: A row in the family does not bring to the door or help any difficulty with the neighbors.

SIBERIAN WHEAT.

THE world Siberia, says The London (Eng.) Miller, awakens no pleasant associations in the European mind. It at once conjures up a vision of a long train of prisoners wending their dolorous way to a cross bare plains under the lash of brutal Cossaks. Yet in some respects this popular estimate is altogether wrong. Geographers have long been aware that Siberia is a country of very varied resources. This is what that eminent explorer, Baron Nordenskiold, has to say on the subject.

"Siberia surpasses the North American continent as to the extent of cultivable soil. The Siberian forests are the largest in the world. Its mineral resources are immense, its climate, except the Tundra and the northernmost forest region, healthy, and as favorable for the culture of cereals as any part of Europe." The difficulty has hitherto been to approach this region of natural wealth, as plainly the tedious land journey to Siberia through Moscow is, in the absence of railways, of no use to the British merchant. An answer to this problem seems to have been found by the enterprise and energy of Captain Wiggins, a bold Yorkshireman, who after sixteen years of practical voyaging, has shown that a comparatively easy and expeditious communication between this country and the heart of Siberia is in existence. It would appear that a vessel leaving the port of London at the end of July may confidently reckon on discharging a cargo at Karoui, a port nearly 200 miles up the mouth of the Yenisei, the great waterway of Siberia, and on being back in London without any hindrance from ice floes in the Arctic sea (which it will necessarily traverse) by the close of September. Captain Wiggins has made since 1874 fifteen voyages into these parts, but only once has he encountered any ice in his course, and that was when his departure had been delayed too long. The river Yenisei, which flows into the Arctic sea, is navigable for about 2,000 miles, that is, nearly as far as the frontiers of China, and is provided with many affluents, several of which are also navigable. Moreover, another great river of Siberia, the Obi, which empties itself not far from the mouth of the Yenisei, is likewise believed to be navigable for a considerable distance. With but one transhipment goods can, it is affirmed, be cheaply and quickly forwarded from England to the heart of Central Siberia in something like six weeks. There should be every prospect of a sensible current of trade setting in between the two lands, and if such should be the case, there would be every likelihood of our drawing some supplies of wheat from this great and fertile region. The wheat of Siberia has a good name in Russia, and some of it is said to have a likeness to the wheat of the Canadian Northwest. Before very long our millers may be in a position to judge samples of Siberian wheat with their own eyes.

SINGLE-VALVE ENGINES.

NOT very long ago it was almost universally conceded, says the American Machinist, that nothing in the way of an early cut-off in the cylinder of a stationary steam engine could be accomplished by a single-valve with, at the same time, a reasonably economical steam distribution. This belief prevailed long after the use of the link motion on locomotives, where the steam is so well handled by the operation of the link and single valve as to have kept other means for the most part out of the field. The practice, after it was found that some lap could be added to a slide valve, soon came to the point of making it such as it would cut off the steam at an average for both ends of the cylinder of three quarters stroke. This was thought to be about the limit to expansion possible with a single valve. Now single-valve automatic engines are made to cut off at as early a point in the stroke as is desirable many of them being so constructed that the following with steam for three quarters stroke is not possible, and the steam distribution is very good indeed: not equal to that of four-valve engines, but not so much behind in point of economy as would appear probable. The multiplied demand for small engines no doubt have a good deal to do with the perfecting of the governing devices, and with determining that it was not necessary that they be full-stroke machines; and the perfecting of the mechanism has had as much to do with increasing the demand for them.

SHAFTING

I NEED offer no apology for bringing a subject of this kind before an Association of Stationary Engineers, for wherever you find a stationary engine you will also find more or less shafting, and if any other excuse were required it will be found in the fact that questions on shafting are quite frequently found in the Question Box at our meetings.

It may be however, that there are some present who think that as engineers they are not expected to have anything to do with shafting. They may argue something like this: "Our employers expect too much from us, they look for us to wheel in coal, fire two or three boilers, wheel out the ashes, attend our engines and a score of other jobs, as well as find tools for the whole establishment, and it would be just as well not to know anything about shafting, or we would be expected to attend to that too." In answer to such I would say, that it is not often that a man loses his situation by being too well posted, and in this world of changes one never knows when he may be called on to make use of the knowledge he possesses.

It is of the greatest importance that all shafting should be properly proportioned and correctly put up, as it not uncommonly happens that great loss of power and much annoyance results from carelessness or ignorance, and a plant that is otherwise of the best, rendered unsatisfactory.

The first question the engineer has to decide is what size or strength of shaft he requires to do a certain amount of work, and in doing so he must bear in mind that a small increase in diameter will give a large increase in strength. It is not an uncommon thing to hear a man say that such a size ought to do the work, but to be on the safe side will put in a size larger, not knowing that he is adding a much larger factor of safety than he has any idea of. The strength of a shaft varies as the cube of its diameter varies. Let us assume that a 1" shaft will safely drive at a given speed four horse-power, a 2" shaft will drive as much more as the cube of its diameter in excess of the cube 1. The cube of 1" is 1 x 1 x 1 = 1. The cube of 2" is 2 x 2 x 2 = 8. The cube of 3 is 3 x 3 x 3 = 27 and the cube of 4 is 4 x 4 x 4 = 64.

Now we assume that the 1" shaft drives 4 H. P., the 2" shaft drives as much more as the cube of its diameter is in excess of the cube 1, the cube of 2 is 8, therefore its power compared with the 1" shaft driving 4 H. P., is 2 x 2 x 2 = 8 x 4 = 32 H. P., and computing the 3" shaft with the 1", the cube of 3" is 27 and the power of the 1" is 4 H. P. 4 x 27 = 108 H. P. It must be borne in mind that these figures are comparative and are given to show the rapid increase of strength in a small increase of size, for if we were to use a 3" shaft instead of a 2" we would have 108 H. P. instead of 32 H. P.

Another fact we must not lose sight of, is that the power a shaft will drive is in direct proportion to its speed. If a shaft drives 4 H. P. at 100 revolutions per minute, at 200 revolutions it will drive 8, and at 300 it will drive 12 H. P. The higher the speed of the shaft the smaller the diameter of the shaft to drive a given H. P. Then there is another important consideration in selecting a proper size for a shaft, as they are inclined to bend and also to twist we must take into account the weight of the pulleys and the distance they are from the bearings, and whether the strain of the belts is down or the reverse. The bending of a shaft as well as the torsion contributes towards its liability to break, but the bending is the most likely to cause it. The bending also causes a considerable loss in power as well as the liability of belts running to one side of the pulleys. It follows therefore a shaft loaded with pulleys must have a greater number of bearings and the pulleys placed as near the bearings as possible.

To put up a larger line of shafting than is necessary, is objectionable for two reasons, 1st it costs more to put it up, and 2nd it costs more to run it after it is up. The extra weight of the long shaft as well as the larger circumference which has to move through a greater distance will add materially to the friction. There is one other fact I would notice before leaving this part of the subject, and that is, that the second and third lines may be smaller than the main driver. The reason of this of course, for the first line has not only its own machinery to drive but also the second and third lines with the machinery driven from them.

To make this clear, I have prepared a diagram which I believe will make it plain to everyone. We will call it a mill or factory, and assume that the machinery on it requires 100 H. P. to drive. The machinery on the first floor requires 45 H. P. that on the second, 30 H. P. and on the third, 25 H. P. Now the shaft A and B are practically one shaft, being coupled together by the gear, so are C and D and E and F, but while practically one shaft A has to transmit 100 H. P., while B only transmits 45 H. P., therefore B may be smaller than A, B having absorbed 45 H. P., it follows that C has only to transmit 55 H. P., therefore C may be smaller than A. The machinery on the first and second floors has now absorbed 75 H. P., leaving only 25 H. P. for the third floor, therefore the shaft E and F may be smaller than C.

The same argument will hold good with the shafts B, D, and F. If the machinery which they drive was equally distributed from end to end, then the ends furthest from the motive power might be smaller because they would have less power to transmit, but in practice the disadvantage would be greater than any gain that would be derived from so doing.

I will now give one or two rules to determine the size required to drive a given H. P.

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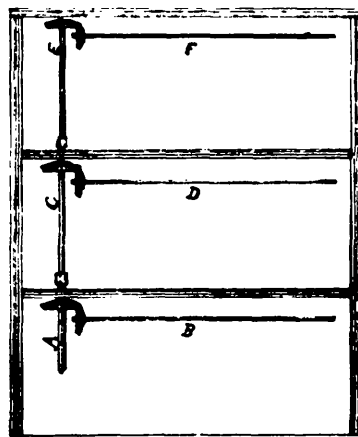
To find the power a shaft will transmit, cube the diameter and multiply by the number of revolutions per minute, and by two, if it is the first line from the engine, and by three if it is the second, and divide by 100.

The crank shaft being the first or prime mover what power will a 2" shaft transmit as a second mover running at 300 revolutions per minute? $2 \times 2 \times 2 = 8 \times 300 \times 2 = 4,800 \div 100 = 48$ H. P. If steel add 40 per cent. If this shaft was to be used as a second line then it would be $2 \times 2 \times 2 = 8 \times 300 \times 3 = 7,200 \div 100 = 72$ H. P. Where the power required is known and number of revolutions is given and the size of shaft is wanted, proceed as follows: What diameter of shaft is required as a prime mover to transmit 75 H. P. at 175 revolutions? $75 \times 100 \div 7500 = 175 \div 42.80 = 2 \text{ in } 43$. The cube root of 21.43 is 2.75. (2.7776) the diameter required.

The same problem with the shaft used as a second line, would be $75 \times 100 \div 7500 = 175 \div 42.80 = 3 \text{ in } 28$. The cube root of 14.28 is 2.42 (2.4261) the diameter required.

Having got the size we want, the next thing is to get it put up, and it is right here where many failures and mistakes are made. Here is perhaps no part of the plan which should be more carefully looked after than the proper laying of the shafting because it is a never-ending source of annoyance if out of line. The rules governing the putting up of shafting are few and very simple.

1st. Be sure that your shaft is exactly at right angles with the engine pulley, and, see that it is dead level, and 3rd, be sure that it is as straight as a line can make it. The same rules should



be observed with intermediate and counter shafts, they must be parallel with main shaft. All shafts carrying pulleys must be level, a shaft driven with gear from a horizontal shaft must be at right angles with it but may be run at any angle from the horizontal, and the same if driven from a perpendicular—in this case the driven shaft must be level, but may be run in any direction. If the building is likely to settle the adjustable hanger should be used, but where there is no danger of settling, stationary bearings should be used, especially for dynamos and all heavy machinery which ought to be a rigid as possible.

I do not think it advisable to give any rule for the distance at which bearings should be set, as circumstances vary in almost every case, but would state that for a 3" shaft the distance should never be more than 12 feet, and for a 2" shaft not more than 11 or 12 feet. These distances in both cases are for shafts without pulleys.

We have stated that second and third lines of shafting may be smaller than the first, but this applies only where they run at the same or at higher speed, and does not apply where the speed is reduced for the purpose of driving heavy and slow speed machinery or lifting heavy weights. Let us try to make it plain. Let us assume we have a weight of 33,000 lbs. to lift and an H. P. engine to lift it with, we can raise the weight one foot high in one minute, but if our weight is ten times as heavy, or 330,000 lbs., it is evident that to lift this with the same engine it can only be done by a sacrifice of time, or in other words a reduction of speed (bear in mind that to lift a weight greater than the motive power can only be done at a sacrifice of time). Now what are we going to do? Our weight is 330,000 lbs., and our engine is only 100 H. P. the power required to lift it. It is evident we must construct a system of reducing gear. We will assume that we require three reductions—the first reduction will be from the engine to the first shaft, and so on until we reach the third or last shaft which supports the weight. Now the nearer we get to the weight the stronger must the shafting be, and the same with the gear, because as each shaft is reduced in speed it is capable of transmitting less power, and therefore must be increased in size.

Precisely the same principle is clearly shown in the use of the lever—a man can lift a heavy weight with a lever, but it is always at a sacrifice of time or speed. It is also well understood that the end of the lever on which the man rests may be very much smaller than the end which rests on the fulcrum, because on it rests the whole weight.

LET NOTHING BE WASTED.

THE age in which we live is characterized by its utilization of what has been known as waste material. Debris and refuse are being reclaimed from their supposed worthlessness, while wealth and comfort, says the Age of Steel, are now deduced from what has hitherto been without commercial value or pul service. With epoch-making discoveries we are tolerably familiar, their magnitude giving them dramatic interest, and their coincidence with our own time table of life adding not a little to our concert and boasting. While our progress, however, is a fact, and our bigheadedness a misfortune, the smaller economies of the age are of the unobserved, yet the veritable potentials of our prosperity. Everything has specific value, be it great or small, the difference being in gradation but not in essentials. The pebble is but the microcosm of the rock, and the molehill of the mountain, the difference being one of magnitude but not of substance. In the matter of our industrial waste or refuse this law has generally been neglected till science exposed the folly of waste and the stress of industrial competition compelled its utilization. Necessity has always been the mother of economies, and in this instance when the margins of profits were attenuating into consumptive decimals, applied science came to the rescue and gave commercial value to what had hitherto been a nuisance. Examples are numerous, and by way of emphasis we collate a few of the most conspicuous.

For many years the slag from iron furnaces was but useless refuse. It was dumped on waste land, in convenient ravines, and in unsightly masses wherever possible. It is now manufactured into asbestos, cement, glassware, pottery, fire-brick, fertilizers, and into the paint which now embellishes the Pullman palace car. Sawdust, so long the nuisance of saw mills, once dumped into swamps and pits, can now be made into sheeting for buildings, and when mixed with paper pulp supplies an excellent article. It is also serviceable in making aniline dyes, wood alcohol and certain acids. Cotton seed, once left to rot at the cotton gin and used for fuel, now furnishes the oil, lint, food for cattle and fertilizers; the product of the oil industry amounting to \$16,000,000 per annum, with the sale of lint and hulls realizing over \$1,500,000 each in the same period. The refuse of silk factories or warehouses, once a nauseating and uncleanly compound of leaves, imperfect cocoons and dead worms is now utilized, being sorted by machinery, and the short threads incorporated in valuable commercial fabrics. Coal tar was once but an olfactory nuisance, and sometimes got rid of by burning it under gas retorts, now aniline dyes are obtained from the benzole it contains. Other by-products of coal, such as sulphate of ammonia, etc., are now sources of industry and wealth. The refuse of woolen mills, once a sanitary sinner in the pollution of creeks and rivers has come in the range of chemical science, while in many large chemical works the saving of gases, since a menace to public health, have by condensation been transferred into valuable commercial articles.

Other examples might be quoted, but the catalogue as so far given is ample evidence of the fact that these modern economies of waste play no insignificant part in the general make-up of our industrial products and prosperity.

POWER OF MILL STREAMS AND FLUMES.

THE following table shows the number of pounds of water that will pass through an orifice an inch square under various heads from one to ten feet; also the total pounds of work there are in those quantities of water, the net foot pounds per minute utilized by a wheel with a rating of 80 per cent., and the horse-power developed by the wheel:

Head in feet	Cubic feet per minute (actual)	Foot lbs. per minute (gross)	Net foot lbs. per min. (80 per cent. duty)	Horse-power
1	2.125	131.2437	105.0000	.0014290
2	8.5000	525.0000	420.0000	.0057143
3	15.8750	997.5000	798.0000	.0107143
4	23.2500	1470.0000	1176.0000	.0157143
5	30.6250	1942.5000	1554.0000	.0207143
6	38.0000	2415.0000	1932.0000	.0257143
7	45.3750	2887.5000	2310.0000	.0307143
8	52.7500	3360.0000	2688.0000	.0357143
9	60.1250	3832.5000	3066.0000	.0407143
10	67.5000	4305.0000	3444.0000	.0457143

FLOUR MILLING OBSERVATIONS.

By R. JAMES APPERATHY, in "TRADESMAN."

THERE seems to be a delusion in the minds of some millers, a great many, in fact, in the past, that coarse cloth makes strong flour. It has perhaps arisen from the fact that strong wheat or wheat that makes strong flour grinds coarsely and can be bolted fairly clear through comparatively coarse cloth. But unfortunately none of the strength of the flour is due to the coarseness of the cloth; it is inherent in the wheat.

If wheat does not possess strength, the use of cloth, neither coarse nor fine, can add anything to it. Strong wheat will make strong flour no matter whether ground coarse or fine; but naturally strong wheat makes coarse flour, and in fact it is a somewhat difficult matter to make very fine flour out of it. Bolting flour through coarse cloth does not therefore add to the strength of it, and if it be soft flour is very liable to injure it by leaving it specky. In fact, it is almost sure to do it.

Wheat that grinds low, soft and fine must be bolted on fine or comparatively fine cloth, in order to insure good work. If the cloth is too coarse the flour will be not only specky, but off in color, both of which will condemn it when submitted to the practised eye of the inspector or the customary purchaser of flour.

It will therefore be seen that coarse cloth does not add to the strength, but does detract from color and condition, and hence coarse cloth should not be used except for bolting flour that grinds coarse.

There is no advantage in using cloth too coarse for the material to be bolted; this we have pointed out in a very conclusive manner, and will now say that the mill should be clothed on the start to suit the kind of wheat to be milled and the nature of grinding to be done, and while there may be some after experimenting in order to get the full line of cloth just right, after it is right then it should be kept about in that way and the grinding done accordingly. When the cloth has been put in perfect time and tone then must the miller be governed by it, because if he grinds too high the cloth will not be able to take care of the entire product and some of it will be wasted in tailings and feed, and again, if he grinds too low and too fine the cloth will bolt too freely and be dark and specky.

Cloth can be used only for bolting and separating, and not for giving merit to flour that it does not possess naturally. All mills should be carefully clothed in accordance with the work required of the cloth, and then the cloth should be furnished for the kind of work it was designed to do by the clever manipulation of the miller, who should always understand exactly how to do it.

ROLL SURFACE FOR MIDDINGS.

Much has in the past been said and written about roll surfaces for doing certain kinds and amounts of work. But, as a rule, if there be any deficiency or drawbacks in surface it will be found on the smooth roll side. Corrugated surfaces can be crowded and still do good work, but smooth surfaces cannot be. We do not advise crowding either, because it ought not to be done, but it is asserted unhesitatingly that smooth surfaces cannot be crowded.

If the first pair of smooth rolls has too much to do some will pass through unfinished, and tail over the various processes of bolting and separating and find its way to the next pair of rolls, which, having already been furnished with sufficient feed, find themselves over-worked and unable to reduce all the feed that is furnished and are obliged to let a portion of it escape underground, which in time finds its way to the next pair, and so on to the end, when at last the underground product finds its way to the feed pile and is thus lost.

Each pair of rolls or series of pairs allotted to a certain kind of work should have ample surface to do their portion of the work well without missing any of it. If that is looked carefully after there will be no waste of unground material at the tail end, but all will be well finished.

As an idea as to about what is required, we will say that never less than two pairs of smooth rolls should follow one pair of corrugated in what is called the one-break system, and if high grinding is practised there should be three pairs of smooth rolls to take care of three divisions of the middlings stock. The length of the smooth rolls will depend on the relative quantity that each have to handle.

When making two breaks on wheat, using for the purpose two pairs of rolls, then there must be four pairs on the middlings stock in order to make a low finish. Now it must be remembered that in neither one of the systems here mentioned is it the intention to make middlings. Middlings in both cases are a result not of design, but of necessity, because however much we may desire to make no middling we cannot avoid so doing, and we use the smooth rolls as a necessity. If, then, we have to provide so much smooth roll surface in cases where middling making is not the intention, it certainly requires more in proportion in systems where middling making is the intention; and such is really the fact. All mills having three, four and more breaks on the wheat should be supplied with smooth roll surface in still more ample proportions.

The rule by which to be guided in all cases is to have the tail end of the mill a thorough finish, and if not so at the start smooth rolls should be added until it is so.

MILL OWNERS MUST KEEP INFORMED

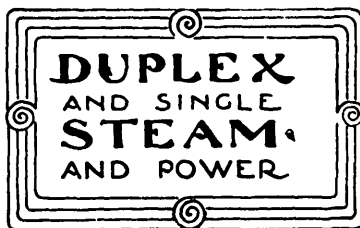
We cannot advise mill owners to unhesitatingly take hold of every new device, process or system that may be offered them with glowing promises of great reward, because "all is not gold that glitters," nor is every new machine, device or process all, as a rule, that is claimed for it by the over zealous owners or vendors.

As a rule, the patentees and vendors of new devices are honest enough; they have faith in their creations and believe them to be all they represent them, but their judgment is necessarily not infallible; it must be more or less biased and cannot therefore be accepted by millers as conclusive. Mill owners and millers must study the nature and principle upon which all new designs for the flour mill are based and if sound in these respects then a more thorough investigation will be in order, and all new appliances of whatever kind that have the appearance of merit on natural lines should be fairly investigated by every mill owner, with the view of keeping his mill squarely up with the times. The most modern mill must be continually undergoing changes, being evolutionized, as it were, in order to keep pace with the rapid march of progress.

Although there may be some men engaged in the field of new discoveries in flour making appliances who have no thought other than to make money of the millers without fair compensation, it is nevertheless true that many of the best men in the business are also engaged in the honest work of perfecting flour mill machinery and methods, and these men should be encouraged by the millers, such of them, at least, as need improvements in their mills, and most of them still do. Very recently must the mill have been built that cannot be improved upon. Therefore when the old and reliable houses and men that have been long in the business and well known to the trade, evolve anything for the mill that appears to be new and intended for the benefit of the flour making interest that promises easily recognized natural features, examine its merits at once and if found to be what is claimed for it accept it at once and put it to work if there is need for it in the mill. Having no room should cut no figure; if needful make room. A flour mill is like an old stage coach in which there is always room for one more, or for something else if it be needed.

The simple fact of the case is that no man can as yet have built for him the most perfect modern mill that can be designed and expect it to be run forever without change; the art is not perfect enough yet and may never be. All must watch for improvements that are improvements and benefit by them in order to hold their trade intact, otherwise, other more progressive men will steal it away from them.

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DOUGHING FLOUR.

At least once a day every miller should make a critical examination of his flour to see that it is running even, and if there is much variation in stock it should be examined often than once a day.

The majority of millers depend on examination of the dry flour under the slick, and it may be that in most cases that will do, as exact evenness and nicety may not be required.

It will be found much better, though, for all millers to make a practice of doughing their flour at least once a day, for in that way only can the color be brought out in full, and in no other way can the strength be so well tested as by doughing, or baking, which is a still more infallible test of strength.

There are a great many varieties of wheat of which flour is made; some of them make dark colored flour white others very white, and sometimes the dark colored flour makes white bread, while the whiter flour sometimes makes dark bread. If the dark bread is common with the white flour, it is due to chemical combination of that kind in the wheat, but it not common it may be owing to chemical changes that take place during the process of fermentation and baking. Careless, indifferent or ignorant dome bakers often bring the very best of flour into disrepute by baking it. For that reason the baking test should not be resorted to except by skillful bakers, while the doughing and drying test is a natural operation that brings out nothing but natural results.

It requires some skill and alertness to properly dough. In the first place the hands should be washed perfectly clean, with the left hand grasp a small handful of flour, and with the hand held about half open make a cavity in the flour with the finger of the right hand, and into the cavity drop a small tablespoonful of water. Then with a small mixing stick prepared for the purpose mix flour and water well without slopping it over. A good flour dougher allows no slopping. After it has been mixed to a proper consistency with the stick, grasp it quickly in the finger of the right hand and begin with the finger of both hands to knead it rapidly. If the proper consistency was obtained and the fingers kept in quick motion there will be no sticking to the fingers, but if not there will at once be a tendency to stick to the fingers, and if so the dough should be rolled in the flour a time or two, or until proper

consistency is reached. The dough must then be kneaded until it becomes very elastic so that it can be drawn out in very thin sheets. It can then be allowed to dry and the color will be brought out to perfection and the strength well tested. If the dough is at first made too stiff try it over again.



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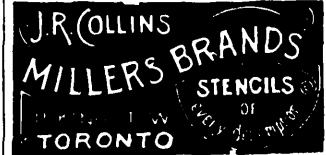
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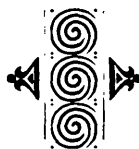
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