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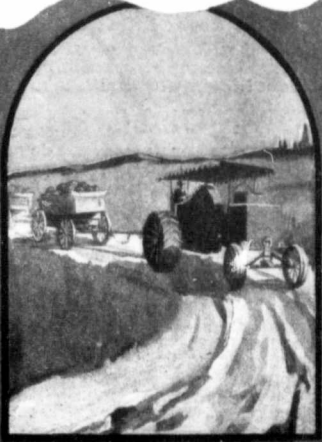
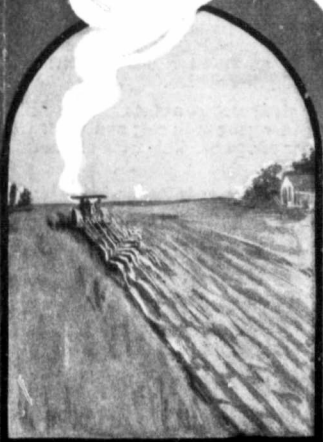
THE
CANADIAN THRESHERMAN
AND FARMER
CANADA'S FARM MACHINERY MAGAZINE

WINNIPEG

CANADA



AUGUST - 1910



E.H. Heath COMPANY Publishers

Success

JOHN DEERE ENGINE GANG



As it was pulled at the Winnipeg Motor Contest by a Rumely 35 Horse Power Steam Engine. (Bronze medal winner class C steam engines.)

MORE JOHN DEERE ENGINE GANGS SOLD IN WESTERN CANADA THAN ANY COMPETITIVE MAKE THERE ARE REASONS

EASY TO HANDLE. The bottoms on the John Deere Engine Gangs are arranged in pairs which give great strength and make the plows run steady. This also permits of firmly bracing the beams and makes one plow steady the other. It is often necessary in actual field work to change the depth of plowing. This can be accomplished much more easily with the John Deere Engine Gang than with any other. The arrangement of the plows in pairs also permits of much better finishing at the ends without stopping the engine.

WONT CLOG. The curved beams on the John Deere Engine Gang give great clearance thus permitting them to go through straw, trash, weeds, and scrub, where other gangs will clog and cause trouble. With the John Deere Engine Gang you do not need an extra man to keep the plows clear of trash. This wide clearance also permits of plowing at greater depth.

SCREW CLEVIS. In addition to the regular clevis adjustment each beam is fitted with a screw clevis when adjustment often needed, it not being necessary to stop the engine to do this. A turn or two with an ordinary wrench while the outfit is moving throws the beam point of the plow needing adjustment up or down giving it the best position to get the required results. This saves time and is a most important feature.

JOHN DEERE ENGINE GANGS are made in 4, 6, 8, 10, and 12 Bottoms

You want to see the Best Engine Gang—Look for a John Deere

WRITE US FOR BEAUTIFULLY ILLUSTRATED FREE BOOKLET

JOHN DEERE PLOW CO. LTD.

WINNIPEG REGINA CALGARY EDMONTON SASKATOON

JOHN DEERE ENGINE GANG



As it was pulled at the Winnipeg Motor Contest by a Gas Traction 30 Horse Power Gasoline Engine. (Gold Medal winner class C Internal Combustion Engine.) Photo taken while outfit was in motion. Note that furrow is just turning.

MORE JOHN DEERE ENGINE GANGS SOLD IN WESTERN CANADA THAN ANY COMPETITIVE MAKE THERE ARE REASONS

WORKS WITH COULTERS. The plows on the John Deere Engine Gang are so assembled as to permit the use of rolling coulters, with the same adjustment as is employed on a regular sulky or two bottom gang plow. This coulters arrangement is a big advantage in breaking sod as they will cut off slices of sod easily thus reducing the draft and also cutting the partially rotted turf into sections, thus avoiding chokir g.

RIGID CONSTRUCTION AND PERFECT DESIGN. The frame on the John Deere Engine Gang has a bridge-like steel construction. It is very light in proportion to its strength and is devoid of unnecessary and cumbersome castings. It is so designed that you can hitch a John Deere Engine Gang to any style of tractor close up, and still maintain the line of draft.

Wide faced, easy running wheels carry the frame, so that no power is consumed in dragging dead weight, it being all practically available for plowing.

STANDARD SIZES. 4 or 6 plows on one frame. 6 or 8 plows on one frame. 10 or 12 plows on one frame. Extension can be furnished for the 12 bottom frame, allowing two more plows to be used, making 14.

We carry a stock of Engine Gangs at Winnipeg and at all of our Branch Houses

You want to use the Best Engine Gang—Get a John Deere

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JOHN DEERE PLOW CO. LTD.

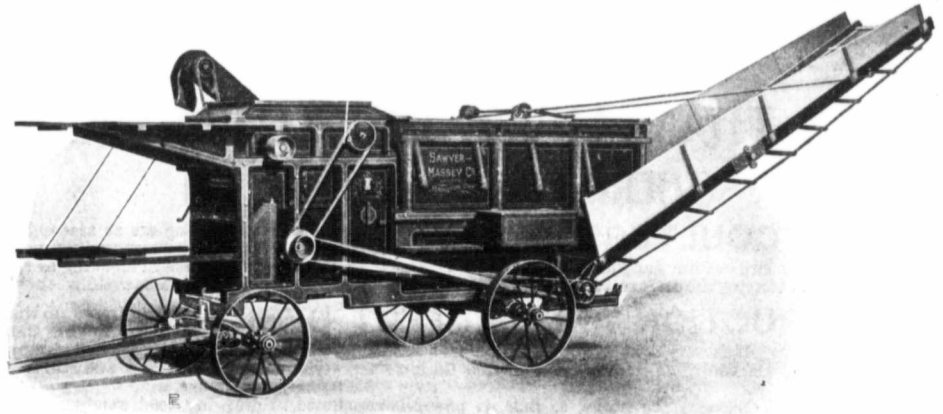
WINNIPEG REGINA CALGARY EDMONTON SASKATOON

A Full Line of Our Goods is Being Exhibited at all the Leading Summer Fairs



The "Great West" Separator [BUILT IN SIX SIZES] 25 x 42, 29 x 50, 32 x 56, 36 x 56, 36 x 60, 40 x 64

Mr. Thresherman: It is now up to you whether you will possess a Separator that is capable of taking care of every bushel of grain. The farmers want such a Separator and realize that the "GREAT WEST" is this identical machine. Send a card to Sawyer-Massey Co., Limited, Winnipeg, and receive our handsome new Catalogue. It will give you the very details you are looking for. It will post you and repay you. The above mentioned sizes, together with the little "ECLIPSE" shown below, will cover the requirement of the North West farmer. The demand for Sawyer-Massey Separators is strong. The harvest is at hand. Do not defer placing your order for a "GREAT WEST," and thus save time, grain and money.



The Little "Eclipse" Separator—30" Cylinder, 36" Body

For the individual Farmer or for Syndicates in the outlying districts where it is difficult to get a Threshing outfit when needed, this little "ECLIPSE" Separator is a treasure. It threshes in first-class style 500 to 700 bushels per day, according to the power used. It can be operated by sweep or tread powers, which are illustrated in our 1910 Catalogue. It is a suitable size for small Gasoline Engines. We can furnish it equipped with Bagger or Single Leg. As a Flax Thresher it is unsurpassed. It is the best small Thresher on the market. Free Catalogue for the asking.

The S.-M. Engines conform to the most exacting Canadian Inspection Regulations

Sawyer Massey Co. Limited.

The Largest Engine and Thresher Manufactory in Canada.

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WINNIPEG

A MAGAZINE
FOR

THE FARM
AND HOME



THE CANADIAN THRESHERMAN AND FARMER

Vol. XV.

WINNIPEG, CANADA, AUGUST, 1910.

No. 8.

The 1910 Winnipeg Motor Contest

Winnipeg is undeniably the home of the motor contest in so far as the New World is concerned. For the idea we must acknowledge credit to England just as we must give her credit for the first real steam engine designed for agricultural purposes. It was an Englishman who brought the motor contest idea to this country although it is assuming proportions so big that in so far as publicity and world-wide interest is concerned, it has eclipsed the tests of agricultural motors now held in the Mother country.

This is probably due in no small degree to the fact that Western Canadian agricultural conditions demand power machinery. Our acres are so broad and labor is so scarce that mechanical power on the farm is a most vital question with the farmer. We are essentially a

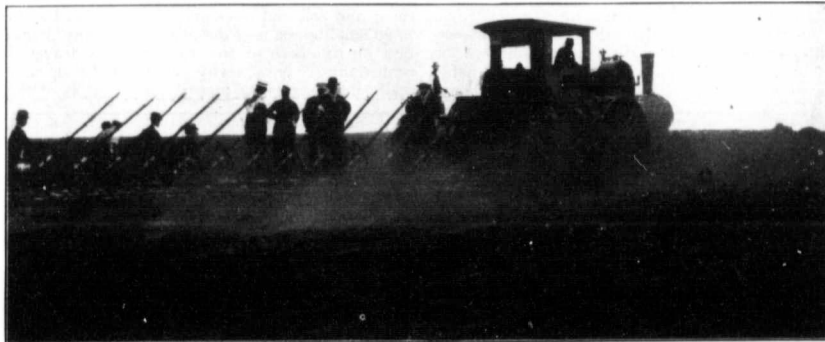
grain raising country with a comparatively short growing season, consequently we must plow, seed and harvest quickly and in a quantity that is measurably great. The "peak load" of the Western Canadian farmer's work is a big one—one that is beyond the endurance of horse flesh to carry. With wheat at from 80 cents to \$1.00 per bushels at the elevator and with wheat as the principal crop profit is measured largely by how many acres the farmer can cultivate and this in turn is gauged by the available power on the farm.

The above may serve to explain why a motor contest is of such keen and vital interest to

the average Western Canadian farmer. It may also serve to explain why a great many manufacturers of gas and steam tractors are anxious and willing to bring their machines to Western Canada and put them to a competitive test. They realize that no where is there such a growing demand for good reliable and cheap farm power as there is in that section of country between Winnipeg and the Rockies and north of the 49th parallel.

its own peculiar conditions to contend with and it is an impossibility to so shape a set of motor contest rules that they will apply to all. The guiding star, as it were, in a motor contest is to so shape the rules and regulations that they will show up the number of horse-power hours of work of each engine with the amount of fuel and water consumed. In other words, it is the amount of work done in a given time on a certain amount of fuel and water that determines the work-

winner is the best for him. One engine may be extravagant on coal but to a particular farmer coal may not be such an important item. The same thing is true to a certain extent in the case of the water consumed. One engine may develop more brake horse power in proportion to its draw bar horse power than the other yet in the case of the farmer his requirements as regards the ratio between brake and drawbar horse power may not be the same as those which govern the performance of an engine in a motor contest. Then says the farmer, "Of what value is a motor contest to me? Why all this fuss and friction in order to determine the capabilities of an engine under only one set of conditions." The real fact is this: That while it is true that only one set of conditions is



Case 32 H.P. Steam Tractor Pulling a 12-Bottom 14-Inch Cockshutt Engine Gang.

There is a prevailing idea that a motor contest is designed primarily to determine which motors are to be labelled as "best." This is, however, a wrong idea. That set of judges is yet unborn who can make a test so exhaustive as to be able to brand the winners in the different classes as absolutely the "best" engines. Certain rules and conditions are laid down for the various engines to follow and in so far as it is possible, these rules and conditions are designed so as to bring out the strong and weak points of the various machines with reference to the requirements of a farm motor. Every farm, however, or at least every community has

ing of an engine. Certain other conditions enter in but they are of minor importance when compared with the economy of fuel and water. It is at this point that motor contest figures are liable to become confusing when considered by the average purchaser of a tractor. We will take for example two steam engines entered in the same class. One wins a gold medal and, of course, the other doesn't. It is absolutely necessary for the prospective purchaser to consider both engines from all possible sides of the contest and apply each and every weak and strong point of both engines to his own local conditions before deciding that even a gold medal

worked out in so far as the final score on each engine is concerned nevertheless a careful study of the score sheet will reveal the fact that the elements of all conditions are brought out in so far as it is possible for a motor contest to bring them out and with the elemental facts regarding fuel and water consumption, horse power developed at the fly wheel and at the draw bar, etc., etc., at hand the average farmer should be able to draw the conclusions that will best fit his own conditions with a fair degree of accuracy.

From the above, don't in any way discount gold medal winners. They earned all they got but at the same time don't classify the

others in the "also ran" class and forget them. Each and every engine entered in the contest must be reckoned with in dealing with the farm power problem of the present and future. They will all be heard from and their records will be by no means such as to make their builder and designer blush.

A motor contest is not designed so much to bring out gold medal winners as it is to bring out the good and strong points of each engine entered. In fact, the real purpose of any such contest is to prove the suitability of any or all motors for general farm work. The first contest held in Winnipeg used weight as the basis of classification, the idea being that only the small motor was adapted for general farm use and that the large sized tractors, both steam and gasoline, were too heavy, too expensive, and too unwieldy for general farm work.

This hardly seemed fair as it shut out practically all of the steam tractors and a great many of the gas tractors as well. Three years ago it did not matter so much, as it really only barred one gas tractor at that time but a maximum weight of 14000 lbs. (the maximum weight used in the contest held in 1908) would bar the greater number of gas tractors built today, to say nothing about the steam tractors. This matter of classification is a serious one. In regulating a motor contest, it is almost an impossibility to so group the motors that there will be any equality in power or size. If horse power be taken as the basis of classification it permits of advantages to some engines and disadvantages to others. For example: In the contest just held at Winnipeg, the classes for internal combustion engines ranged

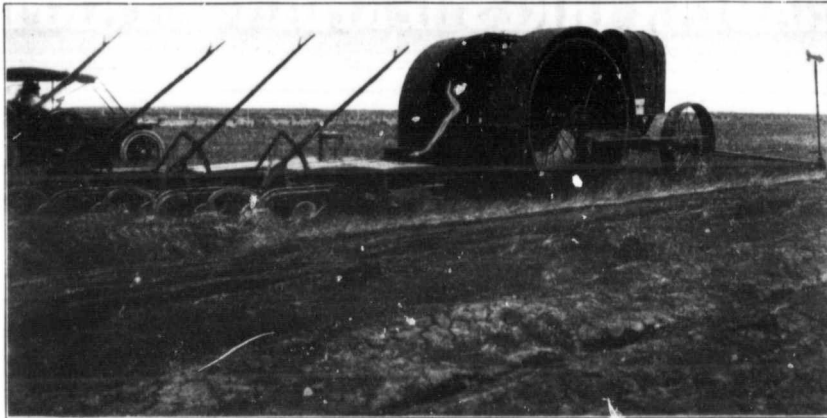
as follows: Class A, 20 brake horse power and under; Class B, 21 to 30 brake horse power; Class C, all engines over 30 brake horse power. We will suppose that an engine in Class A through an exceptional run on the brake developed 21 horse power. It is to all intents and purposes thrown into Class B with engines developing 28 or 30 horse power. The engines in this class are differently constructed and are designed to do a different class of work than engines developing 15 to 18 horse power under ordinary circumstances and the engine that crept up out of its real class is seriously handicapped by virtue of its shifted position and its test is scarcely fair. The same thing holds true with any of the other classes, either steam or gasoline. It has also happened with the horse power basis of classification that an engine

not possible to compel all steam engines to carry the same pressure on account of the differences that exist in boiler design and construction. One other way is left, and it is by no means satisfactory, which is to rate the engines after their various performances on the brake. This again is hardly fair owing to the large amount of jockeying that can be done. It is not said that this was done but any engineer knows that it can be

done and doubtless, so that the engines are placed in the classes by their makers that they are most likely to make the best showing in regardless of where they really belong. From the foregoing it will be seen that classification in a motor contest is an all-important thing and can and does give rise to no small amount of dissatisfaction on the part of the various contestants. Now, why is it really necessary in a motor con-

whose auspices the contest is held. Let each contestant classify his own engine so to speak and from the points given proclaim his own record. As the matter stands at present and as it has stood in the past, only three engines in any one class are awarded prizes and even though all of the others entered in that class may come very near the winners, they receive little or no recognition. Let there be no classes in any contests that may be held in the future but let each engine be judged wholly and solely on its merits and not on the merits or demerits of its competitors. It is true that it would require a more carefully worked out system of rules and a more detailed score sheet than any of those which have been used at previous contests but this would be a blessing rather than a crime. If any criticism is to be offered regarding the contests that have been held it is that the rules and regulations have not been definite enough neither have they been always adhered to throughout the test. There has been too much of a tendency to make rules to suit the occasion and while this sort of thing has resulted in little, if any, hardship to any manufacturer it nevertheless leaves far too many loopholes open.

It is of the utmost importance to every manufacturer of traction engines who enters a contest that he know a considerable time beforehand just what sort of a proposition he is up against, otherwise he does not come prepared to give his machine the best test of which it is capable. Indefiniteness and uncertainty even on the smallest detail also has a tendency to keep many manufacturers away who would get into the game, did they know just what it was. When the first contest was held in Winnipeg and even the second, it was rather an impossibility for the judges to so design a set of rules that they would cover everything but the entries of the past three years have so shown up types and designs that there should be no difficulty in this respect as regards any future contest. The rules



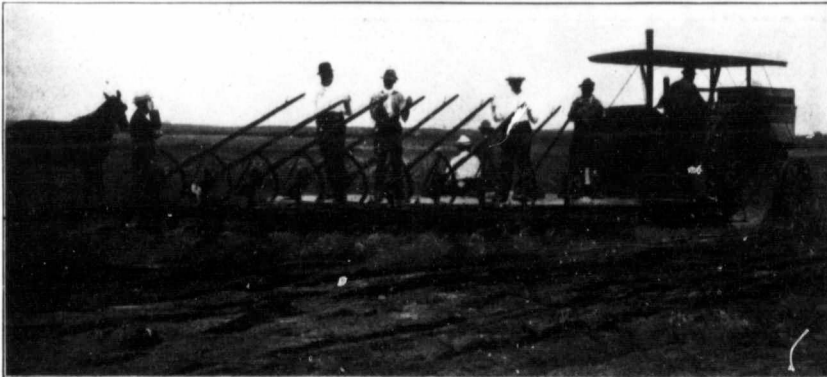
The Gas Traction 30 H.P. Gas Tractor Pulling an 8-Bottom 14-Inch John Deere Engine Gang.

from a lower class has crept up into an upper class and beaten out some of the engines in that class through more or less of a fluke. Such things convey a wrong impression to the farmer, the real user of the goods, and at the same time it results in little that is of value to the manufacturer.

Another thing with reference to this horse power method of classification. How are the judges to determine the real horse

power of an engine? Can they take the manufacturer's rating? Most decidedly no, for no two manufacturers have the same method of rating their engines. In the case of gas engines it is possible to make use of piston displacement as a basis for classification but in case of steam engines the matter of pressures is so irregular in the case of the different makes that it would not be at all practicable, and it is

test, to have any classification at all? As stated before the purpose of a motor contest is not to brand gold medal winners so much as it is to bring out the merits and demerits of the various engines entered. This being true why not enter each engine as an individual, put it through its various tests and give it its rating, the same being in the nature of a certificate from the body or organization under



The L.H.C. 45 HP Gas Tractor Pulling a 10-Bottom 14-Inch P.&O. Mogul Engine Gang.

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should be so complete and the points covered so thorough that both the farmer and the manufacturer could see clearly just what was required of the various engines and just what importance was attached to each and every portion of the test. We will take, for example, the constitution and by-laws of the smallest organization and it will be found that it covers several pages of type, going into minute detail regarding every

point that is liable to come up. Isn't it of just as much importance that every little detail regarding a motor contest be worked out with a full and complete explanation of just why such and such importance is attached to each and every element of the score sheet? Every manufacturer who puts his engine into such a test puts no small portion of his reputation as a builder of farm traction engines into the hands of judges and in doing this is entitled to a clear and concise explanation of every detail of the judges' rating. Nothing but a most carefully worked out score sheet will bring this about—one that will cover each and every point.

The reader may wonder why I have indulged in this long discussion regarding motor contests in general and have said nothing about the 1910 Winnipeg contest which has just been held. The facts are that at present writing (one week after the contest closed), there are no detailed figures available. Before the figures, as compiled from the various data sheets, were made public it was discovered that some slight errors had been made by the judges which necessitated a most careful checking and verification before they are submitted. The question of classification also caused some trouble and dissatisfaction on the part of some of the contestants and at present writing it is not known just what the final result will be. However, it is doubtful if any change will be made in the medal winners as given later on, any such changes being recorded in the September issue of this magazine together

with the full and detailed judges' table.

The 1910 contest was in some respects the biggest thing of its kind ever held in the New World. From the standpoint of entries it was not as large as last year but from the standpoint of a plowing test it was probably the biggest thing ever held any where and at any time. Practically 320 acres was plowed up in two days' time and as for the quality of the work done, it

mechanics, Ames Agricultural College, Ames, Iowa; and Prof. L. W. Chase, professor of farm mechanics, University of Nebraska. The other assistants were W. J. Brooks of The American Abell Engine and Thresher Co., D. J. O'Hara of the Canadian Fairbanks Co., Prof. Musselman of the Michigan Agricultural College, Mr. Charlton of the M. A. C. and Mr. Frith of the C. P. R. Several students of the M. A. C. also assisted in taking the read-

ings and in checking up the engines. There were six classes in all in the 1910 contest, the divisions being as follows: Internal Combustion Engines, Class A, 20 brake horse power and under; Class B, 21 to 30 brake horse power; Class C 30 brake horse power and over. Steam Engines: Class D, 60 brake horse power and under; Class E, 60 to 90 brake horse

one 30 h.p. steam tractor; Goold, Shapley and Muir, one 20 h.p. gas tractor, one 30 h.p. gas tractor; M. Rumley Co., one 23 h.p. kerosene tractor (better known as the Oil Pull) and one 36 h.p. steam tractor; J. I. Case Threshing Machine Co., one 12 h.p. steam tractor and one 32 h.p. steam tractor; Gas Traction Co., Winnipeg, one 25 h.p. gas tractor; Gas Traction Co., Minneapolis, one 30 h.p. gas tractor; Kinnard

Haines Co., one 40 h.p. gas tractor; Burrill Motor Plow Co., one 22 h.p. gas tractor. All engines were supposed to be on the ground not later than Monday, July the 11th, but as is always the case in such matters, some were late. It would have made no difference as the judges did not have the brakes and other apparatus arranged so that it was Wednesday before a real start was made. Two brakes were used this year which greatly facilitated matters. One brake

was loaned from the Manitoba Agricultural College and the other was secured through the courtesy of the Avery Co. This latter brake was nicely fitted with recording instruments which greatly aided the judges in taking the readings and in preserving the records as the work of each engine was carefully recorded on charts with recording dynamometers. Two judges watched each brake together with assistants and one judge and several assistants kept careful measurement of all fuel and water consumed by the various engines.

The brake test shows several things, viz: First, the amount of horse power developed per unit of fuel and water; second, the steadiness with which the engine runs, or, in other words, the variation in its revolutions within a given time; third, the relation between the economical load of the engine and its maximum load; fourth, the efficiency of the engine and fifth, it provides one of the factors in making a comparison between the amount of power developed at the fly wheel and the amount of power developed at the drawbar.



15 H.P. Gas Tractor Pulling a 2-Bottom 14-Inch Cliver Engine Gang.

was A1. It would not be possible to do a better job under the same conditions.

The contest itself was carried on under the auspices of the Winnipeg Industrial Exhibition Association, who provided the facilities for holding the various tests and who furnished the plowing field, the same being secured on the farm of Mr. W. E. Bonner, about 7 miles north of Winnipeg on the Stonewall



25 h.p. Gas Traction Engine pulling a 6-Bottom 14-Inch Cockshutt Engine Gang.

branch of the C. P. R. The work of carrying on the test was directly in charge of professors A. R. Greig and L. J. Smith, professors of farm mechanics in the Universities of Saskatchewan and Manitoba respectively. These gentlemen were assisted by Wm. Cross, ex-superintendent of Motive Power, C.P.R.; Prof. J. B. Davidson, professor of farm

power; Class F, 90 brake horse power and over.

Eighteen entries were made in the 1910 contest, the list being as follows:

International Harvester Co., one 15 h.p. gas tractor, one 20 h. p. gas tractor, one 45 h. p. gas tractor; Avery Co., one 12 h.p. gas tractor, one 25 h.p. gas tractor, one 20 h.p. steam tractor and

To the average observer it is the least interesting of any portion of the contest in that it is very difficult for the average layman to calculate just what is being done. In order that our readers may in general understand what a brake test means we give a reproduction of the explanation of the brake as it appeared in our August, 1909, issue. A concrete problem is worked out which greatly aids the explanation.

The brake consists of two iron pulleys mounted on, and keyed to a 4-inch shaft. This shaft is carried by two large bearings on a wooden frame. The pulley marked A is 40-inches in diameter by 16-inches face and on this pulley the belts are run. The other Pulley B is 58 inches in diameter by 18 inches face, and is flanged both on the inside and rim with flanges outside of the projecting 2 inches. Around this pulley is wrapped 4 folds of 1 1/4 inch rope. Rope No. 1 is fastened to an oak block and goes once around the pulley B, and then around the small pulley C, and back around B again, and then around small pulley D, around B again then around small pulley E and once more around B and then fastens into the oak block again. By this arrangement 16 small pulleys the

straps is equalized on all the ropes. The oak block at the top is carried by a hook bolt to the dynamometer, and the dynamometer is carried by a hook and long bolt to the frame work. The lower oak block to which the two pulleys C and E are attached has a long bolt through it to which are attached a number of 25 pound nesting weights. These nesting weights rest on a scale, and when the ropes are slack the full amount of the weights, bolts, etc., are on the scale. These pulleys revolve in the direction of the arrow so that the friction has a tendency to make all the slack of the ropes be delivered so as to allow the nesting weights to rest entirely on the scale. During the tests of the engines the pulleys were run from 200 to 400 revolutions per minute. Now if the screw G were tightened up sufficiently it

would take up all the slack and have a tendency to lift the weights off the scale. Suppose an engine running at 240 revolutions per minute pulls down on the dynamometer 1300 pounds, and on the scale at the start there were 180 pounds and when running there are only 100 pounds shown on the scale, that means that the slack side of the ropes are tight enough to lift 80 pounds off the scale, or that

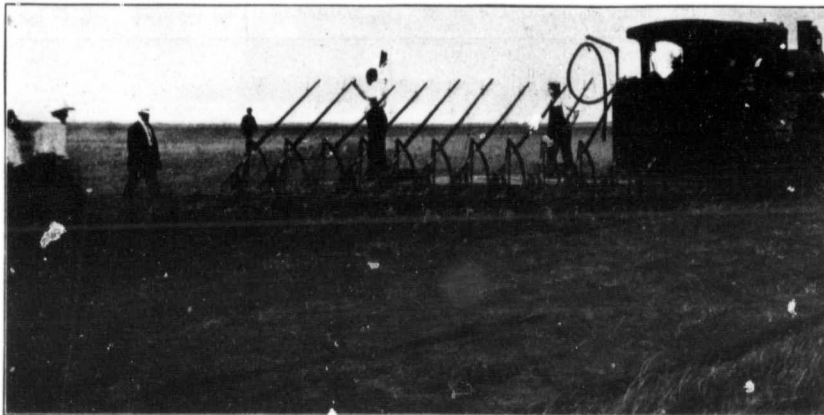
It can readily be seen that by tightening up on screw G any desired tension on the rope can be obtained and thus the friction between the pulley and the ropes increased.

With this large amount of friction the ropes would soon burn if they were not kept cool. This is accomplished by a continuous stream of water being poured into the inside rim of the wheel, and at the same time an equal

of the engines pulled loaded wagons and some of the larger engines pulled dead engines but in practically every case the load was not such as would give any very reliable data as to the tractive efficiency of the engine. At present, in Western Canada, the hauling proposition is not a very vital one although in England and in some places in the States it is assuming considerable importance. The time will doubt-

less come when the farmers of Western Canada will want to know the ton mile cost of hauling their farm products and will at the same time be interested in knowing the capabilities of the various engines on the market as regards their handling the haulage proposition. For this reason it would seem that if future motor contests are to be held that some provision should be made for holding a haulage test paying particular attention to suitable loads and suitable roads that will come somewhere near meeting the requirements of the farmer. If mechanical power is to take the place of the horse on the farm it must do it in every way possible and not least among these is hauling. The real hauling test should be held over a country road sufficiently varied that it would illustrate all possible conditions and where grades and soft spots would determine the "peak loads."

The plowing test at the 1910 contest would have been a most remarkable affair but for the difficulty in obtaining water for the steam engines. Arrangements had been made with the C. P. R. to take water to the plowing field in tank cars but through some hitch a sufficient amount was not supplied to keep the steam engines going. Five trains per day were run from the Exhibition grounds to the plowing field and each and every one was loaded with people eager to see the biggest plowing contest ever held in the World's history. The plowing course was about 4900 feet in length and a plot of ground was allotted to each engine in the proportion of 3/10 of an acre per brake horse power. It was a sight that may never be witnessed again. From ten to twelve



The Avery 30 H.P. Steam Tractor Pulling a 12 Bottom 14-Inch Cockshutt Engine Gang

of the 1300 pounds shown on the dynamometer 1220 are due to friction, and 80 pounds are due to the weights. This 1220 pounds multiplied by the velocity at which it would travel if it were a belt on the pulley would give us the amount of work being done, and if that were divided by 33000 would give us the horse power. For example, the pulley is 50 inches in diameter and the rope 1 1/4 inch, then

quantity is carried away by means of the funnel shown at J. This water could be made to boil if the supply were cut down and if cut off all together would soon evaporate, and then the rim of the wheel would become hot and burn the ropes.

The brake test lasted Wednesday, Thursday, Friday and Saturday by which time all of the engines were ready to go to the plowing field on Monday, July



The Gookl, Shapely & Muir 30 H.P. Gas Tractor Pulling an 8 Bottom 14-Inch Cockshutt Engine Gang

the centre of the rope is 5 1/4 inches in diameter or 205 feet in

$$\frac{4 \times 12}{48 \times 7}$$

diameter and 205 x 22 feet in circumference, then the horse power would be at 240 revolutions per minute:

$$\frac{205 \times 22 \times 240 \times 1220}{48 \times 7 \times 33000} = 119$$

18. There was no hauling test held this year owing to the difficulty of obtaining a suitable course and also because of the fact that the plowing test was so long and severe. A hauling test is valuable for some things, provided a suitable load can be secured but where the engines entered vary so greatly in horse power it is a very difficult matter to secure suitable loads that will accommodate the horse power of each engine. Last year some

engines were working at one time to say nothing of those that were not entered in the contest but were giving daily demonstration of their ability as plowing engines. Among these must be mentioned the Rumely Oil Pull Tractor which pulled a Rumely 8 bottom 14 inch engine gang and which did most excellent work. The Oil Pull drew a large crowd of spectators and the work done by both engine and plow was such as to give it a high place in the estimation of future users of farm power. This engine burned 11 cent fuel oil in both its brake and plowing test although it was not entered for any medal. The old reliable Hart-Parr was also giving a demonstration on the plowing field, pulling an 8 bottom 14 inch John Deere Engine Gang. It also burned 11 cent fuel and to say that the quality of work done was perfect would be cutting it short. No class was provided for cheap fuel oil engines consequently both the Hart-Parr and The Rumely Oil Pull were not entered.

The International Harvester Co. also gave daily demonstration with two of their engines that were not entered in the contest. One engine, a twin cylinder, pulled an Oliver engine gang and the other, a double opposed, pulled a P and O Mogul engine gang.

To the observer the various plows that were at work were of as much interest as the engines even though it was not and was not intended to be a contest of plows. As a matter of fact, the quality of plowing cut very little figure in the judges' decisions only in so far as straightness of furrow and finish at the ends is concerned. There was

steam Tractor, the Gas Tractor 30 h.p. gas tractor The Flour City 40 h.p. Gas Tractor and The Hart-Parr 25 h.p. gas tractor although the latter was not in the contest. Most of the International Harvester Co. engines pulled P. & O. Engine gangs. The Goold Shapley & Muir 20 h.p. gas tractor pulled a series of Verity gang plows, the Avery Tractor pulled a 3 bottom 14" P. and O. gang and the Burrell motor was

The Flour City Tractor, which won the gold medal in its class in 1908 and 1909, was making a beautiful showing and bid fair to eclipse its previous records when some new cork grips that were being used in the clutch for the first time became filled with oil and it was impossible to make them hold. This compelled the engine to withdraw as it would have taken considerable time to change back to the wood-

rive before we go to press and if so they will be published, comment being withheld until our September issue. We, however, give below the judges' score card and the unverified reports of the points as won by the different engines.

Score Sheet as used by Judges.
Brake Test.

Horse power hours per unit of fuel 100	Points
Water used, in gallons per carrying capacity of engine	10



The Avery Tractor Pulling a 3 Bottom 14-Inch P. and O. Gang. The Little Tractor Attracted No Small Amount of Attention

equipped with Moline beams and bottom.

It is no longer a question in the minds of those who have given time and attention to the traction plowing proposition but that the plow has its own place to fill. The suitability of the plow for the work in hand is no small factor in the success of the engine and while it is not possible to secure a contest field that will cover all plowing conditions a

en shoes that are ordinarily furnished with this engine. It is hard for any contestant who has made all possible preparation to go through a test to have some slight accident make a withdrawal necessary but such are the chances that must be taken by those who go after glory in a motor contest. The quality of work done was not judged by the regular judges but was in the hands of Angus Mc-

M. E. P.	10
Steadiness of running, vibration, condition of engine, etc.	10
Horse power hours per 100 gallons water	21
Draw bar H.P.	20

Brake H.P.

Plow Test.	
Fuel per draw bar H.P. hour	90
Water per draw bar H.P. hour	30
Acres per hour per Brake H.P.	20
Quality of plowing	10
Distance travelled per fuel capacity of engine	15
General condition of engine, stops etc.	15
Design and construction	50

Score of Points.

Internal Combustion Engines.

Class.	No. Pnts.
A. 1. International Harvester, 15 H.P.	1 306.7
2. Avery Tractor	5 275.3
B 1. International Harvester, 20 H.P.	3 329.3
2. Goold, Shapley & Muir, 20 H.P.	3 292.2
but developed 34.15 H.P., consequently was disqualified for this class. Birrell Motor No. 6 did not complete tests.	
C. 1. Gas Tractor, Minneapolis, 30 h.p.	18 354.4
2. International Harvester, 45 h.p.	9 350.1
3. Gas Tractor, Winnipeg, 25 h.p.	7 334.0
4. Goold, Shapley & Muir, 30 h.p.	8 274.6
Kinnard Haines No. 10 did not complete plowing test.	

Steam Engines.

D. 1. J. I. Case Co., 12 h.p.	12 267.6
E. 1. Avery Co., 20 h.p.	13 269.3
2. J. I. Case Co., 25 h.p.	14 297.0
Developed over the 90 H.P., consequently were disqualified for this class.	
F. 1. J. I. Case Co., 32 h.p.	16 356.1
2. Avery Co., 30 h.p.	15 291.9
3. Rumely Co., 36 h.p.	17 280.8

Signed,
A. R. Greig,
L. J. Smith,
Engineers in charge.

The 1910 contest was in many respects much more complete than those which have been held in the past, yet there is still much

Continued on Page 83



The Rumely Oil Pull Kerosene Tractor Pulling a Rumely 8 Bottom 14-Inch Engine Gang

practically every variety of engine gang on the market today at work on the plowing field.

The Cockshutt engine gang was pulled by the Case 32 h.p. Steam Tractor, the Case 25 h.p. Steam Tractor, the Case 12 h.p. Steam Tractor, the Avery 30 h.p. Steam Tractor, the Avery 20 h.p. Steam Tractor, the Goold, Shapley & Muir 30 h.p. Gas Tractor.

The John Deere Engine Gang was pulled by the Rumely 36 h.p.

plowing contest nevertheless furnishes a very good basis for comparison.

The plowing contest in 1910 lasted two days and although the weather was exceptionally warm, judges, manufacturers and spectators stayed by the game nobly. Some of the engines, through accident or otherwise, were unable to finish their allotted amount of ground which necessitated some of the other engines finishing the work after the contest was over.

Kay, Esq., Supt. of the Indian Head Experimental Farm, James Murray, Esq., Supt. of the Brandon Experimental Farm and Prof. S. A. Bedford, of the Manitoba Agricultural College. These gentlemen are all practical farmers and admirably qualified to judge the work done.

It is with regret that we are obliged to omit a detailed discussion of the various tests as conducted in 1910. It is possible that the judges' tables may ar-

Some Motor Trials of 1873

When we dig through the musty pages of history and search the records carefully we find that motor contests are by no means new. It is well known that they have been important factors in the development of the traction engine in England for some considerable time but their place on this side of the water has until recently been a negligible quantity.

Recently, however, in going through some old magazines we found an account of a motor trial held at Orange, New Jersey, in 1873, just 37 years ago, and we give it to our readers at this time as it contains some very interesting data regarding the performance of a motor in road work. The matter in digest is as follows: "The engine and boiler were of the same general dimensions as the road locomotives. The furnace door was placed at one side of the fire-box, and the reversing lever, throttle handle, and steam gauge were all brought to the same side, the engine driver standing on the frame of the machine which is sufficiently broad and is immensely strong. The tanks for fuel and water were so placed as to be within reach of the driver. The steering apparatus was located at the side opposite the working gear of the engine, and was operated by the engine-driver's assistant, who finds standing room on that side. The whole machine was carried on four large wheels, with broad thread, covering a total width of 6 ft. Its weight exerts a compressive force of 5,600 lbs. on each foot of width, or 467 lbs. on each inch.

The wheels had holes drilled in their faces, like the wheels of the traction engines, in which could be inserted strong spikes for breaking up old roads previous to making repairs, or for loosening the surface previous to metalling new roads.

The preliminary examination of the proposed trial ground and its

selection took place late in September, and a half day was devoted to an examination of the engines and of the road-bed. Engine No. 1 was found at Orange, and, after a careful examination had been made of its design and construction, the driver started with it over an awkwardly narrow and winding piece of road, traversing it without apparent difficulty, and going forward and

backward at varying speeds, steering with evident ease and accuracy. The writer then took the place of the driver, and, although the experience was a novel one, found no difficulty in acquiring, in a very short time, such command of the machine that it became evident that but little training would be required to enable any ordinary intelligent mechanic

portion of road containing heavy grades was selected for the public trial of the locomotives which had been described. It consisted of a short section of nearly level road, in the village of South Orange, near the railroad station, and of that part of the road, on either side of this nearly level stretch, which ascends from the valley by a moderately heavy grade, on the eastern side, and by a very re-

straint, when reversing suddenly. Steerage seemed almost equally easy and precise, whether going forward or backward. A block of wood 6 or 8 in. high, thrown under one forward wheel, was driven over without apparent difficulty or injury to the machine.

After these experiments and the examination of the locomotive were concluded, the party rode over to South Orange, where a

and weighing, with their loads, 5,000 and 5,600 lbs. respectively, a total of 10,600 lbs. This load was drawn up a grade of 10.10 in 100—equal to 533.28 ft. per mile. The wagon tires were very narrow and much worn, and were observed to cut into the roads somewhat, notwithstanding the thoroughness with which the road-roller had done its work.

The driver of the engine was a lad without experience. By putting coal in large pieces on his fire at the worst portion of his route, he caused his steam pressure to fall rapidly, and was compelled to stop on the heavy grade until the pressure rose to 90 lbs. again, when another start was made, and the top of the hill was reached without apparent difficulty.

Some annoyance was experienced from priming, partly in consequence of the low pressure maintained in the boiler, but principally, no doubt, because the boiler had not been in use long enough to thoroughly clean its interior surfaces. This engine was, therefore, detached, and No. 2, which had been long in use, was taken for the next trial over this same course.

SECOND TRIAL.

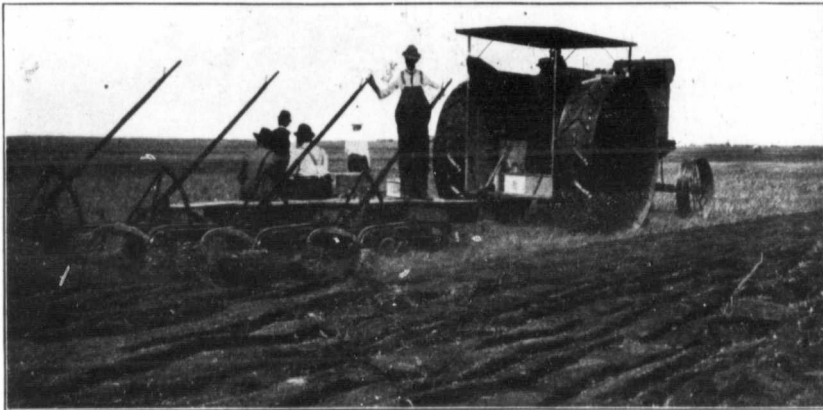
A trial was next made of the power of manoeuvring possessed by these engines.

No. 1 was stationed at a part of the road which had not been rebuilt, and where the ground was soft and uneven. The machine turned continuously, for a considerable time, in a circle of 18 ft. radius, crossing the gutter at one part of the course, and gave no

evidence of difficulty arising from any cause. The engine could turn, when required, in a space slightly greater than its own length, by carefully backing and filling.

THIRD TRIAL.

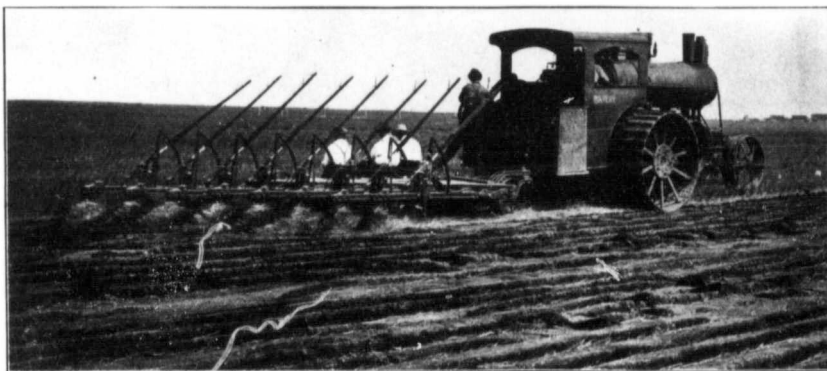
Locomotive No. 2, being attached to the same two wagons used in the first trial, drew up the hill



The Flour City 40 H.P. Gas Tractor Pulling an 8 Bottom 14-Inch John Deere Engine Gang

backward at varying speeds, steering with evident ease and accuracy.

The writer then took the place of the driver, and, although the experience was a novel one, found no difficulty in acquiring, in a very short time, such command of the machine that it became evident that but little training would be required to enable any ordinary intelligent mechanic



The Avery 20 h.p. Steam Tractor pulling an eight bottom 14 in. Cockshutt Engine Gang

to manoeuvre the locomotive on the most difficult road. The reversing handle, the throttle and the steering wheel were conveniently located and easily operated. Reversing could be performed promptly, notwithstanding the weight and consequent momentum of the fly-wheel, which, it had been apprehended, might cause loss of time, if not an excessive

markably steep grade on the western side. The road-bed was remarkably smooth, hard and compact.

FIRST TRIAL.

The first trial was made at 10 o'clock, a.m., Oct. 1st, with Engine No. 1.

The load consisted of two wagons heavily laden with stone,

to the summit without halting, and without priming or difficulty of any kind. The steam gauge indicated, at starting, 120 lbs., and at stopping, 90 lbs. pressure of steam.

The time occupied in traversing 1,450 ft. was $3\frac{1}{2}$ min.; the speed being about $4\frac{3}{4}$ miles per hour. Returning to the foot of the hill, a third wagon was brought up and attached with the other two, to the same locomotive.

FOURTH TRIAL.

The total load in wagons was now 16,530 lbs., and the excess in weight of the rolling wheels of this engine was over the regular and, as already stated, the efficient traction driving-wheels of No. 1, brought up the figure to a total of 23,230 lbs.

This load was taken up the same heavy grade in 4 min.—a most precisely 4 miles an hour. The steam pressure varied from 105 to 120 lbs.

The action of the driving-wheels was carefully observed, but no evidence of slip was discovered, with even this heavy load.

The proprietor and agent both desired to try again, using the same engine, with a fourth wagon added to the train; but time was passing rapidly, and it was decided to change the ground, and to experiment with heavier loads on less exceptional grades.

FIFTH TRIAL.

The locomotives and wagons were taken across the railroad track to the other portion of the selected road, where the grade was 2.27 ft. rise in 100 of horizontal distance, or 225.46 ft. per mile. This did not approach, in steepness, that already described, but it was, nevertheless, a heavy grade.

Engine No. 1 was here attached to a train of six loaded wagons, weighing, all together, 30,080 lbs. Starting with 95 lbs. steam, it drew the train steadily, and with apparent ease, except when, as in the first trial, priming occasionally produced some annoyance.

SIXTH TRIAL.

The train was stopped, engine No. 2 was substituted for No. 1,

and, with the same load, on the same grade, a trial of speed was made. The mean speed, over the whole course, was 3.6 miles per hour, that figure being exceeded at times. The steam pressure varied between 90 and 105 lbs. The length of the course was 1,435 ft.

SEVENTH AND LAST TRIAL.

A train of 10 wagons was next

the steam that the engine would take was required to keep the piston moving. At starting, the engine exhibited a tendency to rise forward. It may be concluded from these two facts that this load was about a maximum for the engine when carrying 85 lbs. of steam, and that, while drawing it, nearly all the weight of the engine was brought upon the drivers.

assumed at 0.04.

Coal.—The amount of coal used on this engine during the day was 350 lbs.

Effect on the Road-bed.—During all trials, the effect produced by the locomotive upon the road surface was carefully observed and compared with that produced by the hoofs of the horses, which were at intervals climbing the second grade with loaded wagons similar to those used with the traction engine. The hoofs of the horses, it was noticed, cut into the load somewhat, loosening the metalling and injuring the surface, thus increasing the resistance offered to the vehicles following them. The wheels of the traction engine, on the contrary very perceptibly compacted and improved the load, and thus, to some extent, reduced tractional resistances. There

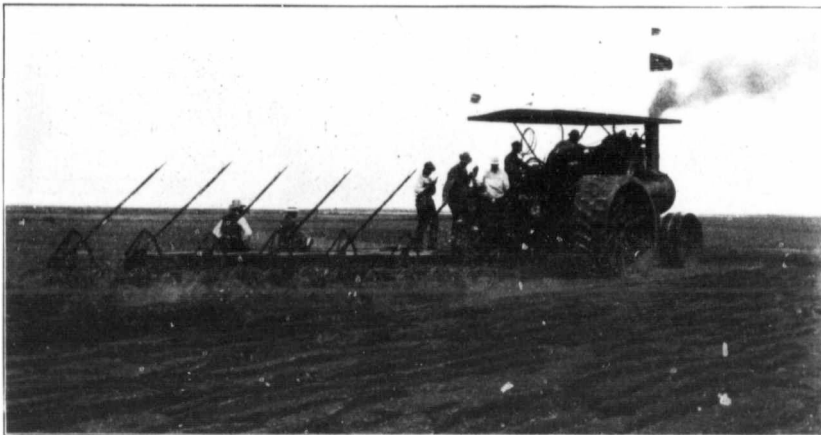
was a marked difference in the action of the two motors upon the surface, and it was evidently a matter of economical importance.

Horses vs. Steam.—Each wagon could usually be drawn to the top of the hill by two good horses, but only with great effort. Three were required to do the work as comfortably as it should be done, and this number could pull a single load steadily and with moderate exertion.

The locomotive on this grade therefore performed the work of between twenty and thirty horses. We may conclude that it can, with 85 lbs. of steam, draw a load which would require the severest exertion of twenty horses. The maximum steam pressure proposed by the builders of these engines is 130 lbs., at which pressure they are still far below the limit allowed by our own laws.

It was now late in the afternoon, and it was concluded to suspend work for lack of time to make up other trains.

The great steam road-roller was brought forward; its construction was examined by all present, and its effective action in compacting the road was observed. It moved backward and forward, on this grade of 225 ft. to the mile, rapidly and steadily, and was said by its owner to be able



The 'cumely 36 h.p. Steam Tractor, pulling a 14 bottom 14 in. John Deere Engine Gang

made up, and engine No. 2 was attached. The total load was now 63,400 lbs.; the course was the same as during the preceding trial. Several unsuccessful attempts were made to start this load, the connecting chains snapping as soon as the strain came fully upon them. Chains were finally obtained of sufficient

Even during this trial no slip of the driving wheels could be detected, notwithstanding the fact, already stated, that they were smooth on their wearing surfaces. The marks left, by the bolt holes in their rims, upon the surface of the road were perfectly distinct and undistorted. The engine gave no trouble by priming.



Goid Shapley & Muir 20 h.p. Gas Tractor in the contest. This engine pulled 3, 2 bottom 14 in. Imperial Gangs. The photographer miscalculated and mapped only the engine at work

strength, and a start was made. The load, increased by the weight of a large number of men and boys who clustered upon the wagons, was taken to the top of the hill without accident and without a halt. The steam pressure varied between 85 and 124 lbs per sq. in. At the lower pressure, the throttle was carried full open, and it was evident that all

It was noted, during the trials on this grade, that the wagons would just start backward down the hill when detached, and it is therefore to be concluded that the co-efficient of traction on a level, corresponding with the coefficient of rolling resistance, must have been very nearly represented by the tangent of the angle of the grade, or about 0.0427; it may be

to ascend the grade of 533 ft. to the mile, upon which the first trial was made with the traction engine.

The day's work thus terminated and the party separated. The information which had been acquired respecting steam traction and the construction of metalled roads was most valuable, and it was considered by all that the day had been spent pleasantly and profitably.

RESUME.

Reviewing the experiments on the Aveling & Porter road locomotive and steam road-roller we may make a brief resume of the facts developed, thus:

1. A traction engine may be so constructed as to be capable of being easily and rapidly manoeuvred on the common road and in the midst of any ordinary obstructions.

2. Such an engine may be placed in the hands of the average mechanic, or even of an intelligent youth of 16, with confidence that he will quickly acquire, under instruction, the requisite knowledge and skill in its preservation and management.

3. An engine weighing rather more than 5 tons may be turned continuously in a circle of 18 ft. radius without difficulty and without slipping either driving wheel, even on rough ground, and may be turned in a roadway of a width, but slightly greater than the length of the locomotive, by proper manoeuvring.

4. A road locomotive, weighing 5 tons 4 cwt., has been constructed, which is capable of drawing, on a good road, more than 23,000 lbs. up the almost unexampled grade of 533 ft. to the mile at the rate of four miles an hour.

5. Such a locomotive may be made, under similar conditions, to draw a load of more than 83,000 lbs. up a hill rising 225 ft. to the mile, at the rate of two miles per hour, doing the work of more than twenty horses.

6. The action of the traction engine upon the road is beneficial, even when exerting its maximum power, while, with horses, the injury to the road-bed is very noticeable.

7. The coefficient of traction is,

with such heavily laden and roughly made wagons as were used at South Orange, and under the circumstances noted, not far from four per centum on a well made macadamized road.

8. The amount of fuel, of good quality, used may be reckoned at less than 500 lbs. per day, where the engine is a considerable portion of the time heavily loaded, and, during the remain-

ing time, running light. It may be considered, without probability of serious error, that, during the trials at South Orange, Engine No. 2 performed pretty nearly an average day's work.

DEDUCTIONS.

A number of interesting problems may be solved by reference to the facts learned here. A comparison of the efficiency of the road steam traction engine with

small diameter of the wheels of the wagons used, and partly because the wagon bodies were not mounted on springs. To be absolutely certain that no error is committed by over-estimating in the following calculation, this coefficient will be taken at 0.03.

The actual tractive force required to overcome the rolling resistance was, then, 63,400 x 0.03 = 1,902 lbs. The force required to

give a total of 5,253 lbs. direct resistance, and a coefficient of adherence of 5,253 : 18,348 = 0.28, which slightly exceeds that found on earlier trials of smooth wheels.

Experiments made by Capt. Robt. Merry, at the Jackson Iron Mine, Negaunee, Mich., and the observations and experiments of the writer, indicate the maximum direct tractive force of a good horse to be about 250 lbs. This

corroborates the estimate already made, making the tractive power of this engine equal to that of twenty horses.

Deducting from the above the weight which could be drawn, on an equally excellent but level road, by this locomotive, the coefficient of traction being the same, we find it equal to $\frac{5,253}{175,100} = 175,100$ lbs., or very nearly eighty gross tons, and, excluding the weight of the locomotive (163,452) 75 tons. With the machine, as with

the animal, it would not be expected that in regular work, on ordinary roads, more than one-half of the maximum power would be exacted, although, with such a reserve, the machine possesses a decided advantage over the animal.

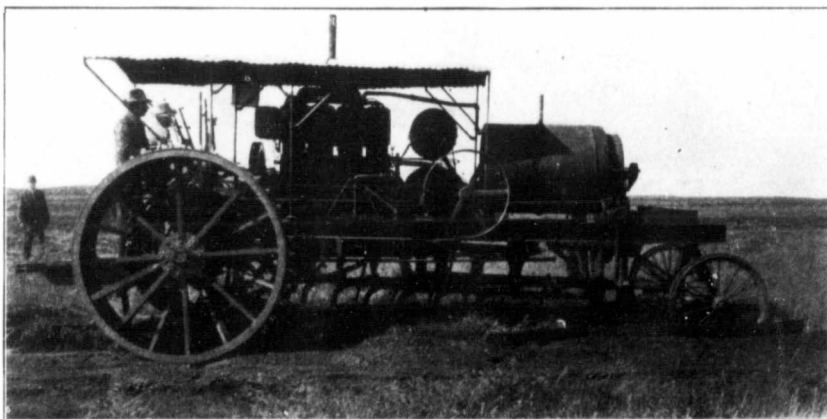
Working Time.—The working time of a horse is usually considered to be eight hours per day for dray horses, and less for carriage horses. The dray horse, which is kept in harness eight hours per day, is usually standing unworked a considerable proportion of this time while his load is handled, and also during one-half, usually, of the remaining time, his vehicle drawn unloaded. The horses of the Third Avenue street railroad, in New York city, are worked less than six hours per day, and are given one day in seven as a day of rest. This is

about equal to the working time of horses and cattle crossing out Western plains with moderate loads.

The steam engine requires no such careful limitation of working time. It can work twenty-four hours uninterruptedly as readily as a single hour. Ten hours a day would be, in most cases, made the daily working time of a



The Case 12 h.p. Steam Tractor pulling a 4 bottom Coekshutt Engine Gang



The Birrell Motor opening up its first furrow, 6 Moline bottoms are being pulled

that of horse-power in drawing heavy loads, is especially important, and we will now make such a comparison, basing it upon the most reliable data at hand.

Traction Force.—It has been already stated that Engine No. 2 developed a tractive force equal to that of twenty horses.

The actual tractive force may be determined as follows:—The

overcome that component of the force of gravity which directly resisted the motion of the load, in this case where the road lay at an angle with the horizontal, whose tangent was 0.0427, was $W \sin \theta = 2,700$ lbs.; the total resistance was therefore 4,602 lbs.

Including the weight of the traction engine itself, these figures become 2,251 and 3,002 lbs.,

road locomotive, the period being determined by the proper length of the working day of the driver, rather than by the capabilities of the machine.

The working time of the traction engine may therefore be stated to be, ordinarily, twenty per centum greater than that of the dray horse, and to be capable of indefinite extension when required.

The loss of working time by the horse through illness, at the farriery, etc., and that lost by the locomotive in the repair shop, are proper subjects for comparison; but it is difficult to determine them in the absence of reliable data. We may estimate these losses as equally affecting the two motors, with a probability that the correction of any error in such estimate may make a change favorable to the locomotive.

First Cost.—Comparing the first cost and running expenses of steam and of horse power, we may work from tolerably well established data. The list price of the Aveling & Porter road locomotive, experimented with at South Orange, is, delivered in New York, about \$4,000.

The average cost of horses purchased by the Third Avenue Railroad in New York city, is now \$157.50, and it would require more than twenty such horses to pull the load of the traction engine, while an addition of twenty-five per cent. must be made for the greater length of the working day of the locomotive. Twenty-five such horses would have a first cost of \$3,937.50, to which must be added the large item of cost of harness.

The first cost of steam and of horse-power is, therefore, nearly equal, the difference being in favor of steam, leaving also, on the side of the engine, the immense advantage arising from its ability to work longer hours when required, and indefinitely. The interests on these first costs also nearly balance each other.

Running Expenses.—The running expenses of the locomotive consist of cost of attendance, of fuel, oil and repairs, and of depreciation in value with use; those

of horse power are attendance, food, stabling, sickness, and depreciation with age.

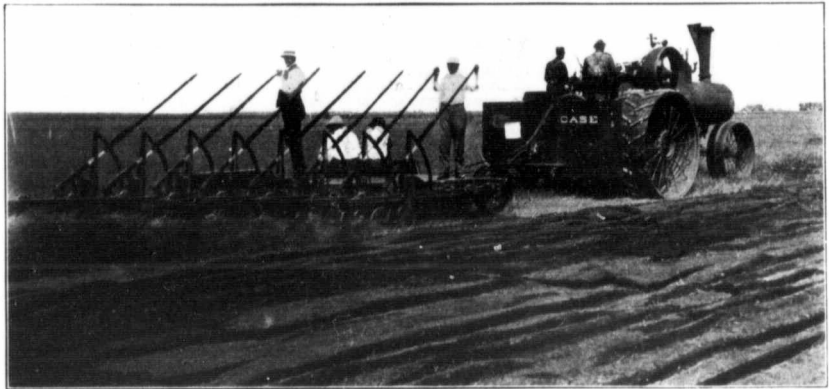
The cost of attendance upon the one engine and the twenty-five horses may be taken at \$939 and \$3,130, respectively, assuming each driver of the latter to be able to manage a six-horse team. The engine driver receives three dollars per day and the other men two dollars and a half, and there

similar estimate will give, for the annual expense of keeping one horse, very exactly \$300, excluding attendance. In the year 1870, 10,315 horses in the State of New York cost for stabling, feeding, repairs to harness and shoes, etc., according to the official statements, \$3,182,838.24, or \$308.56 each animal. From this is to be deducted about eight dollars per head for receipts from sales of horses,

later.) 65.00
 Cost of stabling, general expenses, and incidentals 180.00
 Total annual expenses, including depreciation.... 206.43
 Add to the above the cost of harness (not stated), say 3.00

The total annual cost of horse-power, for comparison, \$5,235.75, to which we add \$3,130 for driver, and we make a total cost per year of \$8,365.75 to be compared with \$2,439, the total annual expense of doing an equal amount of work.

The expense account when doing heavy work on the common road under the described conditions, by steam power, is therefore less than 25 per centum of the average cost of horse power, as deducted from the total expense



The Case 25 h.p. Steam Tractor pulling an 8 bottom 14 in. Cushman Engine Gang

are 313 working days in the year. The cost of fuel, oil and incidentals, excluding repairs of the engine and its depreciation, may be averaged at \$900 per year, in the vicinity of New York. This is somewhat higher than the cost of similar items on railroad locomotives in New York State.

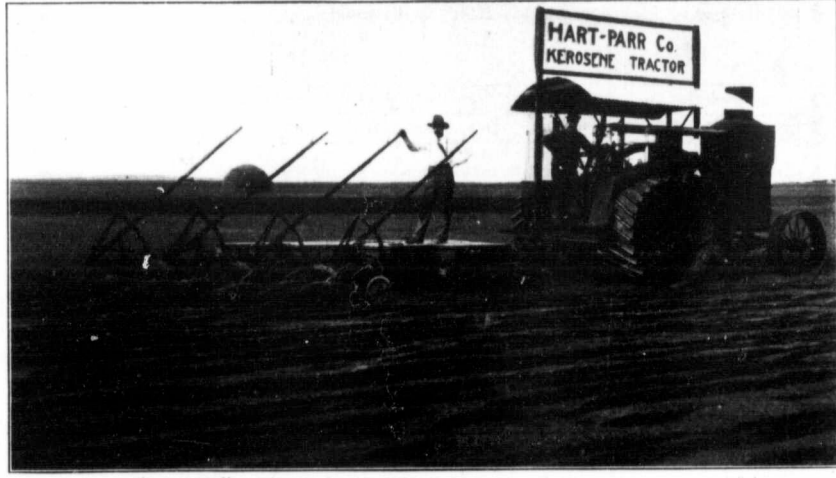
The cost of repairs and depreciation has been thus far so small at South Orange that it could not be estimated, but for the life of

leaving for annual expenses, say, \$300 per horse. The expense account, excluding attendance, would be, for twenty-five horses, \$7,500, as against \$1,500 for a similar amount of steam power, and including attendance, \$10,500, as against \$2,439.

Referring once more to the expense account of the Third Avenue Railroad, we find it working more economically than the average as given above. This com-

parison of such power in New York State, while if we take for comparison the lowest estimate that we can find data for in our whole country, we still find the cost of steam power to be but 29 per centum of the expense of horses.

We may state the fact in another way: a steam traction engine, capable of doing the work of 25 horses, may be worked at as little expense as a team of six or eight horses.



The Hart-Parr at its demonstration work near the contest field. 8 14 in. John Deere bottoms were pulled.

the engine, it will be likely to average something less than fifteen per cent. of the first cost, or in this case, \$600 per annum. This we arrive at by an examination of railroad locomotive expenses, as officially reported.

The total annual expense, therefore, of the traction engine referred to may be reckoned at \$2,439 as a maximum figure, including cost of attendance. A

pany employs an immense number of horses, buys its supplies in large quantities, taking advantage of the market, and is able to do much better than could any individual or smaller capitalists. The following data were kindly furnished by Mr. Charles S. Arthur: Average first cost of horses, per head.....\$157.50
 Average price obtained when sold, (3½ years

Prospective — Thus, thirty years after the defeat of the intelligent, courteous and persistent Hancock and his co-workers in the scheme of applying the steam engine useful on the common road, we find strong indications that, in a new form, the problem has been again attacked and at least partially solved. It was formerly supposed that success in the transportation of passengers by steam on post routes would lead to the application of that motor to the movement of heavy loads and to agricultural purposes generally. When, after so long a trial, the experiment finally seemed to have failed of success, it was believed that steam could not be applied to heavier work on common roads. As we have now seen, however, it appears probable that the inventors of that

JUDGES' RECORD SHEET 1910 MOTOR CONTEST

RECHECKED AND VERIFIED AS CORRECT BY ENGINEERS IN CHARGE, PROFS. A. R. GREIG AND L. J. SMITH

CLASS	Entry Number	MAKER'S NAME	ENGINE DATA														TWO HOUR BRAKE TEST																				
			Cylinders			Rated R. P. M.		H. P.		Pulley		Drivers		Speeds in M. per Hr.		Capacity of Fuel Tank Imp. Gal.	Capacity of Oil Tank Imp. Gal.	Total Weight, lbs.	On Drivers	Price F. O. B. Winnipeg	Piston Rod Diam.	Piston Speed feet per min.	Area of Piston Sq. Ft.	Piston displacement Cub. Ft. per min.	Clearance Engine Pulley	Authorized Steam Pressure	H.P. Developed	R. P.M. Eng. Pulley	Gals. Water Used	Per cent. Water used	Fuel Used, lbs.	Per cent. Fuel Used	H.P. Hrs. per Unit Fuel*	Total running time	Lbs. water evaporated per lb. fuel	H.P. Hrs. per 100 gal. water.	Mean Effective Pressure in Cylinder	H.P. 2 Hr. Test Max. Test	Avg. E. Steam Pressure
A. Internal Combustion 20 B. H.P. and under.	1	International Har. Co. ...	1	8	14	250-300	250-300	15	18	36	9 1/2	56	22	2.10	1.75																						
	5	Avery Co.	4	4 1/2	5	1000	1000	12	36	8 1/2	10	40	6	10	to 2	19	7.5	6,000	2,500	2,500.00	833.3	.123	102.5	27 1/4 *	14.16	11.27	4.3	57.3	35.5	26.7	5.58	2 hrs.	1.21	659	28.08	.74	...
B. Internal Combustion 21 to 30 B. H.P.	2	Avery Co.	1	12	18	350	350	25	25	40	11	65	20	3	1	41	47.5	12,000	...	2,000.00	583.3	.442	257.8	127 11-16 *	20.69	254	4.5	13.5	35.5	17.6	5.71	1.24m	1.27	644	31.7	...	...
	3	Goold, Shapley & Muir Co.*	2	7 1/2	10	350-400	350-400	20	28	18	9	70	22	2.5	2	41	37	11,000	7,800	2,300.00	583.3-666.7	.307	179.1-204.7	69 3/4 *	28.13	350	1.1	3.05	40.5	14.5	9.48	1.57m	0.27	4015	72	82	...
	4	International Har. Co.	1	8 1/2	15	240-300	240-300	20	23	40	10 1/2	70	20	2.10	1.75	30	44	14,200	10,100	2,300.00	600-750	.418	250.8-313.5	125 1/4 *	22.11	235	10.0	22.7	28.5	17.2	10.86	2 hrs.	3.51	442	82.6	98	...
	6	Birrell Motor Plow Co.	4	8 1/2	10	300-350	240	22	45	34	9	78	24	2.5		39.5	130	22,000	15,000	3,200.00	500-583	.394	197-229.7	106 3/4 *	27.21	203	3.1	2.4	65	23.5	5.86	2 hrs.	0.48	1755	32.5	93	...
C. Internal Combustion Over 30 B. H.P.	7	Gas Traction Co.	4	6	8	550-650	550-650	25	45	18 1/2	9	96	24	2	1 1/2	45.6	90	...	...	3,000 cash	733.3-866.7	.196	143.7-169.9	59 1/4 *	34.66	597	0	0	70	22.0	6.93	2 hrs.	0	...	50.8	99	...
	8	Goold, Shapley & Muir Co.	2	9 1/2	13	325-375	325-375	30	45	26	9	8 1/2	26	2 1/2	2	49	102	17,730	12,600	2,775.00	704.2-812.5	.492	346.5-399.7	92 3/4 *	34.86	304	4.4	4.3	77	22.5	6.34	2 hrs.	0.57	1584	49.3	90	...
	9	International Har. Co.	2	9	14	320-340	320-340	45	55	28	10 1/2	75	24	2	2.1	39	112.5	20,990	15,040	2,700.00	700	.492	44.4	89 1/4 *	46.49	344	15.0	13.3	55 1/2	20.3	11.78	2 hrs.	2.71	620	60.06	97	...
	10	Kinnard Haines.	4	7 1/2	8	500	300	40	60	34	10	96	24	2.25		39	277	19,000	...	2,400.00	666.7	.307	204.7	104 3/4 *	49.76	297	0	0	64	23.4	10.88	2 hrs.	0	...	56.32	99	...
	18	Gas Traction Co.	4	6 1/2	8	550	450	20	60	24	9	96	24	3	2	51	81	17,500	12,000	3,500 cash	733.3	.230	168.7	74 1/4 *	51.84	493	0	0	67	18.8	10.83	2 hrs.	0	...	64.2	96	...
D- Steam 60 B.H.P. under	11	Rumely Co.	2	10	12	375	375	25	50	36	11	64	26	1.9		80 ker. 67 gas.	112	26,700	17,800	3,400.00	750	.545	408.7	113 1/4 *	46.8	378	8.6	7.67	106k 1 1/2 g	132.5	6.88	2 hrs.	.80	...	52.0	95	...
	12	J. I. Case, 36 B. H.P.	1	8 1/2	10	250	250	...	36	40	10.5	66	20	2.4		18 cu.ft.	143	17,475	13,975	1,812.50	1 5-16 *	.367	152.9	124 1/4 *	44.25	264	252.3	176	3.50	34.1	25.28	2 hrs.	7.2	35.1	62.2	.74	134
E Steam 60 to 90 Brake H. P. .	13	Avery Co. 60 B. H.P.* . . .	2	6	10	250	250	20	60	40	11	65	20	1.5	4	26 cu.ft.	303	26,000	18,000	3,200.00	1 1/4 *	.193	...	106 1/4 *	66.79	256	398.7	132	556	39.6	24.02	2 hrs.	7.17	33.5	93.03	.69	169
	14	J. I. Case, 75 B. H.P.* . . .	1	11	11	250	250	...	75	40	12	72	24	2.6		25.4 cu.ft.	217	25,800	20,400	2,593.75	1 9-16 *	.652	...	125 *	61.69	265	364.5	168	443	32.3	27.85	2 hrs.	8.22	33.8	44.6	.65	136
F Steam 91 and above Brake H.P.	15	Avery Co., 90 B. H.P.	2	7	10	250	250	30	90	40	12	80	26	1.5	4.5	13 cu. ft.	371	36,000	24,000	4,000.00	1 1/4 *	.264	...	125 1/4 *	97.08	265	611.2	165	701 1/2	100	27.66	2 hrs.	8.71	31.7	95.54	.78	189
	16	J. I. Case, 110 B. H.P.	1	12	12	230	230	...	110	43.5	16	84	36	2.37		39.4 cu.ft.	305	40,460	31,560	3,744.00	1 15-16 *	.775	...	137 *	98.61	233	604	198	606	28.4	32.54	2 hrs.	9.97	32.6	62.6	.76	156
	17	Rumely Co., 120 B. H.P. .	2	7 1/2	14	250	250	36	120	41	12	84	30	2.03		28.12 cu.ft.	500	46,480	30,985	4,300.00	1 1/4 *	.261	...	129 15-16 "	105.86	247	623	125	861	56.6	24.59	2 hrs.	7.24	34.0	65.1	.78	175

*These engines developed more than their allotted horse power, which threw them out of their class, consequently they were disqualified.

CLASS	Entry Number	MAKER'S NAME	HALF HOUR MAXIMUM BRAKE TEST								Plows					PLOWING TEST																		
			H.P. Developed	R. P.M. Eng. Pulley	Gal. Water Used	Fuel Used, lbs.	H.P. Hrs. per Unit Fuel	Total running time	M. E. Pressure	Ave. Steam Pressure	Entry Number	Number	Width	Make	Miles travelled	Acres plowed	Time, minutes	Acres per Hr.	Average Draw bar Pull, lbs.	Fuel used, lbs.	Fuel used lbs. per acre	Water used, gal. acre	Water used per acre	D. R. Pull per 1 inch width of furrow	D. R. H.P. lbs. per acre plowed	Fuel Used, gal. per acre	Drawbar H.P.	D. R. H.P. Brake H.P. %	D.B. H.P. Max. B. H.P. in. %	D. R. H.P. Hrs. per unit Fuel	Per cent water used per acre	Acres plowed per Max. B. H.P. Hr.	Per cent Fuel per mile	Total points allowed in Judging Engines
A. Internal Combustion 20 B. H.P. and under.	1	International Har. Co. ...	15.5	247	2.75	6 1/2	8.67	30 min	70.7	...	1	2	14"	Oliver	12.49	3.91	290	0.72	1705	81.5	22.58	27.9	7.72	60.8	15.72	3.23	11.39	75	73.5	4.87	25.7	.046	3.93	306.7
	5	Avery Co.	19.2	1173	1.15	11.75	5.7	30 min	39.6	...	5	3	14"	P. & O.	7.14	3.20	255	0.75	1980	75.5	23.59	3.6	1.12	47.1	11.78	3.37	8.87	62.5	46.1	3.49	15	.089	7.95	275.3
B. Internal Combustion 21 to 30 B. H.P.	2	Avery Co.	No test on maximum or plowing								2																							
	3	Goold, Shapley & Muir Co.*	34.15	363	1	7	7.9	14 min	84.2	...	3	6	12"	Verity	8.92	6.65	369	1.08	3250	152.5	22.93	5.4	.81	45.1	11.63	3.28	12.58	44.7	36.9	3.55	.22	.031	5.95	292.2
	4	International Har. Co.	22.6	240	2.75	9.5	8.32	30 min	82.7	...	4	4	14"	Oliver	8.92	5.00	222	1.35	2450	76.5	15.3	30.0	6.00	43.8	11.66	2.19	15.75	71.1	69.5	5.33	14	.058	4.08	329.3
	6	Birrell Motor Plow Co.	29.1	199	2.7	17.5	5.8	30 min	50.9	...	6	...	14"	Moline	3.57	2.73	159	1.03	...	93	34.00	10.0	3.66	...	...	4.86	...	...	...	...	.035	...	...	...
C. Internal Combustion Over 30 B. H.P.	7	Gas Traction Co.	35.1	616	0	23	5.3	30 min	50.0	...	7	6	14"	Cockshutt	12.49	10.6	375	1.70	4550	179.5	16.93	0	54.16	14.3	2.42	24.24	69.8	69.0	5.91	0	.048	4.5	334.0	
	8	Goold, Shapley & Muir Co.	38.8	335	1.2	24.5	5.5	30 min	49.8	...	8	6	14"	Cockshutt	10.70	8.82	390	1.36	4200	240.5	27.26	5.3	.60	50.0	13.58	3.89	18.44	52.9	47.6	3.49	.06	.035	.655	274.6
	9	International Har. Co.	47.8	345	4.0	19.25	8.7	30 min	61.6	...	9	10	14"	P & O.	12.49	17.59	416	2.54	7350	260	14.78	119	6.76	52.5	13.9	2.11	35.30	75.8	73.8	6.69	6	.453	7.63	350.1
	10	Kinnard Haines.	50.2	302	12.3	12.0	14.6	30 min	55.9	...	10	6	...	Jno. Deere	...	12.43	408	1.83	5400	199.5	16.05	0	...	55.1	14.46	2.20	26.41	51.1	49.2	6.32	0	.034	4.47	354.4
	18	Gas Traction Co.	53.9	489	0	20.5	9.2	30 min	67.28	...	18	7	14"	Jno Deere	12.49	12.01	356	2.02	5500	329k 3g	27.64	27.7	2.3	4.91	13.06	3.49	26.45	56.5	53.8	3.71	2	.041	4.88	not scored
D- Steam 50 B.H.P. and under	11	Rumely Co.	49.2	372	3.4	34k 1 1/2 g	5.49	30 min	55.6	...	11	8	14	Rumely	10.70	8.98	412	1.31	3580	1420	158.1	864	96.21	63.9	17.06	...	22.31	50.5	37.2	10.78	67	.022	9.09	267.6
	12	J. I. Case, 36 H. H.P.	60.0	268	99.7	171	17.5	30 min	83.9	131	12	4	14"	Cockshutt	16.05	6.06	170	2.14	6900	892	147.2	828.6	136.7	61.6	16.24	...	34.74	52.01	36	11.04	45	.022	11.87	269.3
E Steam 60 to 90 Brake H. P. .	13	Avery Co. 60 B. H.P.* . . .	96.6	276	149.5	238	20.3	30 min	124.8	167	13	8	14"	Cockshutt	5.55	20.17	413	2.93	6850	2432	120.6	1969	92.6	61.2	16.15	...	47.34	76.6	50.1	13.4	42.7	.031	9.93	297
	14	J. I. Case 75 B. H.P.* . . .	94.3	255	143.3	192	24.6	30 min	70.8	135	14	8	14"	Cockshutt	17.84	12.16	201	3.63	11500	1820	149.6	1308	107.6	68.4	18.01	...	65.36	67.3	52.5	12.03	29	.029	36.28	291.9
F Steam 91 and above Brake H.P.	15	Avery Co. 90 B. H.P.	124.4	240	275.4	517	12.0	30 min	135.2	189	15	12	14"	Cockshutt	7.14	33.08	497 1/2	3.99	10860	3282	99.20	2713	82.01	64.6	18.78	...	74.92	75.9	58.0	18.92	27	.031	7.19	356.1
	16	J. I. Case 110 B. H.P.	129.0	225	227.4	278	23.4	30 min	84.8	157	16	12	14"	Cockshutt	21.45	24.07	381	3.79	10700	2910	120.8	2244	93.22	54.6	14.79	...	56.08	53.0	41.3	12.23	14.6	.027	15.33	280.8
	17	Rumely Co., 120 B. H.P. .	132.07 135.8	243	320.8	511	17.6	10 min 30 min	84.8	176	17	14	14"	Jno. Deere	12.45																			

Unit of fuel, 7 lbs. gasoline, and 100 lbs. coal; 7.9 lbs. kerosene.

Wt. of Imp. gal. gasoline 7 lbs. Wt. of Imp. gal. kerosene used, 7.9 lbs

COCKSHUTT LEADS

MORE COCKSHUTT ENGINE GANGS IN USE AT THE ENGINE COMPETITION THAN ANY OTHER MAKE
THE WORK DONE SURPASSED ALL OTHERS AND ELICITED THE STRONGEST PRAISE FROM SPECTATORS



GOLD MEDAL WINNER IN HEAVY STEAM ENGINE CLASS USING 12-FURROW COCKSHUTT ENGINE GANG

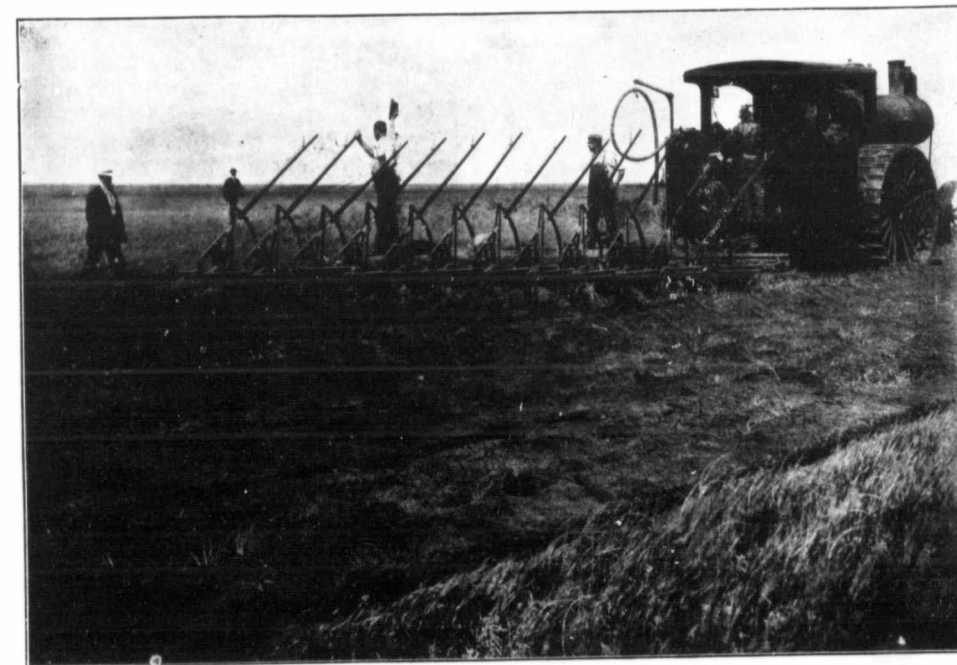
The Cockshutt Engine Gang again proved its superiority at the annual Engine Competition held at Winnipeg recently. The most striking feature about the contest was the large number of Cockshutt Engine Gangs in use, and though the contest was confined to Traction Engines, it was quite evident that the various engine manufacturers had a very strong preference for the Cockshutt Engine Gang. From the other makes of plows which took part in the contest, it was quite evident that other manufacturers were attempting to imitate the principles of construction of the Cockshutt Engine Gang. What the Cockshutt Engine Gang achieved in construction at the start in the most direct and simplest way, other manufacturers were attempting to adopt by various complications, but without success. The moral was well demonstrated. What Cockshutt's had originated and proved by actual test to be the best in the field, other plow manufacturers were copying. They were trying to achieve what we started out with four years ago.

Hundreds of Spectators Praise Excellent Work of Cockshutt Engine Gangs

Hundreds of farmers from Western Canada followed up the work of the Cockshutt Engine Gangs and nothing but praise could be heard from all sides, as our plows cut their way through the hard, tough sod and turned over the furrows completely flat and smooth, round after round on the mile stretch. These men had been reading their papers back home for months; they came to pass their critical opinions on all makes, and the actual field tests positively convinced them that the Cockshutt was the only Engine Gang successfully designed and constructed to meet Western conditions.

COCKSHUTT PLOW
BRANDON REGINA LIM
SASKA

ENGINE GANG AGAIN



SILVER MEDAL WINNER IN HEAVY STEAM ENGINE CLASS USING 12 FURROW COCKSHUTT ENGINE GANG

The crowds saw at once the great advantages of the independent lever system which we first introduced. When plowing became hard in some parts, instead of having to drop back from 12 to 10 plows or from 8 to 6 plows, the operator on our plow simply pulled up one bottom, thereby making the change quickly and turning one more furrow than a gang bottom plow could (and make the change quickly), thus making full use of the engine power. It was easy to see that the Cockshutt Engine Gang was notably light in draft considering the depth plowed and the hardness of the ground, and also that one man standing on the roomy platform was quite sufficient to operate the Cockshutt Engine Gang.

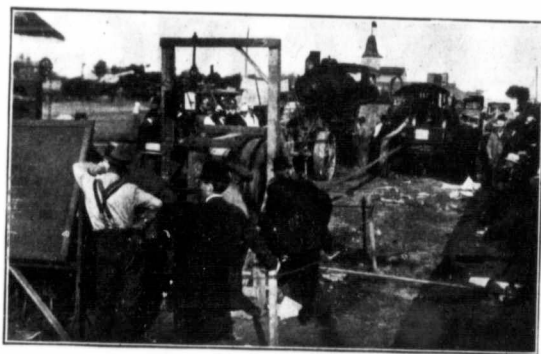
Several Spectators After Following up THE WORK OF VARIOUS PLOWS Buy Cockshutt Engine Gangs

This was the most striking tribute that could be paid to any engine gang at the trials. After following up the work done by the various plows, a large number of spectators came to our show-rooms and gave their orders for the different sizes of Cockshutt Engine Gangs. We want every interested farmer to have our new Booklet on Traction Plowing. It is full of illustrations showing the Cockshutt Engine Gang in actual operation on hundreds of farms, throughout Western Canada. After you see these illustrations and read the numerous letters from our customers, you will readily see why Cockshutt Engine Gangs are turning over more land in Western Canada than all other makes combined, and why they are giving universal satisfaction.

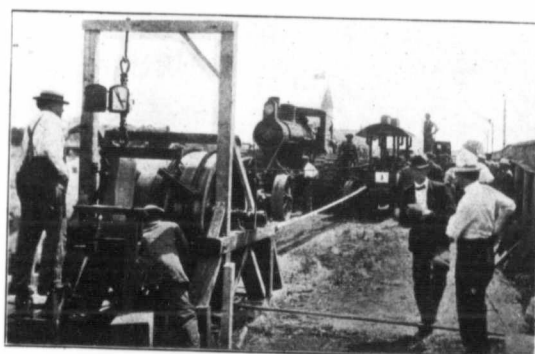
WRITE FOR TRACTION PLOWING BOOKLET OR SEE OUR NEAREST AGENT

COMPANY **WINNIPEG**
TED CALGARY EDMONTON
TOON

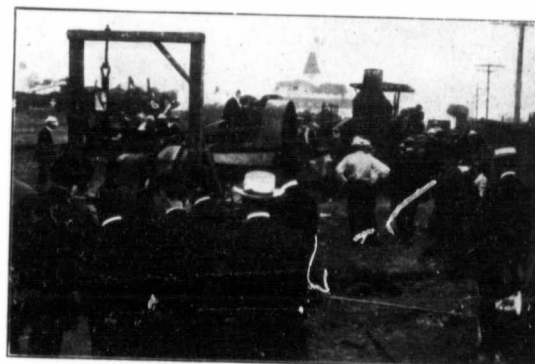
ENGINES AT THE WINNIPEG MOTOR CONTEST DOING THEIR SEVERAL BREAK STUNTS



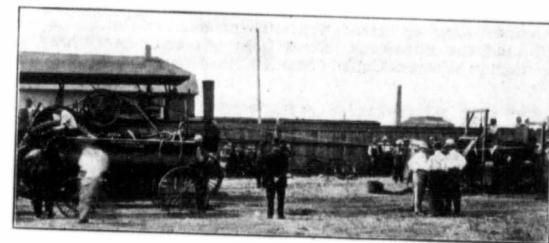
The Goold Shapely & Muir 20 h.p. Gas Tractor on the Right



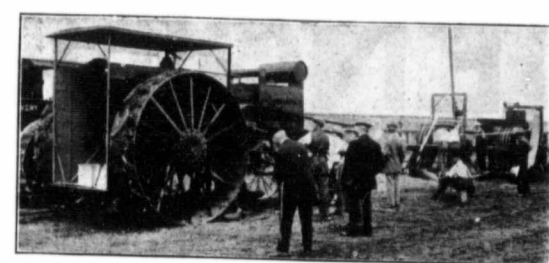
The Goold Shapely & Muir 30 h.p. Gas Tractor on the Right



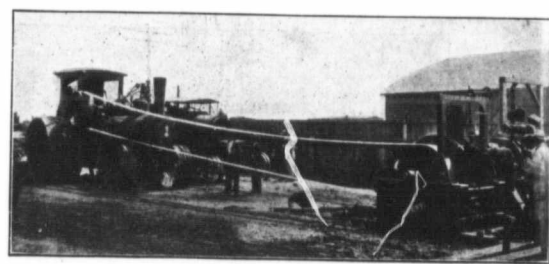
The Rumely Oil Pull Kerosene Tractor on the Right



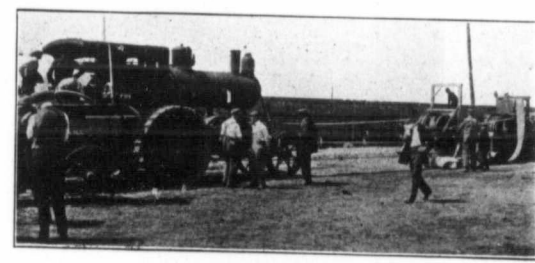
The Rumely 36 h.p. Steam Tractor



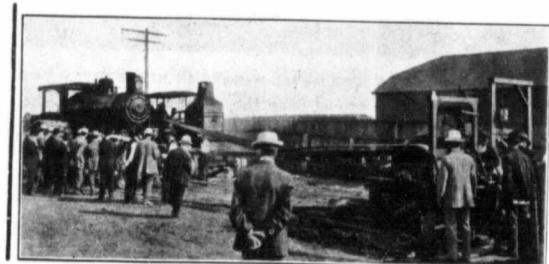
The Flour City 40 h.p. Gas Tractor



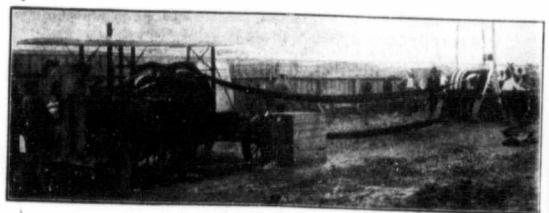
The Case 32 h.p. Steam Tractor



Avery 30 h.p. Steam Tractor



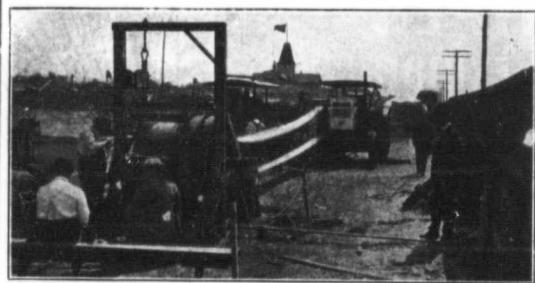
Avery 20 h.p. Steam Tractor



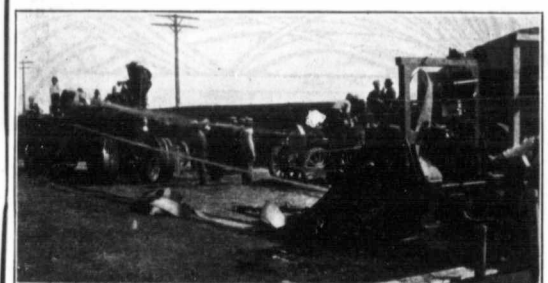
The I. H. C. 15 h.p. Gas Tractor



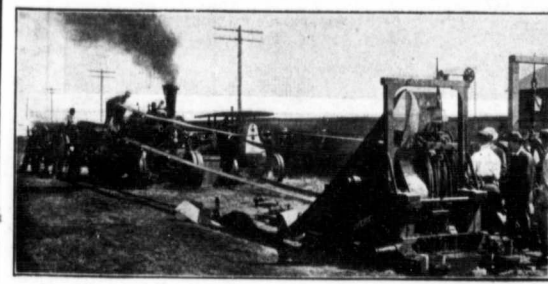
The Little Avery Tractor Working the Brake Stunt



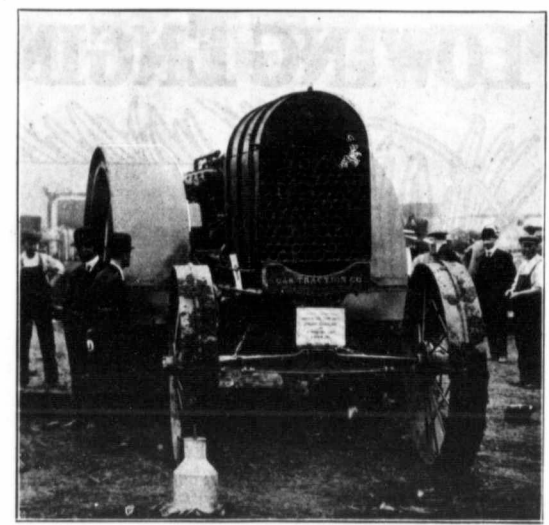
I. H. C. 45 h.p. Gas Tractor



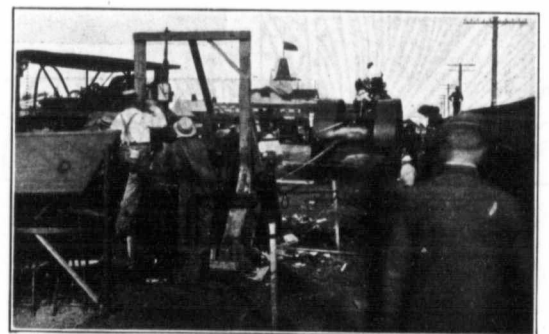
The Case 25 h.p. Steam Tractor



The Case 12 h.p. Steam Tractor



The Gas Traction 30 h.p. Gas Tractor



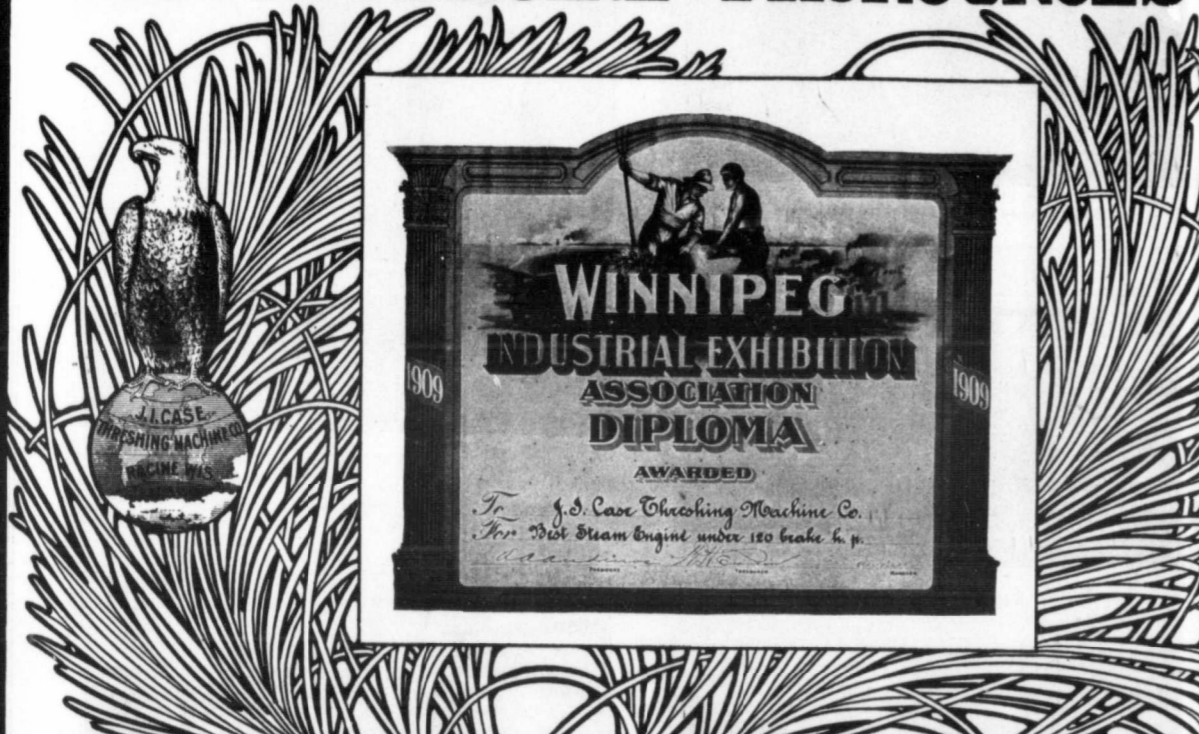
The Gas Traction 25 h.p. Gas Tractor



The Birrell Motor Plow on the Right

PROFESSOR OF CIVIL ENGINEERING PLOWING ENGINE - PRONOUNCES

ENGINEERING EXAMINES THE "CASE" IT THE BEST AND BUYS ONE



HOMER M. DERR, A. M., PH. D.
Professor of Civil Engineering
South Dakota State College
Assoc. Member American Society of Civil Engineers

BROOKINGS, S. DAK.
April, 4th, 1910.

J. I. Case Threshing Machine Co.,
Watertown, S. D.

Gentlemen:-

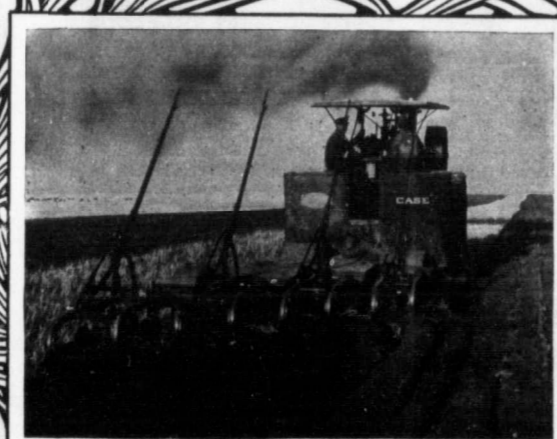
Being somewhat interested in modern farming and in breaking prairie sod with power in particular, I have for some time been investigating the various makes of steam and gasolene engines designed for that purpose. In some respects a gasolene engine is like a balky horse. They will work very well under favorable conditions if properly handled, but if very much overloaded will refuse to work for anybody. Therein is the special advantage of steam; it will always work and will not shirk from a very heavy overload. I have observed that nearly all the manufacturers of steam engines for this work are putting upon the market a gasolene outfit to meet the crying demand for it by those who wish to buy an experiment; on the other hand, I have noticed that the manufacturer of the two always prefers to sell his customer the steam outfit, for he well knows that it will give the best satisfaction and render the most service for the money invested.

I have made a great many measurements and comparisons of plowing engines, and have no hesitancy in saying that I believe the Case 110 H. P. Plowing Engine for 1910 is the best proportioned, most admirably designed for converting a maximum amount of energy into pull at the draw-bar of anything I have yet seen. I have just given my order for one of the engines.

I am,

Very truly yours,

Homer M. Derr



J.I. CASE THRESHING · RACINE

MACHINE CO. INCORPORATED WIS · U · S · A ·

Chicago
ENG & CO.

TORONTO, WINNIPEG, REGINA, CALGARY

Have Your Engine Timed Right.

I own a 2 horse power International water-cooled gasoline engine.

With this engine I run a Little Giant trip hammer, a Giant Wonder Disc sharpener and emery wheel, also a large Lancaster Power Drilling Machine. I have had all these running at one time and it seems to make very little difference on the working of the engine.

My engine is rated to use 2 gallons of gasoline in ten hours, but so far it has never used over a gallon and a half. Gasoline costs laid down here from 30 to 33 cents per gallon, which makes the cost of running the engine very low.

There are several things that could be said about operating a gasoline engine. One of the most important things to know is when your engine is timed right; that is, to have it explode at the proper time, acting practically the same as a cut-off valve in a steam engine.

Enclosed is a dollar for one year's subscription to your paper.

Yours very truly,
Dan McQuarrie,
Gen'l Blacksmith,
Govan, Sask.

Has Threshed Two Seasons.

I own and operate a 20 h.p. Geiser portable gasoline engine. I am sorry to say that I have no photos of our outfit at work, but will give you some of the particulars regarding it.

I have threshed two seasons with my engine and am well pleased with it. Last autumn we ran thirteen days, threshing 23,000 bushels of grain and consuming 300 gallons of gasoline at 26 cents per gallon. Our engine runs like a top. We have not used it for anything but threshing as yet.

Yours truly,
H. A. McEwen,
Tompkins, Sask.

Pumps Water with Ease.

I have a 2 h.p. Fairbanks Morse gasoline engine which I have used for about two years for pumping water.

I have had very little trouble with my engine except occasionally with the sparker. After a man gets familiar with his engine he will have very little trouble in running it.

From September 28, 1909, to October 23, 1909, I supplied water from my well, 85 feet deep, to the thresher 37,448 gallons or 6138 barrels; during the same period to other threshers 6138 gallons or 198 barrels; making a grand total of 43,586 gallons, or 6,336 barrels. This is outside of what I pumped for my own use for horses, cattle etc. During this period I used about 1 1/4 gallons of gasoline and very little trouble and expense I had.

Yours truly,
J. Funk,
Stavelly, Alta.

Gas Engine Experience Department

UNDER this heading we shall publish regularly the experiences of our readers with gas engines, stationary, portable or traction, as a matter of mutual help. We want you to give us your experience. Tell us your troubles, no matter how small, and we shall be pleased to set you right. We have made arrangements whereby your questions will be referred to a staff of experts, and the answers to your questions can thus be relied upon. What we want principally is your experience with a gasoline engine. It is only in this way that we can build up this department making it mutually valuable to yourself, your neighbor, and to this magazine.

Has Had No Trouble Yet.

My engine is a 20 h.p. International Harvester gasoline, and it works fine. I run a 12-inch plate grinder in the winter and a 32x40 Belle City separator with high bagger, blower and self feeder. In dry grain my engine only works about two-thirds of its power.

We threshed about 25 days last fall and threshed 23,000 bushels of grain, using 9 barrels of gasoline. We would not like to be without our outfit now.

We paid 30 cents a gallon for gasoline at Arcola. My engine is a portable and I am sorry now that I did not buy a traction, so that I could have plowed with it. It is such cheap power.

Hoping you will favor me with one of your "Plain Gas Engine Sense" books, as I wish to learn all I can about these engines, although I have had no trouble yet, I remain,

Yours truly,
Andrew V. Carr,
Arcola, Sask.

Averages from 1100 to 1200 Bushels per Day.

I own one-half interest in a 20 h.p. Fairbanks-Morse portable gasoline engine, and if I ever buy another engine, it will be the same make. It is strongly built and is economical.

For threshing we run a 28x50 J. I. Case separator. We average from 1,100 to 1,200 bushels per day threshing and use about 3 quarts of gasoline per hour.

There is another engine in this vicinity of a different make, the same size as ours, which uses 40 gallons per day. In my estimation, the steam engine in a few years will be a thing of the past, as with a gasoline engine, an experienced engineer, fireman, water hauler and straw hauler is saved, which means that the gasoline engine saves three-quarters of the expense in connection with steam.

Yours truly,
Albert Callroon,
Northlands, Sask.

Gasoline the Only Power.

I am pleased to furnish you with my experience with gasoline engines and I will also send you a photo in the course of two or three weeks.

My engine is a 20 h.p. portable International. We have threshed 20,000 bushels of grain with it this fall, although the threshing season had started three weeks before we got the machine. We have a 32 Belle City separator. The gasoline engine in my estimation is a power that is just as responsible as any

other power, which I have had any experience with, viz., steam, water and electricity. In fact, it has been no trouble whatever, always ready to do its work at any minute.

We burned on an average of 1 1/4 gallons of gasoline per hour, although the straw was very tough, requiring a great deal more power than the average season; but we never noticed this as the engine did not work out its full power at any time.

In my opinion, gasoline power is the only power and the one that is destined in the very near future to do all farm work, as it can be operated with a great deal more economy than steam. I paid 27 cents per gallon for gasoline, laid down here.

Trusting that these few facts will be of some use to you and intending purchasers, I remain,
Yours truly,
C. Caron,
Mutrie, Sask.

Uses one Gallon of Fuel for Every Hundred Bushel.

I have operated a 29 h.p. Portable gasoline engine for two years, for threshing, crushing grain and sawing wood.

It works first class, in fact better the second year than the first because we understood it better. When threshing we are hard on gasoline for we thresh fast. We use 2 1/4 gallons per hour, about one gallon to the hundred bushels. Gasoline costs us 28 cents per gallon here.

I certainly think a gasoline engine is the best paying outfit for threshing.

Yours truly,
W. H. Moore,
Yorkton, Sask.

Plows for 90 Cents per Acre.

We only got our gasoline engine late last fall, so cannot give you much information, but we are keeping an exact account of same, and shall be pleased to send on all particulars, at some future date.

Our engine is a 20 h.p. International Harvester. With it we have plowed stubble with a 7 disc plow (Emerson) and a 4 section harrow behind. We plowed 125 acres at a cost of 90 cents per acre, and intend to do all our farm work with it, including threshing.

Enclosed please find \$1 for our subscription. I think The Canadian Thresherman and Farmer a very good paper.

Yours truly,
F. Furber & Sons,
Normanton, Sask.

The Gas Tractor an Ideal Engine.

I own and operate a Hart-Parr oil tractor. It is 45 brake power and 22 tractive. It pulls ten-inch plows in stubble and 6 fourteen-inch plows in breaking and backsetting and 8 four-summer-fallow.

The Hart-Parr oil tractor is operated with coal-oil, which brings it down to a very cheap operating engine. It is certainly a cheap operating engine. I use a little gasoline. Gasoline costs me 24c a gallon and coal-oil 18c at Winnipeg. Then it costs me about 70c a barrel freight. I am allowed \$1.60 for my empty barrels at Winnipeg and the credit I receive for my empty barrels pay the freight on my oil and buys my cylinder and gearing oil.

It takes two to run the outfit. I will give you the cost of breaking wild prairie sod from 3 to 4 inches deep figuring a day of 11 acres:

4 gallons of gasoline to run engine till hot enough for coal-oil at 24c, a gallon..	.96
3 1/2 gallons coal-oil to acre for 11 acres at 18c per gallon	6.93
Lubricating oil.....	.75

Total cost for 11 acres...\$8.64

I can break about 1 1/2 acres an hour and plow 2 acres an hour in stubble or summer-fallow. My stubble and summer-fallow plowing figure about the same as my breaking, and I pull 8 14-inch plows instead of 6 as in breaking or backsetting.

The gas tractor is the ideal engine. My engine is oil cooled and I have no bother with the cooler, as there is no waste to the oil. I can also operate with coal-oil, which is much cheaper than gasoline.

Another thing I like about a gas tractor is that it takes just a few minutes to get it ready to grind feed, saw wood, or anything one wants to use it for.

I am sending you a dollar for my subscription to your paper.

Yours truly,
C. W. Wilbur,
Morris, Man.

Saws 16 Cords of Wood on 2 1/2 gallons of Gasoline.

I own and operate a 3 h.p. Stickney gasoline engine for sawing wood and grinding.

I can saw about 16 cords of wood, using from 2 1/2 to 3 gallons of gasoline, in ten hours and can grind about 8 bushels of barley and 10 bushels of oats per hour and use 4 gallons of gasoline in 10 hours. My engine runs a 22-inch saw quite easily. I have an elevator attached to the saw to carry the wood blocks away. Gasoline costs 28c per gallon if bought by the barrel.

Enclosed please find photo of the outfit.

Yours truly,
A. P. Dickman,
Langham, Sask.

WELL---THE GREAT PLOWING CONTEST IS OVER AND THE GAS TRACTION ENGINE WON THE GOLD MEDAL

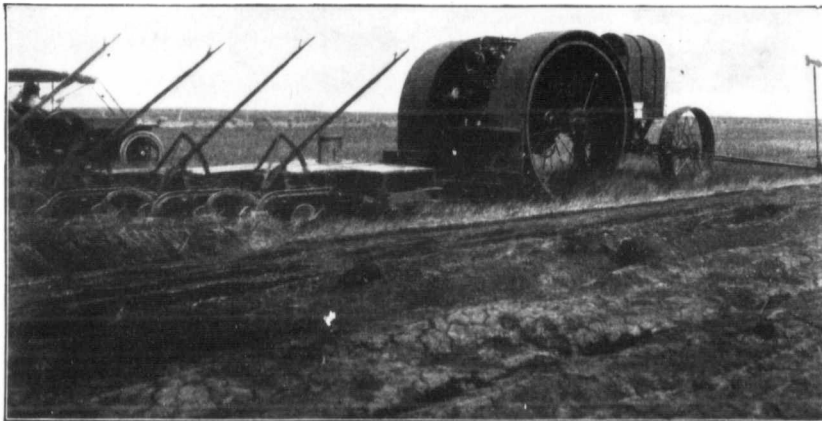
Never before in the history of the world has there ever been a plowing contest like that conducted by the Winnipeg Exhibition this year.

It was as complete a test as competent committees and judges could make it—plenty of room, 320 acres, plenty of time, an 8-hour run—so that every detail of an engine had every chance to show what it could do.

The score sheet of the Judges showed that engines were judged both according to a Brake test and a Plow test.

Brake test showed the horse power hours per unit of fuel—the engine's steadiness of running—vibration, condition throughout, etc., etc.

Plow test determined the fuel used per draw bar horse power—the acres plowed per hour per brake horse-power—the quality of the plowing—the distance travelled per fuel capacity of engine—the general condition of the engine, the stops made, etc.—also the design and construction of the engine.



UNDER THESE EXHAUSTIVE TESTS THE GAS TRACTION ENGINE WON FIRST AND THIRD PLACE

Farmers of Western Canada will understand even more fully how complete, thorough and decisive this test was, when they note who were the Judges that awarded first place and third place to the Gas Traction Engine. They were:

Prof. A. R. Greig—Professor of Farm Mechanics and Engineering. The University of Saskatchewan.

Prof. L. J. Smith—Professor of Farm Mechanics and Engineering. Agricultural College of Manitoba.

Prof. J. B. Davidson—Professor of Farm Mechanics and Engineering, Ames, Iowa.

Prof. L. W. Chase—Professor of Farm Mechanics and Engineering. University of Nebraska, Lincoln, Neb.

Wm. Cross—Formerly Superintendent of Motive Power, and Assistant to Wm. Whyte of the Canadian Pacific Railway.

THIS CONTEST PROVED OUR CLAIM

That is, that the Gas Traction Engine is the most efficient, most durable and least expensive in up-keep of any all-purpose farm power.

SURELY, SIR, you will now believe that the Gas Traction Engine is the engine for you. We have made big claims for it, but we backed our claims by our guarantee. Now both our claims and our guarantee are backed by the result of the World's Greatest Plowing Contest—by the decisive awards of such competent authorities as Prof. Greig, Prof. Smith, Prof. Davidson, Prof. Chase and Mr. William Cross.

NOW, WILL YOU GET IN YOUR ORDER FOR A GAS TRACTION ENGINE?

The demand will be greater than ever—but we will still sell under our "Golden Rule" Guarantee.

It Guarantees—The absolute accuracy and labor-saving ability of the self-steering device.

The fuel consumed in plowing an acre of ground.

The number of breaker and stubble plows the engine will pull.

The size separator it will continuously and steadily drive.

The material and workmanship for one year from date of engine's acceptance.

Effective seeding.

Send in your orders now. Delay in ordering means more delay in getting your engine.

For engines to be used in Canada write The Gas Traction Co., Winnipeg.

For engines to be used in the United States write to The Gas Traction Co., Minneapolis, Minn.

THE GAS TRACTION COMPANY

Dept. C. T., WINNIPEG

MANITOBA

A Good Record.

Answering your letter for facts about gasoline traction engine work, I take pleasure in sending you herewith some photographs of our engine which is a Hart-Parr 22-45 horse power, bought June, 1909.

Since June 7th, 1909, we have had the engine in constant use,

as far as weather would permit, and have done plowing, discing and harrowing, both double and single, and threshing, also moving granaries and hauling cook-outfit.

The engine has given very satisfactory work on the whole, and the work done has been extremely good.

WORK OF GASOLINE TRACTION ENGINE, JUNE 7 TO OCTOBER 30, 1909

Kind of Work	Date 1909	Load	Miles Travel	Width of Cov'd	Amount of work
Plowing-Breaking	June 7 to July 21, inc	6-14 in. plows	524	7 ft.	460 acres
Plowing Stubble	October 2 (one day)	6-14 in. plows	10	7 ft.	8½ acres
Double Discing	July 23 to Sept. 7, inc	5-8 ft. discs	801½	20 ft.	1939 acres
Single Harrowing	Oct. 15 to Oct. 19, inc	7-sec. Harrow	167	33 ft.	668 acres
Single Discing	Oct. 20 to Oct 30, inc.	4-8 ft. disc.	10-sec. harrow		
Single Harrowing	Sept. 8 to Oct. 14, inc	32 in x 54 in			18,500 bu wheat
Threshing		Case Separator			10,452 bu. oats
		Total mileage.	1502½		

OIL USED IN BREAKING 460 ACRES

Kerosene 1642 gals. at 25c.	\$410 50
Gasoline 238 gals. at 30c.	71 40
Cylinder Oil 32 gals. at 61c.	19 52
Black Lub. 30 gals. at 26c.	17 80
	\$519 22
Per Acre	\$ 1 13

With the kerosene we use about an equal quantity of water. In general the kerosene used is about one barrel per day, the average being for plowing 3-56/100 gallons per acre; which would be a fair figure for any work where the engine had a full load. Threshing we used about 30 gallons per day.

The highest day's run plowing was 40 miles, working 24 hours, on July 2, with full moon, which amounted to 33 acres. The average was 16 acres per actual

working day, which includes every day the engine actually plowed. The crew consists of two engineers and two helpers running double shift. Our driving team hauls all the oil and water and brings the crew back and forth to the field.

Trusting that the above answers your questions, I am,

Very truly yours,

W. Gordon Smith,

Mgr Overbrook Wheat Farms, Eyebrow, Sask.

Costs 5 cents per bushel for Wheat.

I have a 20 h.p. International gasoline engine and a 32-inch Belle City thresher.

I find that it costs me 3 cents a bushel to thresh oats, 5 cents a bushel for wheat and about 8 cents for flax. That is, taking it from the stooks.

I have been running this rig for three years and find it satisfactory for my own threshing, but not for custom threshing. I think it is the fault of the agents that buyers have trouble with their engines. They say that a little boy can run an engine for there is nothing to it. But I find that it takes a big boy to run it for there is a lot to it.

It takes 15 gallons of gasoline to run the outfit a day and I pay 18 cents a gallon for same.

Will you kindly send me the book "Plain Gas Engine Sense?"

Your truly,
Taylor Tollefson,
Dubuc, Sask.

Gas Engine the Farmer's Power.

My engine is a 15 horse power International portable engine. I use it to run a 32 inch Belle City separator and I run a 10-inch crusher and wood saw in the winter and spring.

I have run my outfit three seasons and have had very little

trouble with it, as it is always ready to go when I have it in shape. I have heard some say that a gasoline engine was like a balky horse; it would stop when it liked and start when it got ready. But I have never found this the case, as when my engine stopped I always found the cause. After running it a short time I could detect anything that was wrong before it stopped.

I use about 12 gallons of gasoline per day of ten hours when threshing and about 6 when sawing. I pay 33c. per gallon for gasoline by the barrel. I can often run the whole rig alone and sometimes help to pitch.

I believe that when one is buying an engine he should be sure to get one large enough to do his work without over-working it.

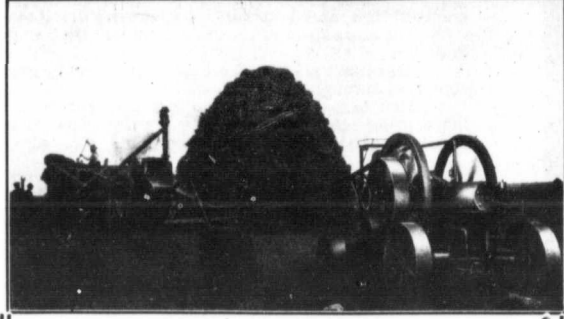
Yours truly,
B. Raymer,
Red Deer, Alta.

Keep the Mixture Right.

As per request, I am forwarding you photo of my gasoline engine. It is a Gilson 2½ air cooled, 4 cycle. The photo represents one day's work, 10 cords, consuming about one gallon of gasoline at a cost here of 28c. per gallon. The average consumption is the same as that mentioned, which is certainly a low consumption.

The nominal speed is 450. As a rule for most work I lower the

The *Manitoba* 25 H.P.
Gasoline Threshing Engine
will save you
Money, Time, Worry



Write us for catalog C, and particulars of the most liberal guarantee ever given with a threshing engine. They are guaranteed to do the work, are low in price and sold on easy terms of payment. Investigate before buying.

We manufacture GASOLINE ENGINES for every purpose, POWER and PUMPING WINDMILLS, WOOD and IRON PUMPS, GRAIN GRINDERS, SAW FRAMES, Etc.

See our Big Exhibit at **BRANDON FAIR**

The Manitoba Windmill & Pump Co. Ltd.
Box 301
Brandon, Man.

Here's Your Binder Engine

Here's the engine that saved crops last year for thousands of farmers and it's going to do it again this year. Light weight and efficiency—that's the secret. Weighs only 165 pounds and the simplest and highest grade farm engine in the world. The Cushman 3 h.p. 4 Cycle, 165 lbs. The Light Weight Wonder

Also a wonderful work, time and money saver on all other power work. Easiest to start, smoothest, quietest running especially adapted for cream separator, pump, churn, grinder, wood saw, and all other farm machines, and it more than pays for itself in one season by saving your grain crops. Attach engine to your binder by our simple brackets. No blacksmith needed.

Send Your Name Now for Free Book
Let us tell you about the superiority of the CUSHMAN and its record in the hands of others. Careful shipment to be made in your territory for July and August delivery. Please state style of binder for which you want engine. Write postal now to Cushman Motor Works, 2052 N. St., Lincoln, Nebr.

THIS IS IT ?

Scouten's Engine **Automatic Coupler**

Uncouples without slacking speed of engine at all but cannot be uncoupled accidentally by any pull of the engine.

See it at the Fairs this season, it can be seen at the Nichols and Shepard Thresher Co. exhibit.

Write for pamphlets today with testimonials. Each coupler guaranteed to give satisfaction or money refunded.

Price \$10.00 Cash With Order.

Scouten Bros., Riding Mountain, Man.

Patronize Those Who Patronize This Paper

speed and increase diameter of pulley on the engine. Having three sizes I find it to advantage to change and when the engine is under its load the speed is not so variable. In cutting cordwood the saw should be sharp with just enough set to clear itself, which means a saving of power and time.

At threshing time the engine is put into service elevating grain into the granary, which is certainly a labor saving. It also runs a six inch grinder grinding at the rate of 8 to 10 bushels per hour of wheat or barley, according to fineness required. This I find requires the most power.

I have had the engine 2½ years and have never had any difficulty to start it and keep it running. The ignition has never given any trouble whatever. I use dry cells. But when using the engine for outside work in extremely cold weather, I have taken the battery to be warmed first, as I find the cold does affect their efficiency somewhat. After warming the gasoline by standing it in warm water just previous to being used, there never was any difficulty in starting. Lubricating oil is apt to be too thick in cold weather to run unless a lighter grade of oil is used. I have found by mixing about 15 per cent. of coal oil, better results were obtained.

I may say by keeping the mixture right, more power is obtained and the heat is lower, which insures a more perfect lubrication of the cylinder, especially in air cooled engines, but will say when running five hours steady in summer time the engine has never once overheated or failed to give its rated power.

The gasoline engine is often claimed by manufacturers to be able to run itself after it is started, but I do not believe that such is the case. It needs attention just as other machinery does, with a little thoughtful study besides. It will then be unnecessary to call for the expert, as many has to do for some trifling thing which might easily have been remedied.

I think the Gasoline Department in your paper will benefit many. I am a subscriber myself to Gas Power and Gas Review, both of which are excellent magazines.

Wishing you every success,
Yours truly,
Percy Wheeler,
Rosthern, Sask.

Uses a Portable for Threshing.

In answer to your request in regard to our experience with a gas engine, would say that we have run our engine four years and have had a good return for the money we put into it. We have had some bad luck as well as good, but I will say that the last two years we have had the very best of satisfaction, as last year our engine did not cause us one minute of lost time and this year we had a little trouble the last few days we were out, but it was on account of a poor spark. We could not start it in the morning without



THE Flour City Tractor

Twice Winner of the Gold Medal in
the Winnipeg Contest, 1908 and 1909



A General
Farm
Engine of
the
most
Modern
Design
and
Construction



The Acme
of Strength,
Lightness
and
Durability
Our Catalog
tells all
about it

An Engine that has Demonstrated by Comparative Tests its Superiority

Kinnard-Haines Co., 828 44th Avenue North and Bryant, Minneapolis, Minn.
Ontario Wind Engine & Pump Company, Ltd., Dominion Sales Agents, Winnipeg, Calgary and Toronto.

burning it out two or three times with gasoline. I think there is more trouble with gas engines caused by a poor spark than anything else. I find that if I have a good spark we can go right along without the least trouble. All the trouble we ever had with our engine was getting started in the morning. After we got it started it would run all day if we wished. I think if more attention were paid to the ignition and cylinder oil by the men who have gas engines, there would be less trouble with them.

I also think that if the makers of the different engines would send an experienced man out with their engines for a week or ten days, they would be doing a good thing for themselves as well as the man that bought their engine. I do not think they give themselves nor their engine nor the man who buys justice as they will sell an engine and go and start it and go away and leave it to the man who bought it to play with it until he gets out of patience and then goes after an expert to fix it up. The makers of the different engines should do all in their power to educate the men to handle their engines and if they would do this the day is not far distant when we will see the gas engine the horse of the farm.

Our engine is a sixteen horse power Flour City portable and we run a thirty-two inch Belle City separator with feeder and blower and have plenty of power. Our expenses are:

Three stook team per day	... \$4.40
One pitcher in field per day	.. 2.50
Myself per day	..... 5.00
Gasoline per day	..... 5.00

We thresh from 550 to 600 bushels of wheat, and oats and barley 700 to 800 bushels per day. Our engine uses from 18 to 20

gallons of gasoline per day of ten hours and it costs us delivered at our station about 22c. per gallon.

I might say that our engine is about nine years old, so you will see that we have not got an up to date engine and when we could get such good results out of this engine we should get greater results from an up to date engine.

We use our engine mostly for threshing, although we have done some crushing and wood sawing with it.

I also might state that we had a very funny thing happen just at dark one night. I was at the engine and was going to stop for the day when I saw sparks coming out of the blower of the separator and I thought the machine was on fire. I stopped the engine and after getting a pail of water I got on top of the machine to see where the fire was, but I could not find any fire. On closer examination, however, I found that there was some binder twine wound around one of the beaters between the boxing and the beater and caused it to heat and set the twine on fire. As the twine burnt the sparks went out the blower. One of the men picked up a piece of burning twine and lit his pipe with it. I have threshed more or less all my life and never saw a thing like that happen before.

I think that a gas engine is much easier to handle than steam after one gets to understand it, for if you have a good ignition, plenty of good oil and if you regulate the gasoline properly, you can depend on it that the engine is going to run. I have left our engine for an hour or more and gone into the field and pitched. I would not be afraid of starting it in the morning and going away from it till noon if it were not for putting oil on it.



GILSON MFG. CO., 216 York St., GUELPH, ONT

Harmer Implement Co., Winnipeg, Western Jobbers

Wishing you all success, I remain,

Yours truly,
Chas. Pittman,
Silver Plains, Man.

A Problem for Smith.

F. W. Smith, the popular cigar man, whose interest in baseball is well known, is in the habit of buying two seats when he attends a ball game so that he will have plenty of room. The ushers understand this peculiarity, and when Mr. Smith arrives at the grandstand he forks out the two tickets and an usher conducts him to the seats with due ceremony.

During the recent series of games played in Spokane between the Indians and the Seattle team, Mr. Smith started for the game one afternoon with the customary two tickets in his pocket. As usual, the usher took in at a glance what the two pieces of pastboard were for, and led the way to the seats. When he reached them he paused.

"What's the trouble, young man?" said Mr. Smith.

"Sorry, sir," said the usher, "but if you sit in these two seats you're going to have some difficulty. Don't you see? They're on opposite sides of the aisle?"

Course in Gas Engineering

This Course will consist of a series of practical talks on the theory and practice of the gas, gasoline and oil engine. They will be simple, illustrated where necessary, and of such a nature that the gas engine owner may easily adapt them to his daily engine work.

Course in Gas Engineering.

Continued from page 24 last month.

der of the rotation there is no current flowing. It may be readily seen that by connecting one end of the armature wire to the armature core, and by connecting the other to an insulated metallic contact segment, carried by the armature shaft, upon which bears a stationary insulated brush, the current impulses may be taken from the magneto for use.

"Now as to the practical use of such a magneto for ignition purposes. Since it is only during a small part of the armature rotation that current is being generated, it is necessary to rotate the armature shaft at such a speed that these electrical impulses shall be so timed as to correspond with the periods when ignition is required by some one cylinder of the engine. If this were not attended to, the ignition periods of the engine might occur during the parts of the armature revolution, when no current was being produced. In order to bring about this result, the magneto and the engine must, at all times, run at a properly proportioned ratio of speeds and the positions of the engine, crank shaft, and armature must be adjusted right in the first place. If the magneto shaft is geared to the engine at the right ratio, and the teeth of the two gears are correctly meshed, the desired result will be brought about. For instance, if the engine be of the four-cylinder, four-cycle type, four sparks will be required for each two crank-shaft rotations. Four sparks will be produced for each two revolutions of the magneto, as well, and thus, if the magneto and the engine run at the same speed, the sparks will be numerically correct. If geared to the crank shaft, the crank shaft gear and the magneto gear would have the same number of teeth, and if driven from a two to one shaft, the number of teeth in the two to one shaft gear would be twice as great as the teeth of the magneto gear. By changing the particular teeth of one gear which are in mesh with certain teeth of the other, the current impulses may be made to occur at the moments when the pistons are exactly in the firing positions."

In variable-speed engines, as automobile machines, for instance, the service required of the ignition outfit becomes more exacting as the speed increases, owing to greater compression and less available time. This in the case of mechanical current generators is met by a natural increase in voltage with increase in speed, which constitutes another advantage of this type of generator as compared with primary and

secondary cells. Thus less hand manipulation of the spark is required, but all magneto systems should be provided with means of altering the armature position relative to the crank-shaft position in order to alter the time of spark.

LESSON X.

Systems of Governing.

At the outset an essential difference between steam and gas engines in the matter of governing should be noted. The working fluid in the steam engine is a comparatively stable medium, and, as long as the pressure remains constant, one position of the governor mechanism always cycle after cycle recurring with the same development of power. This is absolutely essential for close governing, and in this respect the steam engine has some advantage over the gas engine. The conditions in the latter are very different. The working fluid is prepared by the engine itself, air and fuel being mixed at the engine to produce the medium. Various expedients to this end, more or less successful, are in use, but outside of this, due to accidents of design or other reasons, stratification of the charge more or less complete, and variation in ignition may result in unequal velocity of pressure propagation through the mass of the charge giving a bundle of different diagrams for the same heat value of the charge. Thus it may result that the same position of the governing mechanism may not, and often does not, indicate the same power developed, and speed fluctuations are the inevitable result. Fortunately the mixing and ignition apparatus of our modern engines can be made perfect enough in their action to confine these fluctuations to within allowable limits.

All gas engine governors come under the following systems as far as their effect upon the diagram is concerned. Mechanically they may be of various designs, as inertia, fly-ball, etc., a discussion of which will appear later.

1. The Hit-and-Miss System.
2. Variation of the Ratio of Fuel to Air with Change in load; Quality Governing.
3. Variation of the quantity of the charge to suit the load. Ration Fuel to air remaining constant; Quality Governing.
4. Combination systems.
5. Governing by varying time of ignition.

1. The Hit-and-Miss System.

This system effects speed regulation by cutting out explosions altogether, depending on the load.

Thus, for instance, if the engine is running at full load, the explosions or cycles will follow each other in regular order until the speed has increased enough above the mean to cause the governor to act, preventing the drawing in the next charge, thus causing a "miss." This in turn causes the speed to fall sufficiently below the mean to make the governor act the opposite way, causing the explosions to recur. At any other load less than the full load the governor action is the same, except that as we go down in the scale the proportion of "misses" to "hits" constantly increases. This system may be operated in any of the following ways:

(a) By keeping the fuel valve closed, so that the engine draws only air for the miss cycle.

(b) By keeping the inlet valve closed, thus preventing the admission of both fuel and air.

(c) By keeping the exhaust valve open. In this case the admission valve is usually automatic, and its opening is prevented by the fact that on the next stroke no vacuum is formed, the exhaust gases being sucked back into the cylinder.

Theoretically this system of regulating is the simplest, and, from the standpoint of fuel consumption, the most economical; practically, however, it is beset with certain difficulties. In theory the cycles are all gone through under exactly the same conditions, and hence ratio of fuel to air, pressure of compression and point of ignition can only be adjusted once for all to suit the requirements of best thermal efficiency. The thermal efficiency of the cylinder should therefore be the same at all loads.

In practice there is some deviation from this ideal condition, even assuming "perfect governor action," but the variation depends somewhat upon the manner of governing. Thus in engines in which only the fuel valve is kept closed to produce the miss cycles, it will be generally found that the card directly following a miss period is larger than those following it, at least for loads approaching full load. This is due to the fact that during the miss period the cylinder has been thoroughly scavenged by air causing the next charge to be purer and somewhat larger in quantity than the average. Under very low loads the effect is apt to be the opposite, that is, owing to a prolonged period of miss strokes the cylinder has cooled so far as to make the first cycles following somewhat slow burning until the cylinder heats up again.

It is evident that these variations must have their effect upon cylinder efficiency, but the effect

perhaps is greater with liquid fuel engines than with gas engines proper, because a cool cylinder is likely to condense some of the fuel vapor, thus causing a direct loss.

In engines that govern by keeping the exhaust valve open, drawing the exhaust gases back into the cylinder, the effects above outlined may be less marked, but the method cannot on that account be recommended as better than the other, because the inevitable mixing of the exhaust gases with the incoming charge has its own harmful effects.

In spite of these facts, however, the hit-and-miss system of governing, no matter how carried out, usually shows a somewhat greater economy of fuel in practice than the other systems.

We next turn to the efficiency of this system as a speed regulator. It is evident that the closeness of regulation, in case centrifugal governors are employed depends altogether upon the sensitiveness of the governor, that is, upon the facility with which it changes from one position to the other; altogether it is possible here also to have a governor too sensitive resulting in needless hunting, but whatever the type of hit-and-miss governor, the regulation will be closest if at the higher loads a constant series of explosions is followed by a single miss cycle, or if at the lower loads a single explosion is followed by a constant series of misses. Thus $\frac{3}{4}$ load should be represented by the series III-III, etc. and $\frac{1}{2}$ load by I----I----, etc. Any disturbance of the governor, accidental or otherwise, as through want of care, increased friction, wear, etc., will alter this real condition so that a $\frac{1}{2}$ load for instance, may be represented by the series III-II-III-II, etc., but such variation at once unfavorably affects the regulation. These accidental conditions are not under the control of the operator, and the net result is that hit-and-miss regulation, though economical, is somewhat unreliable, and certainly not as close as that obtained by some of the other methods, unless a very heavy fly-wheel is employed.

Hit-and-miss governing is, therefore, little employed where close regulation is essential, as for electric current generation. For ordinary commercial power operation, where the regulation need not be closer than say 3 to 5 per cent., the system is quite satisfactory, although it is being slowly replaced even in this field. It should be remembered in this connection that, if the engine is belt-connected to the power consumer, the flexible connection will tend to equalize the speed variation to a certain extent.

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2. Governing by varying the ratio of fuel to air; quality governing:

In this system the governor is usually made to act upon the fuel admission valve, so that as the load on the engine decreases the engine receives less and less fuel in the same total charge volume. This, of course, decreases the area of the indicator card developed to suit the load. Instead of acting upon the fuel valve, this method of governing has also been carried out by sucking back a certain amount of exhaust gases, thus also decreasing the heat content of the charge. Another way is to regulate the air admission valve, making the fuel valve automatic. All things considered, however, the first mentioned method is the best.

Considered from a thermal standpoint this system has the advantage that, since the total charge volume remains practically the same for all loads, the

compression pressure remains constant throughout.

It, therefore, should follow on theoretical grounds that the thermal efficiency of the cylinder should be about the same for all loads. In practice, however, it has been clearly shown that this system is inferior at low loads to the next one to be described. In fact, the fuel consumption per horse-power usually increases very rapidly as the load drops. The reason is that, as the fuel-ratio is decreased, the mixture rapidly becomes difficult to ignite, and above all, slow burning. This necessarily increases the heat loss to the jackets and the ignition difficulty may go as far as to prevent ignition altogether, causing a direct loss of fuel. In most cases after-burning is clearly recognizable by the low dropping of the expansion line. Designers have tried to overcome this difficulty by placing the time of ignition also under control, making

it earlier as the load decreases. The scheme, however, does not appear to have been very successful.

As a method of governing, this system is capable of giving close regulation with the proper weight of fly-wheel. The very fact, however, that the compression pressure does not drop in proportion to the maximum pressure introduces a disturbing factor into the crank effort diagram, which would tend to make the regulation under this system less close at low loads than under System III.

3. Governing by varying the quantity of charge of constant composition to suit the load; quantity governing:

Governing by changing the quantity of charge to suit the load may be carried out in three ways:

(a) The engine draws a charge full stroke each time, but a part of the charge, depending upon the load, is forced back into the suc-

tion passages, the inlet valve being under governor control.

(b) The incoming charge is completely cut off by the governor at the proper time, the charge expanding behind the piston for the rest of the stroke. This is known as the cut-off method.

(c) The charge is throttled down throughout the entire compression stroke, the governor determining the position of the inlet valves. This is called the throttling method.

Quantity governing in general is, on thermal grounds, open to the objection that the compression pressure decreases with the load, and hence the cylinder efficiency constantly decreases. On the other hand, the mixtures remain readily ignitable down to the friction load, with the result that quantity governing is on the whole more economical than quality governing. The fact, too, that the compression pressure, de-

Continued next issue



The Canadian Thresherman and Farmer

CANADA'S FARM MACHINERY MAGAZINE

PUBLISHED MONTHLY BY
E. H. HEATH COMPANY
LIMITED
WINNIPEG CANADA

Members Western Canada Press Association
Authorized by the Postmaster General,
Ottawa, Canada, for transmission as
Second Class Matter.



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TREASURER

"Everything begins and ends with the soil."



THINGS ARE NOT AS BAD AS THEY SEEM LIKEWISE THE CROPS

OUR GUARANTEE

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Western Canada is so used to good crops that when a partial failure does strike the three prairie provinces a mole hill is quite likely to assume the proportions of a mountain. If one were to take stock of all the reports circulated it would be an utter impossibility to arrive at anything like a definite conclusion.

Western Canada is a big country and when we hear the cry of crop failure we can come to but one conclusion and that is, that it is sectional rather than general. As a matter of fact some sections (and by no means the minority) are blessed with bumper crops which, with the high prices prevailing, will yield most handsome returns.

It is true that in some sections the yield will be exceptionally light and some farmers are bound to suffer, but taking the country as a whole the yield will be such as to cause no alarm in business circles.

Western Canada is distinctly a grain raising country and while the pessimist may get in his work for a time even the farmer who has a poor crop will forget his failure and turn his thought toward the yield of another year. It is simply a case of "take the bitter with the sweet" and stick to the game. The winning post is a sure reward.

This issue contains an exceptionally complete illustrated report of the 1910 motor competition which was held at Winnipeg. We are confident that in no other publication will there appear such a fine set of illustrations and the report itself is full of meat for any farm power user. Farm power is a live topic today and it is a pretty certain statement that within the life time of the present generation the horse as a beast of burden on the farm will be practically superseded. It is rather a slow process, but it will come just as sure as time will pass. The manufacturer is making every effort to keep up with the demand for farm tractors and the farmer is by no means slow to appreciate the benefits and economy of the tractor as a labor saver and a money maker. The motor contests that have been held in Western Canada have probably done more than any other one thing to boost the farm power proposition, and the data secured at these contests has been of inestimable value to the farmer who has studied it carefully.

It is true that should these contests be held in the future each succeeding one will see some changes in the rules and regulations as the development of the tractor and the requirement of the user go hand in hand. These contests are, or at least should be, primarily for the farmer and should be so designed as to show him the possibilities of the various motors competing as farm power producers.

Don't attempt to swallow these reports in one piece but take them up part by part and digest the whole matter thoroughly. In this way the most can be gotten out of them. There is far more to the figures that are brought out than mere scores of points.

The straw throughout Western Canada in this season of 1910 is, in general, short. This will mean that there will be far less to go through the various separators than in 1909. It also means that there will be a large number of "jobs" for the threshermen to

handle. These jobs are a menace to the threshing business in that they almost force the thresherman into lumping things, which in a great many cases results in a cut rate for threshing. It is true that the farmer with only a few bushels to thresh can scarcely afford to pay out the bulk of his crop for a threshing bill, but, on the other hand, the thresherman must move just as far for a small job as a large one and as the number of moves in case of a light crop is far greater than in the case of a heavy one he is seriously handicapped in so far as profits are concerned.

Again, when the straw is long and the amount of grain threshed is small in proportion to the amount of grain put through, the thresherman is obliged to do a lot of work for his money and the farmer never sees fit to add on an extra five dollars for the extra labor performed by the thresherman. It is a poor rule that won't work both ways and no farmer should refuse to pay a good price for his small job that even then will scarcely give the thresherman a living wage.

For the past two years we have carried on a very active campaign among the farmers and threshermen of Western Canada for subscriptions. We have met with results that have been very gratifying to us and in 1910 and 1911 we will carry out a subscription plan that will eclipse anything that we have yet put on.

Last year we put on a \$2000 prize guessing contest and 2000 people were pleasantly surprised in the way of prizes. This winter we will put on a subscription campaign that will not only make 2000 people happy but should make friends and boosters of 10,000 new readers of the Canadian Thresherman and Farmer. Better than that, it will give both old and new readers alike a chance to get in on some of the good things we have to offer. We are not as yet quite ready to make our announcement but it will come just as soon as some of our present plans are a little more perfect. Watch for it as it should be of particular interest and value to everyone. We want the name of every wide awake farmer in the three prairie provinces on our subscription list as a bona fide paid up subscriber to the magazine. We want them to get their share of the mealy up-to-date matter that we are putting out from month to month. We want them as continuous readers of the Canadian Thresherman and Farmer and for this reason have laid our subscription plans most carefully. Watch for our big announcement later.

The time of "Something for Nothing" in the world is past. It is true that we still have the "Gold Brick Man" with us, the man who will give you gold dollars for anywhere from 10 to 90 cents. Occasionally we hear of this being done in the advertising game but don't let it mislead you. Advertising space costs good money to produce and the man who offers it to you gratis puts you as an advertiser up against one of two things. He either has a proposition whose value is nil or he is getting a club wedge to hold over your head later on. Advertising space that is worth having is worth paying for—the free kind is not advertising.

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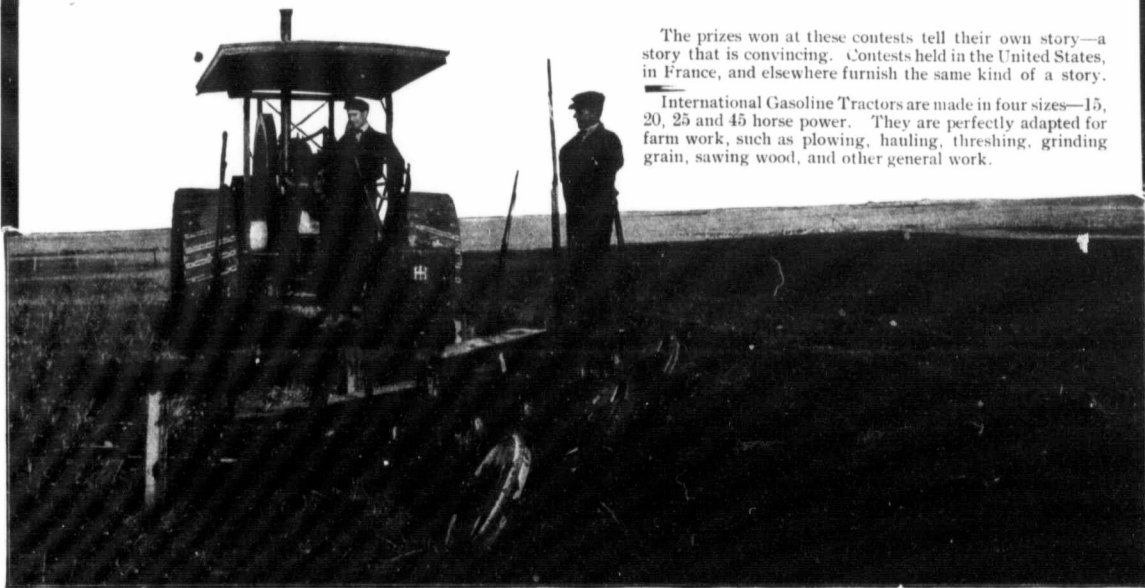
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The Draft of Farm Implements

BY L. W. ELLIS.



TO MANY farmers the word draft is familiar but not its meaning. The farmer knows what a draft horse is, reads about plows of light draft, and knows that a heavy draft horse is needed to pull an implement with heavy draft, but if he is asked to define the term, he would probably answer, vaguely, that it had something to do with pull. Defined in plain terms, draft is resistance, that is, the resistance of a load to the force seeking to move it over or through the soil. It belongs essentially to the implement and represents dead weight to be overcome. The force exerted to overcome it may be called the **pull** or the **tractive force**. It belongs essentially to the prime mover, whether it be a horse or a tractor.

The question of draft of implements is of great importance to the farmer. It is very easy to obtain fifty per cent difference in the draft of plows. For instance, the plowing bill of the United States is probably about \$450,000,000 per year. If a Bureau of Farm Engineering could be established in our National Department of Agriculture, and if it accomplished nothing more than to induce farmers to use the lightest draft plows, under perfect conditions, the annual saving over present practice would be at least 90 or 100 millions dollars, or five times the cost of the whole department with its 11,000 trained workers.

Draft and power are not closely related, as speed is an element which must be considered. A heavy draft implement at one mile per hour requires less power to move it than a light vehicle at ten miles. **Power and pull** are two different propositions. It will, of course, require twice as much power to exert a given pull over twice the distance in the same time, or twice the given pull over a constant distance in the same time. Moreover, draft does not necessarily depend on weight. Everyone knows that it takes less force to pull a wagon over the ground than to lift it. It is easier to pull a wagon on firm, dry ground than a sled of less weight, since rolling friction is less than sliding. Again, a plow may not weigh as much as a sled, but pulls harder, owing to the friction of the soil. With every implement there are countless things which affect the draft but to date no one has ever made a study of the comparative draft of all implements under the same conditions. It is reported to the writer that during the present summer one authority on tillage and one on agricultural engineering intend to make such tests of all tillage implements.

It is impossible to go into detail in illustrating these differences, but some figures may possibly be of interest. Just as agriculture is the world's funda-

mental occupation, so the plow is the fundamental tillage implement, and it is natural to consider it first. To begin with, the plow must have the proper shape for the work in hand. In stubble plowing, one expects to do more work, as the soil is pulverized in addition to being turned. It is not surprising then to note that a stubble plow pulls 20.9 per cent heavier than a sod breaking plow in the same soil, doing the same amount of work. Furthermore, a stubble plow usually cuts from 25 to 50 per cent deeper than a sod plow. On the other hand, the sod plow is used in soil which is much more difficult to plow. This difference in soil outweighs the extra work done by the stubble plow, hence, in the same section from 40 to 60 per cent more power is usually applied to the breaking plow.

The amount of moisture in the soil affects the draft. In two sets of tests on this point in clover sod, the difference amounted to 142 and 144 per cent, respectively. In sod ground a rolling coultter reduced the draft 20.86 to 25.34 per cent, in the average of different sets of tests. Of course, in all cases, comparison is made of the draft for a given unit of work. Usually this is taken as one square inch of the cross section of the furrow slice, which is obtained by multiplying the depth by the width. As a matter of fact the size of furrow also has considerable to do with the draft. The furrow that can be plowed with any given plow is, of course, limited as to depth and width. However, within reasonable limits, it can be varied, and the results of tests seem to indicate that the larger the furrow that can be plowed within these limits, the lighter the draft per square inch of the cross section. This being the case, it is obvious that a man not only gains in time but in power expended to the acre, if he sets his plow to cut the largest furrow than can be well handled. In tests in an old corn field in Illinois, the relative draft per square inch at different depths was 8" (the lightest draft) 100; 7"—103.8, 6"—108.2, 5"—110.2, 4"—117.3. One reason for this is, that the surface soil is usually drier and quite often somewhat baked. Moreover, the proportion of the area of the cross section to the total cutting edge aims to make the larger furrow easier to cut in proportion to size. For example: To cut a furrow 4"x12", there must be a cutting edge of 16" in shin and share to 48" of cross section, or in the ratio of 1.3. For a furrow 6"x14" the cutting edge is 20" and area 84", or in the ratio of 1:4.2. Scientific tests with a walking plow have shown that 55 per cent of the draft is due to the cutting of the furrow by the shin and share; hence, an increase in the proportion of cutting edge to

area increases the draft of the plow per unit of work. For the same reason the sharpness of the share is also important. At the Winnipeg contest last year two 6-bottom x 14" gang plows of the same make, supposed to be plowing the same depth, showed a difference in draft of 45 per cent. Most of this can be attributed to the fact that one was a new, sharp plow, just from the factory, while the other is said to have been used for several months for quarrying stones in a piece of new ground.

The angle of the share with the landside is an important factor and must be adjusted for different soils. For instance, in Colorado, in dry alfalfa fields, a plow with an acute angle will dodge the roots, while one having a share at nearly a right angle to the landside will chip up the baked ground and break or cut the roots cleanly. In a mellow loam the slanting cut must be used. The soil is not firm enough to hold the roots taut, hence they double over and clog a share which is set at a wide angle.

Friction of the sole and landside accounted for 35 per cent of the draft of the plow in the tests previously quoted. It is, of course, impossible to eliminate this completely, but the inventor of the sulky plow practically did away with the landside by substituting a staggered wheel to take its place. He then supported a large part of the weight of the plow on a frame carried on wheels, in place of on the sole. The effect of these changes was such that, even with the added weight of the frame and driver, the draft was practically the same as before. Now comes an engine gang plow, with neither a staggered wheel nor landside, but which works perfectly. The plows follow the engine obediently, without any tendency to swing to the left, away from their work, although 13 out of 14 wheels on the plow are castored. The designer has always claimed that, if a plow were given the proper set, it would follow perfectly without anything to counteract the friction on the moldboard, and in this plow he has demonstrated that he knew whereof he spoke. The absence of landside friction, together with a very perfect adjustment, makes it possible for the same engine to pull one and sometimes two extra plows.

Any angle in the line between the point of applying power and the center of draft on the plow, failure to scour, improper adjustment or handling, and many other points not always considered, help to increase draft and make comparative figures unsatisfactory, even in the same soil.

Soils vary greatly in resistance. For instance, a test in England for a furrow 5x9" gave a draft of

227 lbs. in loamy sand, 250 lbs. in sandy loam, 440 lbs. in strong loam and 661 lbs. in blue clay,—a difference of 194 per cent. between extremes. 57 tests in Missouri soils gave an average draft of 5.26 lbs. per square inch of cross section of furrow, and the same number of tests made in Utah by the same man showed an average of 5.94 lbs. per inch. In Utah seven trials on clover sod averaged 6.47 lbs per inch; a like number on oats stubble 4.68 lbs. The test previously referred to in Illinois averaged 4.76 lbs. for all depths, all plows and all conditions of soils. However, it may be said that for ordinary depths and widths of plowing, the draft per square inch of cross section ranges from about three pounds in sandy soil to seven and eight pounds in clay; six to seven in tame clover sod and from 10 to 15 pounds in virgin prairie sod. The draft of a furrow 6"x14" would then present an extreme range of from 250 to 900 pounds. From 400 to 500 pounds per 14" plow in old land in the middle West is about the average. Since authorities agree that a horse should be asked to pull continuously only about 1/8 to 1/10 its weight, a plow of this draft is a heavy load for two horses of from 1400 to 1500 pounds weight and three should ordinarily be used. In practice three ordinary farm horses of less weight are made to pull a plow with a draft of 400 to 500 pounds; hence, we can probably figure the working power of the ordinary farm horse at 150 pounds, in fairly hard, continuous work. If all factors are not favorable, it is very easy to increase the draft of a plow 10 per cent, which is equivalent to about 1/3 the work of one horse. As approximately 25 million horses and mules are now maintained on farms in the United States and even this number is not sufficient to do the necessary plowing at the proper time, it can be seen that an addition of 10 per cent to the draft means either that plow teams are overloaded or poor plowing is done. Probably both results are caused and the loss through poor work is greater than the loss through extra feed required to produce the additional power.

Meager as are the comparative draft data on plows, they are ample as compared with those on implements of other kinds. Practically nothing in the way of tests have been made of modern tillage implements; hence, the draft can be approximated only by comparing the number of horses used on implements of different sizes. Outside of the plow the ordinary drag harrow, the disc harrow and the clod crusher, or pulverizer, are the principal tillage implements used in the North. The following table gives a sort of comparison

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of these three on the basis of the horses used to pull them, allowing 150 lbs. as the effective pull of each horse:

	Disc Harrow	Dr g Harrow	Crusher
Width feet	8	20	8
Weight total	560	320	1100
Weight per ft.	70	16	138
Horses required	4	4	4
Approx. draft	600	600	600
Draft per ft.	75	30	60

The above comparison can not be regarded as more than a rough approximation. Four horses are often needed to pull a seven foot disc harrow with 16" discs, while the 8 ft. harrow with 16--16" discs was also equipped with four horses. The more mellow the soil, the greater the penetration; hence, the greater the amount of dirt moved. The sharpness of the discs and the decrease in angle to the line of draft also increases the work done. Consequently, an eight foot harrow with discs at right angle to the tongue can be easily pulled over a hard road by one horse, while at the Iowa State College they have a photograph showing eight of their horses—eight tons of horse flesh—having plenty of exercise in moving two disc harrows in a mellow corn field. The condition and texture of the soil play as great a part in the draft as in the case of plows.

In stiff clay land the writer has used two horses weighing 2200 lbs together on a steel spike tooth lever harrow, cutting 15 ft. However, the teeth slanted well backward, the driver walked and it took a great many trips over the

field to get it into condition. To accomplish much in the way of pulverization, the teeth should be set nearly straight and at least one horse provided for each 5 ft. section.

Crushers and pulverizers vary considerably in weight per foot of width. One authority says that rollers should not weigh more than 100 lbs. to the foot and should be at least 24" in diameter. Of course, the greater the diameter, the lighter the draft, unless the weight is increased to correspond, but at the same time the pressure per square inch on the ground is decreased. Ordinarily these implements average about 18" in diameter and weigh from 130 to 150 lbs per foot. An internal combustion tractor, which had been pulling six 14" breaker bottoms in North Dakota was able to handle three 12 ft. disc drills and three 12" sod crushers, weighing 1800 lbs each. Allowing 60 lbs. to a foot in width, for each, the total draft would be 4,320 lbs. At Winnipeg last summer the breaking plows averaged over 700 lbs. to the plow; hence the draft for six bottoms would check up very well with the amount just assumed for the drill sand crushers.

The disc drill, and particularly the single disc drill, is now practically standard. As a rule the furrow openers are spaced 8" apart. Three horses will usually handle a 12 ft. disc drill, seeding a strip 8 ft. wide. Allowing 150 lbs. pull to each horse, the draft per foot of width would be 57.5

lbs. Prof. Davidson of Iowa obtained a higher draft than this; a single disc drill with 10 furrow openers, 8" apart, having a draft of 68.6 lbs. per foot of width. Drills usually place the seed about 2" below the surface, consequently the work of drilling and covering seed takes approximately the same power per acre inch, as the disc or drag harrows doing work as shown in the table.

Mowing machines are usually operated with two horses for a 5 or 6 ft. cut, indicating a draft of about 300 lbs. A leading manufacturer places the draft from 190 to 325 lbs. for a 5 ft. mower. Two other authorities place the draft at from 285 to 340 lbs. for the same width. The draft may easily be doubled by dull knives, tight boxes or too low speed. The knives are not serrated as in the case of the binder; hence about three times the speed of cutter bar must be maintained in order to cut cleanly through the tough stems of forage grasses. The 6 ft. mower will of course require more power than the 5 ft. but not in proportion to the extra cut. In one test five mowers, run in gear but not cutting, showed an average draft of 154 lbs. While cutting the average was 268 lbs. showing that 57½ per cent. of the draft was due to the running of the machine. The actual work of cutting apparently consumed about 23 lbs. per foot. In an actual test of a 4¼ and a 6 ft. mower of the same make, the drafts were 203 lbs. and 263 lbs. respectively. This shows about

34 lbs. of draft for each added foot cut. However, the extra weight of frame and the added size of bearings increased the draft somewhat. It is evident that the wide cut mowers are economical in the same way that the engine is economical when running at high percentage of its rating, less being wasted in internal friction.

The kind of grass cut and the thickness of stand have an important bearing on draft but owing to different speeds of cutter bar, different mowers show lighter draft in different grasses. In an experiment in which five mowers made 12 trial runs, all showed the heaviest draft on a 3½ ton crop of timothy. Two showed a lighter draft on a 2½ ton crop of alfalfa than on a field of wild hay, which was very thick at the bottom. The other three running at higher speed, handled the dense stand of fine grass better than alfalfa.

Six ft. binders range in draft from 300 to 500 lbs., requiring three or more horses to pull them at a speed high enough to do good work. Prof. Davidson quotes tests showing 314 lbs. as the average of two 6 ft. machines, or 52½ lbs. to the foot. To some extent the same statements as to economy in cutting a wide swath might be made as with mowers. However, the binder must elevate and bind the extra grain at some additional expenditure of power. Twelve ft. headers require from 600 to 800 lbs. or from 50 to 70 per foot cut. A header

binder of the same size will require from 100 to 200 lbs. extra to operate the binding attachment. More horses are more commonly used on binders than on mowers in proportion to draft. Since there are more opportunities for sluggish movement of the straw to clog the working parts, a high speed must be maintained. The average farm horse is able to maintain a pull of 150 lbs. only by reducing the net speed to two miles per hour or less. To maintain 2½ miles per hour, at which speed the machines work to best advantage, more power is required.

There are probably more data available as to the draft of wagons than any other piece of farm equipment. The height and width of wheels, the position of the load, the angle of traces, speed of travel, lubrication, character of road-surface, grade and many other factors enter into the question of draft of vehicles. The higher the wheel, the less the draft of the total weight of load and vehicle. Road surfaces are never entirely level and wheels are continually encountering obstacles. The higher the wheel, the less the percentage of grade which each obstacle opposes. Consequently, less momentary force is required to lift the load over the obstacle. This process is constantly repeated; hence, high wheels and smooth roads contribute to light draft. The harder the road surface, the less do the wheels depress the surface soil. Since the force pulling the

load is constantly endeavoring to lift it to the surface, the effect on the wheel is that of constantly rolling up an inclined plane, the gradient of which is determined by the per cent. of the radius of the wheel, which is below the surface of the ground. This fact largely accounts for the low figure of from 8 to 10 lbs. of draft per gross ton on railways as compared to 150 lbs. on ordinary dirt roads.

The width of wheels affects the draft differently under different circumstances. In general the wide tires give from 20 to 120 per cent. less draft than the narrow tire on the same size of wheel. However, when the dust is deep or when there is a thin coating of mud with a hard surface below it, the narrow tire pulls easier. This is probably because the wheel must sooner or later sink to the hard surface and a narrow tire offers less resistance. Again, where there is only one wide tired wagon in a community and this wagon must continually travel in ruts made by narrow tires, the work of filling up these ruts plus that of carrying the load makes the wide tired wagon pull harder.

Each rise of one foot in 100 adds 200 lbs. to the draft of each ton, including the weight of vehicle. On a good macadam road the draft per ton is only about 60 lbs; hence, a rise of only 52 ft. to the mile adds 1/3 to the draft. The better the road, the worse is the effect of grade, since a greater load can be hauled on the level, whereas on the hill the

action of gravity is independent of the ground friction. It is for this reason that railways spend immense sums in cutting down grades.

Road surfaces greatly affect the draft. Taking the draft on a plank road as 100, the draft on other surfaces in a certain test was as follows: Macadam road, 152 to 220; gravel road, 300 to 318; common dirt road, 300 to 509. The lowest draft on a plank road was 25 lbs. per ton and the highest on a dirt road was 224 lbs. per ton. Other tests have shown up as high as 700 lbs. per ton on soft ground; hence, it is hard to make a comparison of the draft of wagons with other implements. However, two horses can usually be depended upon to draw about 3500 lbs. of gross load on ordinary country roads.

Lubrication is another important factor in the draft of all wheeled implements. A wagon weighing 3300 lbs. with load took a pull of 294 lbs. with no grease and 243 lbs. where lard was used. Between these two, taking lard as 100, the comparative draft with other lubricants was as follows: Axle grease, 100.7; cylinder oil, 104.2; castor oil, 106.7; lubricating oil, 112.1; coal oil, 117.6.

Owing to the countless factors that affect the draft of implements, machines and wagons, it is apparent that draft tests under different conditions are of little comparative value. Taken absolutely, however, they give a good line on what either a horse or a

traction engine should be expected to accomplish in handling various loads, under different circumstances. A wider use of the dynamometer, in connection with exercise of abundant common sense, would undoubtedly result in more humane treatment for animals and greater service from traction engines.

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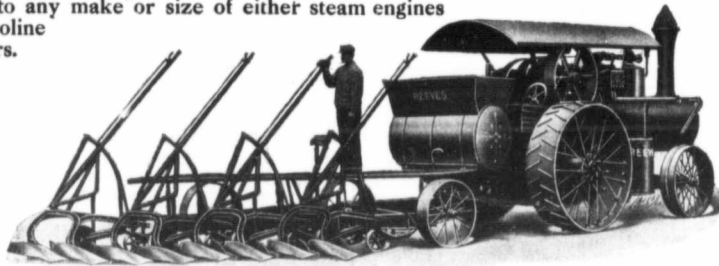
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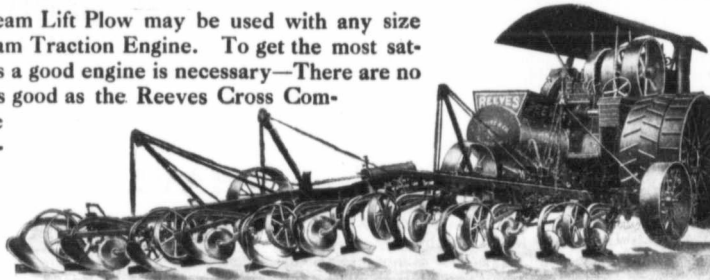
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CANADIAN BRANCH: REGINA, SASKATCHEWAN

The Thresherman's Question Drawer

Answers to Correspondents

G.F. Q. Will some one tell me why an engine should not be reversed without shutting off steam? One expert machine agent called me down for doing it, and said it injured the valve to slide it with the lever when under pressure. I presume I am dense, but I can't see what difference it makes to the valve to draw it with the lever or eccentric. I know it gives the gearing a bad jar to throw the reverse quickly and I would like to know any other reasons. My engine is an old Pitts, used eighteen falls. Has a screw throttle that is slow to use, consequently it is always handled with the reverse lever. The valve has not been repaired and have put in no new rings nor new gears. It works good and steams easily.

A. If an engine is well-designed, reversing it without shutting off steam will not hurt it in any respect. In fact, there is more harm to come from reversing with the throttle closed when the engine is running at a high speed, for when an engine is running in an opposite direction to which the valve gear is set the engine is turned into a pump and it pumps air from the stack through the exhaust nozzle into the boiler. This can be done on a locomotive coasting downhill. However, there are release valves on the steam ports which prevent this on a locomotive; but on a traction engine it can only be done when the engine is pulled by another engine, or by running the engine to a very high speed and then suddenly reversing it. If the flywheel is very heavy it is more effective than if it is light. This we have said will pump air into the boiler; but if the engine is suddenly reversed while the engine is at a high speed and while the throttle is shut, the air cannot go into the boiler, and if enough power is put to the fly-wheel of the engine something will burst; but if the throttle is left open the piston never has any more pressure than is in the boiler to pump against and that should not hurt it.

L.A. Q. In putting on a new engine bed on an engine would you make rigid fastening on pillow blocks when the boiler is cold or would you steam up to about 75 lbs.—working pressure 150 lbs.—to divide the strain on the engine bed equally between expansion and contraction of the boiler, which apparently cracked the lower side of guide of the old bed?

A. The new bed comes with bearing for main shaft babbitted. Opposite bearing has never been opened and seems to be in good order. Would you put it up without rebabbiting both new and old bearings?

3 What h.p. will a 6½ x 10, 10-inch stroke tandem compound engine develop, running 230 revolutions per minute, at 150 lbs. pressure?

A. On some engines there is a slip joint where the cylinder is bolted to the boiler which allows the boiler to expand and contract without exerting an undue strain on the castings; but if the cylinder and bed or frame are bolted rigidly to the boiler it certainly would help matters to bolt it up at a medium temperature of the boiler and thus reduce the danger of breaking the frame.

1. The temperature of the boiler at 130 lbs. gauge pressure is about 355 degrees F. Say the average temperature of the atmosphere is 45 degrees, this would make the average temperature of the boiler 200 degrees. Steam at atmospheric pressure, or just before it shows on the steam gauge is 212 degrees; so you see a medium temperature would be at about this point. As there are only about 50 degrees between 75 and 150 lbs. pressure, 75 lbs. would be a medium pressure but not a medium temperature.

2. The main box in the engine frame is square with the cylinder and in the factory the shaft is bolted fast by means of the main bearing cap, so that after the cylinder and frame are bolted to the boiler, the shaft is rigidly held in place and the outer bearing is babbitted. It may be possible that the outer bearing will be exactly in position. This can be found out by close examination, and if it is not exactly in position the babbitt should be cut out and replaced after the cylinder and frame are bolted to the boiler and shaft is securely held by the cap. To insure the shaft being held properly, the liners should be taken out from between the cap, and the box.

3. The nominal h.p., as given by the manufacturers is 20 and the maximum brake h.p. is 49.

E.H. Q. Why is a compound engine more economical than a simple one?

A. Compound engines are more economical than simple engines mainly because of the high pressure with which they can be worked without involving excessive strains, and partly in consequence of the diminished loss by cylinder condensation. A very early cut-off in a cylinder causes serious condensation. The same number of expansions may be obtained in one cylinder as in two, by sufficiently early cut-off; but the strain of throwing a high pressure of steam on a large cylinder and cutting off very early necessitates enormous strength in the working parts and hence, when the expansion can take place in two cylinders, the



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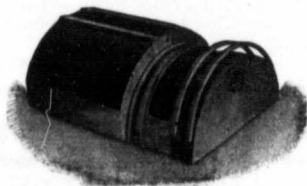
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strain is better distributed, while more smooth and even working is secured. The cooling surface is less, and the range of temperature is less in the high pressure cylinder than in a single cylinder engine with equal expansion, hence the diminished loss by condensation.—Ex. from Practical Engineer.

M. B. Q. Our engine steams up easy, but, just as quick as the throttle is opened to run, the engine drops 10 lbs. of steam at once, and keeps on going down even until she has not got power to pull.

2. What is the matter with my engine? I can have 120 lbs. of steam, steam gauge and pop valve in good condition; she runs and pulls separator, but as soon as they feed the machine she will not run and pull her load with 120 lbs. of steam. What can the cause be?

A. There must be something wrong in the cylinder. The piston may leak badly or the valve may be out of place, which may be caused by the eccentric not being in place as well as the valve slipping on the stem. There may also be something wrong with the steaming qualities of the boiler. For instance, if the exhaust nozzle was not small enough, or if it would not blow the exhaust steam up the stack. Any one of these things would cause the engine to perform as you describe.

2. In this case the engine may be too small for the work, or the valve gear may out of place, or there may be a stoppage of the steam caused by a defective governor or throttle. A stoppage in the heater or exhaust pipe may also cause the trouble, or perhaps the exhaust nozzle is too small. With these suggestions maybe you will be able to run down the trouble.

P. M. Q. What is the cause of a safety plug in a boiler melting when there is water over the crown sheet?

A. This sometimes happens when the plug does not extend far enough through the sheet on the water side, and projects too far from the sheet on the fire side, and when the tin is partly melted out, in time the small part which is in the sheet is blown out. A fusible plug should extend at least three-eighths inch into the water, and the cavity for the tin made cone shaped, so that the pressure tends to keep it tight and there will be no danger of melting or blowing the plug out when the water is over the crown sheet.

H. B. Q. What is meant by mean effective pressure?

2. How do you get it?

A. Mean effective pressure means the average pressure exerted on the piston throughout the entire stroke of the engine.

2. Mean effective pressure is arrived at by the aid of the engine indicator, which records the pressure at all parts of the stroke with a pencil on a card.

G. H. Q. I would like to have you send me if you will, the rules for finding the h.p. of an engine.

A. The rule for figuring the h.p. of an engine is to multiply the area of the piston in inches by the piston speed in feet per minute by the mean effective pressure and divide by 33,000; this will give the indicated h.p. The mean effective pressure is arrived at by the aid of the indicator. To arrive at the nominal h.p. as used by traction engine builders in this country a mean effective pressure of 20 lbs. can be used.

The heating surface of a boiler is computed in square feet. To compute the surface in the tubes multiply the circumference in inches of the outside by the length and by the number of tubes, and divide by 144. This will give you the area in square feet. Find the area of each sheet in the firebox above the grate line, deduct the flue holes, and fire door hole, also the front tube sheet. Reduce this also to square feet. After having the total surface in square feet divide by, say, 12, which will give the h.p. Some builders have given 10, some 11, and some 12, and some 13 square feet of heating surface to the h.p.

D. D. Q. I have a compound engine which has a double oil pump, one part of which supplies the high pressure and other part supplied the low pressure cylinders. Both plungers of the pump are driven with one shaft, there being two eccentrics on the shaft. Now the trouble is, both pumps do not deliver the same amount of oil yet they should have the same capacity, as the plungers are the same diameter and have the same stroke. The pump has no valves in it, but two valves on the delivery pipe leading to the high pressure cylinder, and one in the pipe leading to the low pressure cylinder. The plunger which delivers the oil to the high pressure cylinder gets the lesser amount of oil, and in fact to get a sufficient quantity to lubricate it properly, I have to run the pump so fast that the low pressure cylinder is flooded with oil, and in consequence there is a waste of oil. I have changed the connections and valves of the pump so that the plunger which delivered oil to the low pressure cylinder, was connected to the high pressure cylinder thinking this would help, but the trouble was about the same. The low pressure cylinder got much more oil than the high pressure cylinder.

Now, how can I get the pump to deliver the same amount of oil to each cylinder? If the pump is tight, should the difference in

Continued next month



Practical Talks to Threshermen

Conducted by PROFESSOR P. S. ROSE

TALK No. XXXV.

In reading the letters published in the Correspondence Department of this magazine I have noticed a good many requests for a discussion of grain separators. It would appear that a series of lessons on this topic might be of interest and my own observation in the field convinces me that there is as much need of instruction along this line as any other in the threshing business. The proper handling of a separator is just as important as the proper manipulation of the engine, and separator men are paid just as large wages as engineers. As a matter of fact, there are probably fewer really good separator men than good engineers. It would seem advisable, therefore, to present a series of lessons on the separator and this is what I propose to do.

At some future time I should like to present some more articles on the business side of threshing if the readers would care to have them. I have taken no little pleasure in writing the lessons on this topic which have appeared in these columns during the past few months. There is still much that might be said on this subject, but we will pass it up for the present and proceed to a discussion of threshing machines, first giving a little of their history.

From the time when the Lord rejected Cain's poor offering of the fruits of the soil down almost to the present time, agriculture, with a few exceptions, has not been an honored profession among the nations of the earth. For untold ages little was done to elevate agriculture to the position it deserved and which it has so recently achieved. The tools used in all its branches were crude and clumsy. Men exercised their genius in seeking ways to destroy life, not in means for preserving it. Swords and spears and cutlasses for mutilating the flesh, engines of torture for prisoners, devilish machines to scud poor wretches to eternity—all these were invented and made, but nothing whatever to help make more bread to feed the starving millions.

Decades of centuries rolled by without seeing a suitable plow devised to stir up the soil, a harrow to fit it for the seed, or tools to gather the ripened fruits. All these things were evidently considered beneath and below the efforts of those who had the genius of construction. These were ages of false ideals and it is only recently, this morning as it were, in the history of the race, that the breezes of common sense and sanity have sprung up and blown away the enveloping fogs and mists of a miserable past with its gaunt specter Famine dancing

and circling about, ever near and ever ready to spring out of the mists and wrap us in the cold embrace of death.

The great nations of antiquity did not realize, apparently, that their one great and implacable enemy was Hunger. They did not realize that all other foes were pigmies in comparison. They cut and slashed and fought each other. Nations rose and fell, art and literature flourished. Great captains led mighty armies over plains and mountain ranges and across the deep waters in search of empire with never a thought for the great common mortal enemy of all.

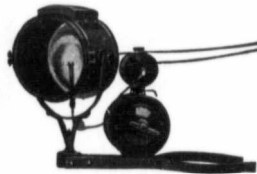
Such is the wretched history of the past with its petty personal vanities, its court intrigues, its poverty and suffering, and its starving millions. It is only this morning, as I said before, that we have awakened to a new and better day. We have at last discerned the real enemy. We have made war upon him, dismantled his guns, stormed his barricades, and entrenched ourselves in the rich valleys and fruitful places of the earth where he can never again assail us. The Goliath of the centuries has been slain with the pebble of Science and Invention. It is the greatest of the world's decisive battles and the real beginning of a better civilization, for to be happy and content and to feel the real spirit of brotherly love man must first be fed.

When the Western nations first began to realize the absolute necessity for more food, they were confronted with the difficulty of obtaining it without proper tools. Crude instruments were at first devised for tillage and as the harvests of grain became large with their subsequent development it was found that the old method of hand shelling by women and children, the beating of the straw with a flail, or the treading out of the grain by oxen and horses was too slow and too expensive. Other means must be found and inventors took up the problem. They realized at once that either of the two century old methods were available. Either the grain might be rubbed out of the chaff as in hand shelling or it might be beaten out—as by flailing or the tramping of animals. It was evident that the successful mechanical thresher must be constructed upon one or the other of these principles. Both methods were tried, as I shall presently show, and both are in successful use at the present time.

A Scotchman named Michael Menzies was one of the first of a splendid group of men who experimented with threshing machines and his efforts, while not

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crowned with complete success, are worthy of notice as paving the way for subsequent experiments. His machine, which was brought out in 1732, consisted of a number of flails attached to a rotating cylinder driven by water power. It was capable of doing a considerable amount of work in a short time and attracted a good deal of attention. The frequent breaking of the flails, however, demonstrated the fact that the really successful machine would not make use of the flail motion in its original form.

The next threshing machine of which we have record was also invented by a Scotch farmer who succeeded in improving upon the Menzies' machine by constructing a rotary cylinder armed with beaters which for the first time correctly applied the principle of flail threshing to a power driven machine. His machine consisted of a vertical shaft supporting four cross arms all enclosed in a vertical cylinder. The grain was fed in at the top of the cylinder and the rapidly revolving arms beat the grain out of the straw during its downward passage. Both grain and chaff fell in a pile at the bottom and separation was afterward performed by hand in the usual fashion of the time by winnowing.

Twenty years later an attempt was made to solve the problem by using the rubbing principle of separating the grain from the straw. This machine employed a large fluted or corrugated cylinder which revolved between a series of small corrugated rollers which were held forcibly against the large cylinder by means of stout springs whose tension could be varied to suit the conditions of the grain. The friction between the corrugations of the rollers and the straw was depended upon to remove the grain from the heads. This machine was experimented with for some time with the hope that it would solve the problem. However, it, too, was found impractical, being slow in operation and liable to crack the grain. The rubbing or fractional machine appeared after these experiments to be valueless and again inventors turned their attention to the flail principle, which had been all but proven successful.

The pioneer work of the early investigators, whose work has just been discussed, led to the final solution of the problem a few years later by another Scotchman, Andrew Meikel by name, who constructed a thresher embodying all the essential features of the present successful machine. This machine, however, was a thresher only and not a combined thresher and separator such as we are so familiar with to-day.

The Boys of the Old Brigade.

Throughout Central and Western Canada it is estimated that there are fully four to five thousand ex-soldiers — veterans of Britain's and Canada's wars. In order to reach this great body of

men the aid of this paper has been asked, so that everyone who has ever served Great Britain or its Colonies may know of the proposed formation of a National Veterans' Association, and that all veterans are eligible to join free of all charge whatsoever. This proposed organization is entirely independent of, but expect to work in harmony with any existing veterans' organizations.

Elaborate preparations are to be made for a grand Re-union in a year or two when the organization will be completed. Some of the best and most prominent men in the West are supporting this movement and a full list of veterans will be published later on.

Anyone knowing any ex-soldiers or veterans are requested to ask them to send their name and full address, (as well as the corps they served with) to the Secretary, Organization Committee Veterans' Brigade, 183 Walnut street, Winnipeg Man.

A large number of names are already enrolled on the "Roll of Honor," among them being veterans of the Crimea, Indian Mutiny, Frontier Wars, Chinese War, South African Wars, Fenian Raids of 1866 and 1870, Wolsley Expedition, Nile Voyagers, British Colonial Wars, North-West Rebellion of 1885, etc., etc.

Cattle Breeding in Japan.

Japan is keenly alert to improve her cattle and, for this purpose, representatives from that country have made visits to the United States and to Europe to buy such stock as appears suitable. Mr. Hashimoto, of the Japanese Government, the head of the cattle-breeding department, while in England, recently, said:

"Meat eating is on the increase in Japan. Its popularity is increased by the recently advanced theory that an overgreat con-

sumption of rice is a source of beriberi. The upper and middle classes, who have hitherto eaten large quantities of rice, are now slowly beginning to add meat to their dietary. Beef is the favorite dish. It is now ten or twelve years since we began to import European cattle into Japan to improve our native breeds. Our object is a dual one. We wish to produce a beast which will be serviceable for draft purposes, and will at the same time be of value when subsequently killed for meat. We also want to produce a good milk cow. For the first purpose a brown breed of Swiss cattle is found to make the best cross; for the milkers we are introducing Ayrshires. On an average we send over one hundred beasts a year, and I have paid as much as seven hundred and fifty dollars for a very good heifer. We also import Berkshire and Yorkshire pigs, and sheep from Russia."

THE INJECTOR THAT DOES THE WORK NEW DESMOND MODEL "U"

The secret of the New Desmond Model "U" lies in the construction.

It is made with a two piece body with the parts connected by a Union Nut.

When loosened the upper part with suction connection can be turned in any direction desired.

When the connection is made to the boiler, the nut is tightened and the injector is ready for work.

The New Desmond Model "U" will fit any space, can be put in any position, or adapted to any conditions peculiar to your needs.

The New Desmond Model "U" starts low, at from 20 to 25 lbs. It works high, from 175 to 190 lbs., lifts water 25 feet, handles water at 130 degrees, and delivers it to the boiler at almost 212 degrees. It is absolutely automatic. It will not "buck" or "break" under the most severe and continued jars.

This means that the Injector can be connected with either side of the boiler.

It is "flexible" on New Desmond Model "U." Injector will answer your Injector needs in every way, shape and manner.

The piping and valves can be arranged to suit your needs and your convenience; not to fit the Injector.

All the tubes screw into the body and cannot fall out, be lost or damaged when the cap is removed. Neither can they get out of alignment.

We rigidly test every Injector and guarantee it fully to work under all conditions.

Now is the time to get busy. Give our New Desmond Model "U" a trial. If your dealer cannot supply you, write us direct.

Remember there is no trouble to attach a Model "U"; it attaches itself.



Any Model "U" fits any Old Connection.

One Injector that fits all Conditions.

Desmond-Stephan
Manufacturing Co.
Urbana, Ohio

Sales Agents for Canada: CRANE & ORDWAY CO., Winnipeg

Keep a Record of Your Work

Threshing time is rapidly approaching and, particularly in the Central States, the threshermen are busy with preparations for the coming season. The thresherman, if he is forehanded as he should be, is putting everything in apple pie order so that when the word comes to "go," there will be no hitch or wait for fixing or adjustment that should have been attended to earlier.

Important as it is that machinery should be in prime condition for the season's work, that grain may be thoroughly threshed and cleaned and the customer satisfied, still more important is the keeping of an account of the business. The merchant's books, properly kept, are his sole guide as to whether it shall be worth while for him to continue in the business any longer, or in the case of much business, what departments shall be pushed and what eliminated. The same is true, to a certain degree, of the thresherman's business.

Style, and an elaborate system of book-keeping is unnecessary and impracticable for the thresherman. It is necessary that he have a sufficient record of his business to show what he has made—or lost—with the different kinds of threshing he is called upon to perform; what his daily expenses are, and last, but not least, his receipts.

Now the mere mention of book-keeping in connection with a threshing rig is apt to cause the thresherman unacquainted with the keeping of accounts to throw up his hands; and yet it is a very simple matter. How simple, we shall endeavour to show in the following:

Without going into the "anatomy" of book-keeping, we might make the general statement that all book-keeping is based on what is called Debits and Credits. If a man or a machine or a horse in which you are interested is costing you money, an account should be opened with him or it and that money charged to this account. Whatever the amount, great or small, if it is paid out for this item it should be set down to the account thereof. Here we may start the book.

We would suggest the threshermen get a strong book, the better if it is small enough to carry in the pocket, with paper good enough to take ink, and ruled for this purpose. There are books gotten up on purpose for the threshermen's use, all of which are good. Several pages are ruled for every kind of account that a thresherman will need to keep, with plain instructions for keeping the accounts. But whatever form of book is used, it should have several pages ruled with dollars and cents and date columns for the keeping of a cash account. This

is where the thresherman makes a record of every cent that passes through his hands, whether going or coming. The important thing is to make the record; the next important thing is to have separate pages; using one page on which to write down the money paid out for any purpose whatever, the other page for making a record of all money received, stating in the proper column what it was received for. Here are some sample entries:

CASH		
Date	Paid to	Dollars
July 14	Jno. Smith for oil	5
	Jno. Jones, wages for week	12
	Dick Smith, wages for week	15

CASH		
Date	Collected from	Dollars
	Henry Smith, thresh bill	40
5	Jno. Kelley, thresh bill	25
	Jno. Jenkins (sold him some old belting)	2.50

The foregoing will give an idea of how the account should be kept; and that it includes every item of money paid out or taken in about the rig, no matter for what purpose, so long as it concerns the outfit. Money paid for repairs, supplies, etc., is entered on the "Paid To" page. Money taken in on account of the rig, whether for threshing, shelling, road work, or any other work that any part of the rig is concerned with, sale of any old parts of material, all come under the heading "Received From," and these two pages, when footed up at the end of the day or week, will show to a cent just what has been received for the rig and what has been paid out for it. The important thing here is to forget nothing which should be entered. The logical thing to do is to have a pocket sized book containing this account and use it the moment money is received or paid out. This done, the thresherman has before him not only the reasons for receiving and paying out money, though mixed as to items, but a perfect record also of his cash transactions during the entire season.

Such an account will be very valuable for several reasons. It serves for one thing, if faithfully kept up, as a check on collections. If any farmer claims to have paid his thresh bill, the cash book will show it and the day it was done. By transferring the accounts to a "Ledger," the thresherman can have a record of any part of the work of the rig.

This cash account should be balanced at the end of every day; it certainly should be balanced once a week. "Balancing" means adding up the two accounts or

pages and subtracting the one from the other. If the "Collected From" page is the largest, as it should be after the season is well started, the difference between the two should be the amount of cash you have on hand at the time the balance was struck; that is, the amount of cash you have on hand as proceeds from the machine. If you have more money on hand in this account than the balance shows, probably somebody has paid you and you have forgotten to put it down. The difference between the amount on hand and the amount shown by the balance would probably be just the amount of somebody's thresh bill which you have omitted to record. It may be the amount of one or two thresh bills that have been paid and not put down, but it will show that you have received money from some source that has not been entered in the cash and you can look it up and get it straightened out. If, on the other hand, you have less money on hand than the balance shows you should have, then you have no doubt made some payment that should have been written in the cash book and was forgotten. For this reason, it is best to balance the cash book up every day when possible, then the day's transactions can be corrected from memory.

So much for the cash account. You see it is a very easy thing to keep account of cash so far as the "knowing how" is concerned. The main thing, and that any man can do, if he tries, is to be sure to write everything down. It will astonish those who have not kept accounts this way to see how much dickering and disputed accounts it will save.

Another good thing for the thresherman is a printed blank showing the particulars of each job, giving the date, the number of bushels, kind of grain, the per bushel rate for each kind, the total bill. There should be a supply of such blanks in duplicate so that when the job is done the thresherman can fill one out for a memorandum for himself, fill out the other one and tear it out and give it to his customer. If the customer pays on the spot he can receipt the bill then and there. If he does not, then both have a memorandum of the job and the amount of the bill; so that there can be no dispute on either side. If the customer pays on the spot, the payment should be entered on the "Cash Received" page and the stub bill marked "paid." But the thresherman should keep the stub in his book whether the bill is paid or not, as a matter of record. He can then, if argument comes up or

he wishes for any reason to know how much work he did for any person or verify the price he got, he can turn to his account book and on the stub is a complete record of the whole transaction. If the account is not paid, of course, the stub is a complete record also and no other need be made. At the end of the season, he can go through his account book, pick out the unpaid bills and make out statements for them. These statement blanks can be had at almost any village store at a small price, and a statement of the account on one of these, just giving the amount of the bill, will serve to present or mail the customer. He already has your duplicate bill showing particulars, which he cannot dispute. Every customer within a month of the job should have such a statement of his account, with a request to pay, unless special time arrangements have been made for payment of same.

Another good feature of a thresherman's account book is pages showing a record of the time of the men working for the machine owner. An ample supply of pages ruled for this purpose is a very convenient thing for the machine operator. He will find it very convenient to keep such a record anyway, and it should show the names of the men, space for every day in the week, so that the days as worked can be checked, and space showing the total days worked during the week and another showing the amount due. This makes a complete record of the time of the men.

Of course it is understood that it will not do to mix up other business in the account which belongs to the threshing machine. Don't mix money from other sources with that received from the work on account of the machine. Keep it separate from any other money you may have and you will have no trouble in having your cash come out right. If you find it necessary during the week to pay out money earned by the machine for some other purpose outside of expenses of running or for anything the machine is not concerned with, write it in the "Paid Out" column the same as though it were for your machine expense. This will keep your cash account straight and you can later on sort out the different items and put them in their proper places in another book if you wish.

And this brings us to the final accounting when the season's work is done, and it is this accounting that will emphasize the value of the business during the season, for you

BY ACTUAL COUNT

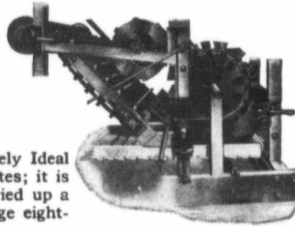
NINETEEN OUT OF EVERY TWENTY KERNELS ARE SEPARATED AT THE CYLINDER



WHEN threshing with a Rumely Ideal Separator, there is 95% separation at the cylinder — 19 out of every 20 kernels of grain fall to the grain pan before the straw gets three feet away from the cylinder.

And—now we will tell you why.

Immediately back of the cylinder, in the Rumely Ideal Separator, the straw first passes over slotted grates; it is then picked up by the *inclined chain rake*, carried up a steep incline, all the while being beaten by a large eight-winged beater.



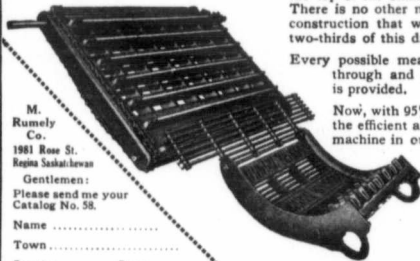
Seven and One-Half Feet of Travel

From the time the straw first touches the cylinder until it reaches the top of the chain rake, it is forced to travel nearly 7½ feet. There is no other machine on the market that has a cylinder construction that will substantiate a claim for any more than two-thirds of this distance.

Every possible means that will facilitate the grain dropping through and being completely separated from the straw is provided.

Now, with 95% separation right at the cylinder and with the efficient arrangement accomplished in the rear of the machine in our combination of six sets of lifting fingers—you can rest assured that when buying a Rumely Separator you will have one that will get *all the grain*.

Further information can be had by mailing the attached coupon to 1981 Rose Street, Regina Saskatchewan.



M. Rumely Co.
1981 Rose St.
Regina Saskatchewan
Gentlemen:
Please send me your Catalog No. 58.

Name
Town
County State

I own a separator years old; an engine years old. Built by

NINETEEN OUT OF EVERY TWENTY KERNELS ARE SEPARATED AT THE CYLINDER

M. RUMELY CO.

can go through it and sort out the different items and put them in their proper place in the final summary. This summary should have two columns. By writing down the loss from the different items mentioned in the summary, the thresherman can very quickly get a line on what his profits have been, if he has had any. These are shown on one side as follows: The amount of cash collected during the year, the amount of thresh bills still to be collected and the amount that is taken in from other sources belonging to the rig. These three items will show the entire amount of earnings of the rig for the year. They are all you have had or can hope to get from it, and therefore their amount represents

what it has paid you during the season. On the other hand, there is the amount that you have paid for labor, fuel and supplies, interest and depreciation, taxes, repairs and all sundry items, including the owner's time for at least as much as he would have earned anywhere else during the time he was threshing. All these are charges against the rig paid out for it or to it the same as for or to a person. They represent practically what you have paid to the rig. Subtract them from the amount the rig has paid you, if that is the largest, and the difference is your profit for the season. It might be the case that the accounts will be the other way; that the amount you have paid to the rig is more

than it has earned for or paid you. Then the subtraction will be the other way and the difference means what you have lost for the season.

Now just as important as getting the jobs and making the machine earn money for you, is knowing whether it is earning enough or not to pay you to run it. This, the book-keeping indicated in the foregoing will show you, and show you exactly, if you have done your part in writing down every item of income or outlay as the receipt of money or the payment of it was made.

You see there is no particular book learning needed, all that is called for is good sense and thoroughness; thoroughness in writing down every item as

soon as it transpires, and good sense in going through the account at the end of the season, finding out whether there has been a profit or a loss and acting accordingly. Will you do it?

And then, if you find, as you may, that the season's work has not been as profitable as it should have been, you have the remedy, which is to raise the price. If you find that you can't do this alone, then you will have to get your competitors interested; and the best way will be through organization. Better think a lot about this. It is very important to you.

Thresherman Ads. Bring Results

More Evidence of AMERICAN-ABELL Success in the Field



The above cut shows two American-Abell Engines at work near Scott, Saskatchewan. One is a 26 H.P. and the other a 32 H.P. Cross Compound. These two engines have broken about 2000 acres this season. They are owned by the Ann Arbor Saskatchewan Realty Co., which is managed by C. B. Smith, of Scott, Saskatchewan.

Tugaske, June 29, 1910.
American-Abell Engine and Thresher Co., Regina.

Dear Sirs,

This is to say that the 26 H.P. Traction Engine purchased from you last Fall works to our entire satisfaction.

We pulled ten 14-inch Cockshutt plows on skids in hard backsetting, burning wheat straw as fuel, and may say it went along quite easy.

Would highly recommend this engine to any person wishing a good general purpose engine.

Yours truly,

(Sgd.) J. D. TURNER,
(Sgd.) GEO. A. TURNER.

Scott, Sask, June 7th, 1910.

American-Abell E. and T. Co., Ltd., Regina, Sask.

Dear Sirs,

I have been somewhat slow in writing you in regard to our 32 horse power engine purchased from you this Spring, thinking I would give her a

thorough trial before crowing over the fact that we have others to beat. To say that we are pleased and satisfied with her is putting it mildly because she will sure plow. We are hauling ten plows where we could just as well handle twelve, thirty or thirty-five acres per day is a walk away. We have just finished one section and will begin the next to-morrow.

Steam plowing is no experiment if you have the power we have, with everything as handy, especially the gear pump, coal bunkers and water tanks which are on this engine.

We make two miles without stopping, then only to take coal and water which only takes a few minutes. The two syphons for unloading water makes it easy for the water man.

You need not be afraid to put this engine in the field with them all.

I think she is rightly named "The Cock o' the North" line.

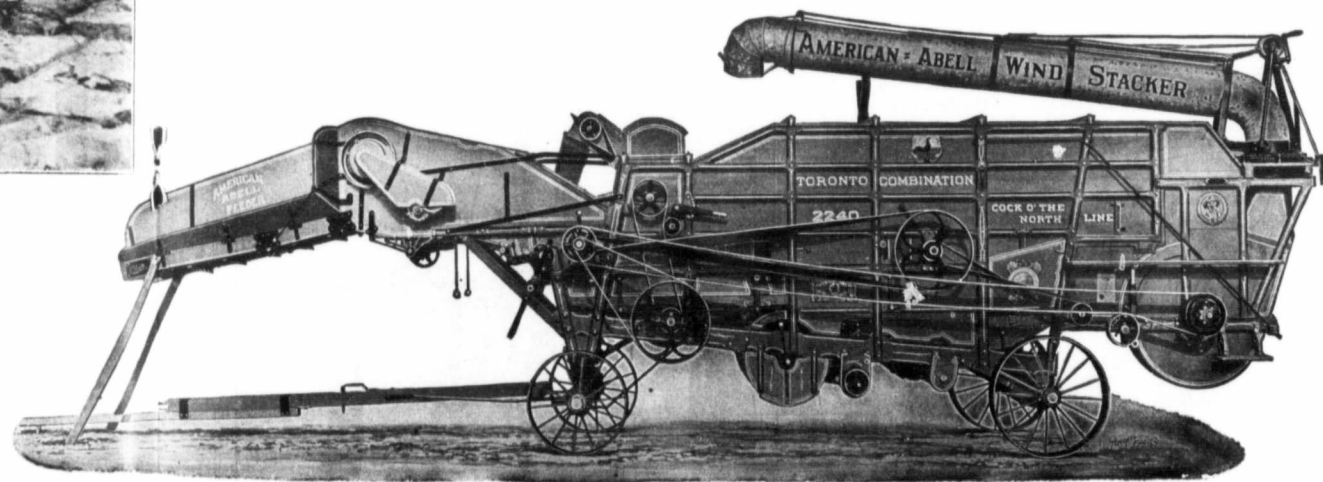
Yours respectfully,

THE ANN ARBOR SASKATCHEWAN REALTY CO.,

Per (Sgd.) G. B. SMITH, Manager.

Have you an American-Abell Separator? You should have if you want to be in the threshing game right. Satisfied customers means profitable business. You are in the business for the money there is in it. Then buy the money making goods.

Canadian made goods for Canadian farmers. Some people are satisfied with anything. Just as well have the best. American-Abell means the best. It assures satisfaction to thresher and farmer.



TORONTO COMBINATION SEPARATOR, COMPLETE WITH AMERICAN-ABELL WIND STACKER AND SELF FEEDER

The Toronto Combination Separator is admirably adapted to the handling of wet and tangly grain such as is sometimes found in the fields of Western Canada. The straw decks are of new design and made in four sections with a drop of 25 inches at the end of the first set of decks. One crank shaft drives the four decks which are perfectly balanced and admirably adapted to the separating of the grain from the straw. The complete shaking up which the straw receives in passing over the different sections thoroughly completes the separation of any grain that is left by our Imperial grate and forks. The decks are pivoted on one end and the crank gives them the necessary motion on the other. That the principal is correct is demonstrated conclusively by their success in the past. Hundreds of threshermen who have used them stand ready to testify to their merits.

We Represent: THE ADVANCE THRESHER CO., Battle Creek, Mich.

THE MINNEAPOLIS THRESHING MACHINE CO., Hopkins, Minn.

American-Abell Engine and Thresher Company, Limited.

TORONTO

REGINA

WINNIPEG

CALGARY

EDMONTON



WINNIPEG EXHIBITION

An Exhibition Directorate must be ever on the alert to obtain an attraction. The rarer it is the better. The visits of Sir Wilfred Laurier to Winnipeg are rare indeed and the announcement that the Premier was to open the show with an address was a drawing one.

The attendance has been the largest in the history of the fair, citizen's day gate receipts having proved beyond a doubt that Winnipeg is alive to the great value to the city the Exhibition is.

Certain lacks that perennially make themselves felt indicate an inclination to fall into a rut that needs strenuous effort to throw off. The giving of such pre-eminence to the platform attractions is possibly the consequence of a city directorate's audit of citizens' day receipts. In view of the bounding into its present pre-eminence of the farm machinery it seems reasonable that it should occupy the prominent place in the grounds assigned to it and too long monopolized by the faker and monstrosity barker. A visitor of some other civilization would surely wonder at being accosted and urged to pay to see one of Nature's hapless blunders while the triumphs of her co-operation with Art had no loquacious solicitors to urge their claims to notice though the sight was free. Is it not time that a shelter was made from the tropical sunshine which we may expect at this time of year over the judging ring? Would it be too much to expect a few rows of seats around it? Other places consider such things necessary. A cover that would shelter exhibits in the ring, attendants, judges and spectators would attract many who passed by without observing the accommodation provided, not knowing what it was.

Dust was everywhere. Water sprinkling arrangements were ridiculously inadequate. Neglect of filth accumulations bred millions of flies that were an unavoidable plague.

That thoroughbred stock breeding is making marked progress was proved by the increase in the entry list which included: Horses, 520; cattle, 655; sheep, 241; swine, 220, all making creditable advances on previous records. Not only were the numbers gratifying for quality was very noticeable. The disparity between the winners of

first and last prizes less marked than in past years, but outside the prize money were many that were no disgrace to their exhibitors and some that had carried off ribbons at Winnipeg and other shows.

HORSES.

Draft horses aroused most interest, of course, as the country is largely confining its breeding operations to animals capable of farm field work. Also the fact that what breeding of light horses there is in the Prairie Provinces is largely in most westerly districts.

The breeders of Western Canada have made one great stride in their business by capturing many prizes with animals of their own breeding in competition with high priced importations. As long as the British or foreign bred and raised horse beats the Canadian-bred in the show ring the former will command a higher price. This excess of price is divided between the importer, the breeder and the transportation companies. Many importers would be breeders exclusively if by demonstration the buyers could be convinced that the best can be had in Canada and that his customers would be convinced too.

Clydesdales

Whether it is the enterprise and munificence of the Clydesdale's associations which makes the prize lists so tempting, the year-in-and-year-out-boosting of the Clydesdale breeders and advocates, the inherent merits of the horse or a combination of all three, there is no getting away from the fact that Clydesdales looked like the favorites of the draft horses. Twenty-six exhibitors made a wonderful contest and bringing a judge from Oklahoma Experiment station looked like a laudable desire to give no opportunity for cavil on the score of favoritism.

Some people claim that the quest for quality to the neglect of size has unfavorably affected the Clyde horse. However, the fact that the first prize aged stallion was the heaviest horse in the show seems to imply that one section of the interest regards size as no bar to usefulness. There were nine aged stallions in the ring, Traynor's Royal Choice capturing first.

In three year olds Graham Bros. took first and second and in two year olds, first, fourth, fifth, and sixth. In yearlings the same firm took the red ribbon.

The Great Skimming Machine

Magnet Cream Separator No. 6
SKIMS 1,000 LBS. AN HOUR

CHILDREN OPERATE IT

The "MAGNET" Cream Separator, 1,000 lbs. an hour can be operated by children to take care of the milk of 50 cows.



The Dairy Farmer with large herds has been waiting for this. No need for gasoline or steam engines, and does not require a man. In has the "MAGNET" square gear construction, the large steel bowl supported at both ends, "MAGNET" brake, one piece skimmer, easily cleaned. Will skim perfectly as fast as ten can milk.

Made strong and durable to out last your time, and run as well for the next generation.

The "MAGNET" has six sizes in capacity, all run by the same drifting gear and fit the same stand.

F. W. Hodson, Esq., formerly live stock commissioner, says, "I have tested your machine of different sizes and consider your separator of 1,000 lbs. an hour capacity excels even the other for obvious reasons."

If you have a large herd of cows write us and it will not cost you a cent to learn how easily the "MAGNET" will take care of your milk.

The "MAGNET" will not wear out in 50 years.

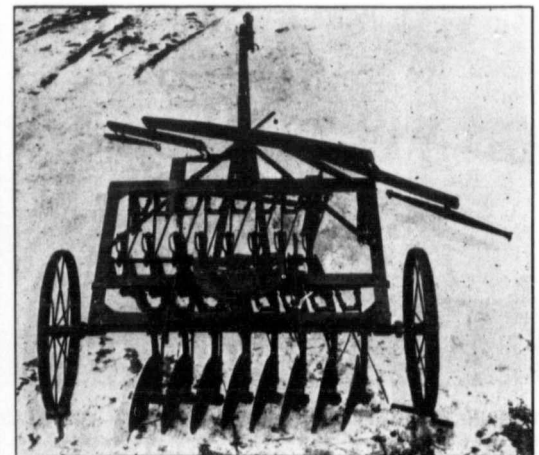
THE PETRIE MFG. CO. LIMITED

Winnipeg, Man. Calgary, Alta. Hamilton, Ont. St. John, N.B.
Regina, Sask. Montreal, Que. Vancouver, B.C.

New Disc Harrow And Cultivator

Patented

Aug. 31, 1909



This wonderful implement was one of the most interesting exhibits at Winnipeg 1910 Fair. The cut of the combination of Disc, Harrow and Cultivator speaks for itself. It Does Not Ridge The Land. With the truck in front, the weight is taken off the horses' necks. An oil box is fitted to each independent disc, which need only be oiled once in three or four days.

One of the most important contributions to Agriculture in recent years.

From what the farmers say of the machine, we know that we have something that every up-to-date farmer in Canada should have. This machine was one of the most interesting exhibits on the Fair grounds at Winnipeg.

ROGERS' COMBINED DISC HARROW AND CULTIVATOR CO.
Suite 321 Somerset Block, WINNIPEG, MAN.

In mares with foal at foot, Little of Portage la Prairie took first.

Traynor Bros.' Mayoress was first in the yield mares with eight others in the ring.

Sir William Van Horne with May Jess, imported, had little to spare in beating Traynor's Royal Gem, bred in Saskatchewan; the field was six.

In two year olds and yearlings, Graham Bros. secured the red ribbons.

In Canadian-bred Clydes the Western Provinces took most of the money and can point with pride to the record made.

Percherons.

Percherons must be given second place, after the Clydesdales, in the apparent interest displayed at the ring side, the three years and over stallion class being represented by a field of ten.

Colquhoun & Beattie's Blondin was a good first and later on a hot candidate for contest as best draft stallion in show.

Ellison of La Moure, North Dakota, took first and second in three year olds, and in brood mares with foals, geld mares, three year olds, two year olds, and yearlings they again scored at the top.

Hutchins, Keeler, Sask., took the lead in stallion and three of his get. Colquhoun with Blondin won the Percheron Championship and Ellison's five stallions the Percheron Society of America's special for best five stallions, the property of one exhibitor. The same firm again scored in best three American bred mares and stud of stallion and four mares.

Belgians.

Belgians seem to have a popularity in the United States that has not yet crept over the border if the loneliness of the one exhibit here is anything by which to judge. Pompon, the property of the Belgian Horse Ranch Co., Calgary, stood alone for the breed. Though it was a one horse job it was well performed. If Pompon is a fair sample the breed will win its way to favor when better known.

Shires

To the insular egoism of the Shire horse breeders in general must be laid the blame for the poor representation of Shires in the horse world outside of England. These people seem quite satisfied with the constricted market of a small area of their own island, where they keep at high prices the best representatives of the breed. The lacking the support to societies that should push the interest of the Shire horse abroad, the American importers, both Canadian and United States, are educating a clientele of increasing numbers in the claims to preferment the horse deserves. John Stott, Brandon, one of the pioneers of Manitoba Shire breeders, had a fine representative in Handsome Prince. Weighman, of

Morden, received a first on the only two year old stallion shown and Ross, of Grenfell, figured in same fashion in the three year old filly class. Stott took first and second on yearling fillies and first on get of sire.

Standard Breds

J. F. McGuire, of Denver, Col., showed Dan McKinney for a first and D. W. Flack had the best two year old. Chas. Little, Winnipeg, got a first prize for yearling stallion and Geo. Moffatt, Souris, a Manitoba pioneer in this section of horse breeding had first prize brood mare.

John Graham, Carberry had the best Coach Stallion, O'Neil of Earl Grey second; the only two Coachers shown.

Hackneys

Hassord's Marion Cassius was to the fore in aged stallions; Graham Bros.' Royal Elegance in three year olds had no competition.

CATTLE

The total entry list of 655 cattle was well distributed among the breeds, Shorthorn standing first as is quite common in Canada. No other breed has marked popularity in both England and Scotland. That, with real merit to fall back on, is sufficient to account for strong preference in this country. Herefords and Angus are making better showings than of old and the Holsteins, Ayrshires and Jerseys would make a cattle show by themselves.

Shorthorns

Barron, of Carberry, captured first on aged bulls with Mistletoe Eclipse. A. S. White, St. Cloud, Minn. took the two year preference with Ringmaster. Subsequently, Ringmaster was champion bull. English of Harding, scored in the senior yearling bulls on Lancaster Lad. Van Horne's imported Boquhan Hero was best junior yearling. Casnell, Saskatoon, had first honor senior calf and Van Horne the junior with Masterpiece.

Out of fifteen aged females Van Horne's Mina Princess was first. Emmert, East Selkirk, led with Susan Cumberland in two year olds. Senior yearlings were topped by White's Gloster Queen and in the juniors the same owner won with Sparkling Gem. Senior heifers were headed by Smith's Miss Muller. Junior calves were led by Olive Wenlock owned by Caswell, Saskatoon. Susan Cumberland was made senior champion female and Gloster Queen the junior; the former receiving grand championship for female.

Open senior herd class went to Van Horne as did also the junior herd. Three calves under one year, Barron. Get of sire Van Horne. Progeny of cow, White. Bull and three females for western provinces, Van Horne, Breeders' herd, Barron; special for two year old heifer, Van Horne.

A Warning!

The dairy public and intending separator buyers are hereby advised that at Winnipeg Industrial Exhibition just closed there was no test of cream separators nor any award of merit offered for them. The same is true of every Fair held in Canada up to this date and will apply to all Exhibitions to be held throughout Western Canada for the balance of the current year.

This warning seems advisable in view of past misrepresentations by certain unscrupulous separator manufacturers claiming to have received for their machines an award where none of any kind was made for cream separators. Confirmation of the statements made herein may be had by simply addressing a letter to "The Manager" of the Winnipeg or any other Fair at which an award of merit may be claimed to have been offered or received.

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Herefords.

The judge, Professor Andrew Boss, St. Anthony Park, Minn. was pleased with the exhibit of white faces. This breed is more popular on ranges than on farms, the rustling propensity being highly appreciated and the uniform markings attractive and persistently transmissible in the grades.

Wm. Shields, Brandon, led in aged bulls with Happy Christmas and in two year olds with Domineer. In aged cows, Shields won with Princess of Highland Park, that later took the championship. Gray, of Austin, received first for two year olds on Happy Sunbeam. Shield's Lady Normandy was best in senior yearlings and his Victoria, of Highland Park, second first senior calf. Shields took first on herd, in junior herd, two calves under one year, two animals progeny of one cow, and three the get of one bull.

Aberdeen Angus.

Though there were five specimens of doddies the herd is hardly to be called popular here, for two parties, McGregor, of Brandon and Bowman, of Guelph owned all the exhibits, which were mostly imported. They made a fine show, however. McGregor scooping up majority of prizes.

Galloways

Somewhat the same may be said of the Galloways. A. D. McCrae, of Guelph, being the only exhibitor.

Red Polled

McComb, of Beresford, was the only exhibitor.

Fat Cattle

McGregor's two Angus bull-ocks were first and second which speaks well for the usefulness of the breed. Van Horne's short-horn being relegated to third place. However, in the contest for best beef animal in the show the shorthorn bull Ringmaster took first, and there you are.

Dairy Cattle

In a city that exports grain to Europe to feed cattle that produce butter for that city's later consumption the increased number and quality of the dairy cattle holds out a ray of hope.

Holsteins

In aged bulls Potter's Sarcistic took highest place. In two year olds Gibson and Scott, Winnipeg, won with Josephine Teake's Sir de Kol. In yearlings Homer Smith, Winnipeg, on Sir Aagie Nurcena, Hancox, Dominion City, led in senior bull calves with Sir Modest Colantha Fayne. Johannis, Winnipeg, took first for bull calf, junior, with Lord Byron de Kol. In a class of twenty aged cows Homer Smith pulled out with first, second, third and fifth. Fafort 10th Bravty first. Potter's Martha Ann took first in two year olds. Hancox's Blanche Colantha Fayne was leading yearling heifer, and the calf prize was his also.

In senior herds Homer Smith was first and in juniors Hancox who also led in get of sire and two calves.

Ayrshires

The entries were many and good. H. G. Clarke, of Georgetown, was the judge who made the following awards of first prizes: To J. M. Bruce, Lashburn, Sask. on Barcheskie King's Own, aged bull and Wetherall Douglas Swell, two year old. Trimble and Sons, Red Deer, Alta, was first with a yearling of merit. Aged cows, Bruce on Bluebell of Armstown. Two year olds Bruce on Burnside Lena. Yearlings Bruce on Burnside Ivy Leaf, senior heifer calf Trimble. Bruce's Bluebell, of Ormston, received championship.

Jerseys

There were six exhibitors: Harper & Sons, Kinley, Sask.; B. H. Bull, Brampton, Ont.; W. V. Edward, Souris Man.; E. Orchard, Graysville, Man.; H. A. Chadwick, St. James, Man.; Wm. Hartley, Middlechurch, Man.

Happily the judge penalized fat and held to proper dairy points.

The following won 1st prizes: Bull on aged bull with Brampton King Edward, two year old, and championship with Brampton King Edward, Chadwick junior bull calf with Lord Jewel.

In females: Aged cows; Harper with Pets Wonder; Western bred herd also. Bull: Two year old heifer, with Rochette Golden Beauty, yearling, senior heifer junior calf, senior herd and two calves get of sire were Bull's also.

In the eastern portion of this province where the price of land and feed is high the industry of beef raising must before long be largely relinquished to the western man. At the same time the growth of the city and the more general demand for good milk is on the increase. In view of these facts is it not absurd that the most money is paid to the beef breeds? Four, five and six prizes given to Shorthorns with extras galore and Holsteins only three prizes. This is a matter of interest to the whole district and those having influence should exert it in the direction of reversing the situation as regards of breeds of cattle of the beef and milk respectively.

SHEEP

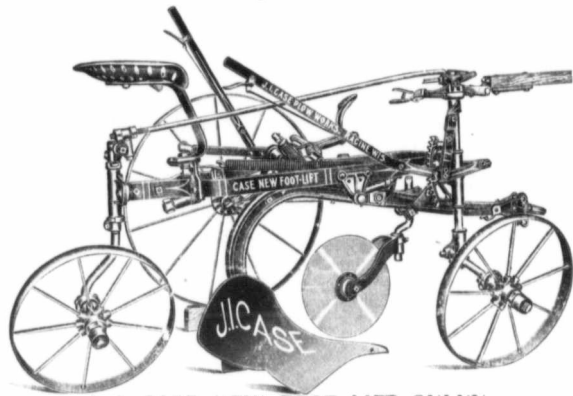
The increased numbers of sheep entries would lead one to suppose that the admonitions of agricultural colleges and high authorities were having their effect. In numbers and quality this year's exhibits were a gratifying improvement on all past years.

SWINE

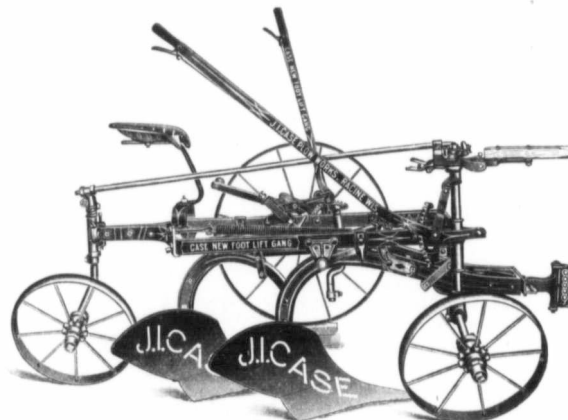
The same may be said of swine in general but space and time for further particulars is not at our disposal.

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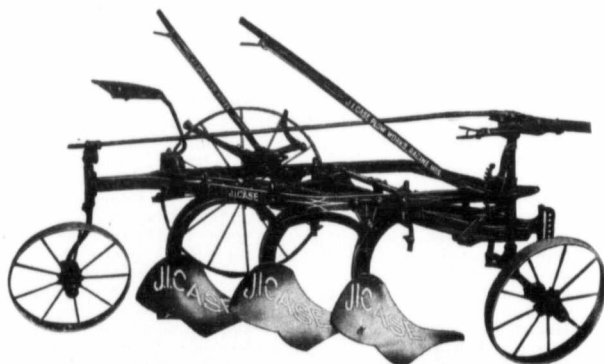
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Save the Moisture.

Save the moisture and increase the crop. Enough is now known of the principles of soil moisture conservation that each one can be in possession of the secret. Then again there is nothing difficult or mysterious about it. It is common knowledge, that anything wet dries on being exposed to the air. The housewife makes use of this principle in hanging out the clothes to dry. It is as well known that oil moves up through a wick, and that if the wick is cut the oil cannot pass over the gap. Water will act the same as the oil and it moves through the soil in the same way that it does through the wick.

Keep in mind that a wet soil exposed to the air will give up its moisture to the air; that water moves from the wetter portions to the drier soil if the soil is compacted, which condition compares to the lamp wick; a loose soil compares to the lamp wick that is cut and so the moisture can not move through it.

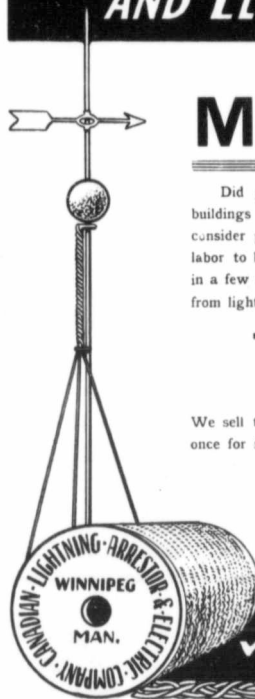
The plant needs the moisture in the furrow slice as that is where it does most of its feeding. Notice the plant growing in the dead furrow. It has its roots in the subsoil. The moisture conditions should be better there than in the surface soil yet the plant does not do well, due to a lack of available plant food. This means that a deep furrow slice will offer more feeding room for the roots than a shallow one. The furrow slice should be packed firm against the bottom so as to furnish the means for the moisture to pass from the sub soil to the surface soil as the plant needs it. To keep the moisture from passing to the surface and evaporating the surface soil should be kept loose, a condition known as the soil mulch.

Another reason for the deep plowing is to furnish a large reservoir to take up the rainfall readily. Shallow plowing can not take in rain as fast or as much of it as deep plowing so the result is more run off.

How are these conditions to be met? The deep plowing has been mentioned. The proof of its value is brought out by the fact that it produces larger yields.

The soil mulch can be produced by the common harrow. Crops are harrowed after they are up, grain can be harrowed till five or six inches high, and some are trying to harrow till it heads out and with good results. The harrowing of grain or corn should only be done on bright sunny days and not before the sun has been up three or four hours. The plant when wet and in the morning and on cloudy days is more crisp and breaks up easier. The mulch should be made as soon as the land is plowed. If it is not, considerable evaporation will take place at once. In plowing do not leave the field before harrowing what was plowed that half day. A plow

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attachment is now on the market that loosens up the surface at the same time the plowing is done. Another way is to hitch an extra horse to a section of harrow when plowing; this does it all at one operation too. In the case of spring plowing it may be necessary to pack it so as to get the bottom of furrow slice compact. The Campbell's sub-surface packer is good for this purpose, though going over with the harrow two or three times packs pretty good and is coming more into favor.

Fall plowing should be harrowed as soon as possible in the spring as moisture will escape fast from the surface that has been compact during the winter.

Humus adds greatly to moisture holding capacity of the soil, acting like a sponge or blotting paper. The plowing under of green crops or weeds when green adds humus. Applying manure is one of the best ways of adding it.

Weeds are large users of soil moisture, and they are at work all the time; as soon as a crop is taken off the weeds go right on pumping out moisture; so that a grain field that would plow nicely at harvest will be too dry to plow well in a month or two and all due to the weeds. And the weeds growing in the grain also rob the grain of moisture and the result

is, that much less grain. One way is to disc as soon as the crop is harvested. It is necessary to have the land free from weeds and this can be done if a crop of corn or a crop of clover is grown every four or five years. Manuring will also help in that it will make the crops grow stronger and so be more capable of smothering weeds, and it also holds moisture.

The best way to insure crop failure is, grow grain year after year, to let the farm get weedy, let the weeds pump out moisture both when crop is growing and after it is cut, plow shallow, and not to harrow right after plowing and if it is fall plowing not to harrow early in spring. To make it still more effective do not apply any manure or plow under any green crops or rotate the crops. The drier the season the smaller the crop.

Now is the time to think of saving soil moisture, to think of insuring a crop even though the season be dry. So plan to kill out weeds, if field is weedy, disc as soon as crop comes off; plow deep and follow plow with harrow; harrow early in spring; apply manure; plow under green crops and rotate the crops.

There is nothing difficult about this, and it will double the crops, and in a dry season make a difference between a crop and no crop.

How To—

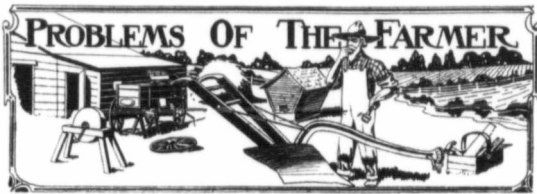
Test Milk.—Dip a well polished knitting needle into the milk and draw it out quickly in an upright position. If diluted, milk should adhere to the needle, but if any water has been added the needle will come out clean.

Cool the oven.—Put a dish of cold water in the oven if it gets too hot while baking. This will not harm anything baking at the time, except puff pastry.

Clean paints.—Use a teaspoonful of borax to a small basin of water for cleaning painted doors, windows and other woodwork. Use fine wood ashes for stains left on window ledges by flower pots. Rinse off well.

Clean silver.—Immerse the articles in sour milk for half an hour, rinse and polish with prepared chalk. Alcohol, ammonia, cooking soda and sal soda are all more or less effective. Use cooking soda in washing the silver knives, forks, and spoons tarnished by eggs.

Use tea.—Strong tea and ammonia make a fine cleaning solution for black silk. Iron the goods on the wrong side after using. Strew the grounds from the teapot over the carpet before sweeping and they will keep the dust down. A poultice of the leaves is very good for inflamed eyes.



MANITOBA.

By Prof. S. A. Bedford.

The Problem of Weeds.

On a recent trip through Southern and Central Manitoba I was greatly interested in noticing the progress made by some of our most persistent noxious weeds. There are certain sections of our fair province that were quite free of these pests a few years ago, but are now completely overrun with them.

The history of their introduction and distribution is very similar on each farm and district. A farmer makes an exchange of seed grain and sows it, not noticing that it contains a few and perhaps a very few seeds of some noxious weed; these get a firm hold on the farm before he recognizes their character. Or he exchanges threshing work with a neighbor and fails to notice that the bottom of his wagon rack is filled with weed seed just ready to shake out when driving over the fields.

Perhaps his fields are unfenced and strange cattle feed on the refuse from threshing machines and spread weed seeds by means of their droppings or possibly the weed seed adhere to their feet and are thus brought on to clean farms. I notice that the sides of ditches in the Red River Valley are often covered with such weeds as cocklebur, darnel and ragweed, no doubt carried there by water, for they are good floaters. Thistles of both kinds are generally introduced by the wind. I find that sow thistle seed will all germinate, and the young plant grows very rapidly.

Flax, that favorite crop of our enterprising American immigrant, is undoubtedly the means of introducing more weed seeds than any other crop. A few days ago an American submitted to me a sample of flax seed offered him, the small sample contained thousands of wild mustard seed of four or five kinds, any one of them would prove a curse to the farmer.

When I want a pretty thorough collection of weeds I can usually get it along the railway; no doubt many weeds start from leaky cars and spread over adjoining farms.

Where such persistent pests as French weed have become generally distributed in large numbers over a farm it is very difficult if not impossible to completely eradicate them, but when first introduced the few scattered plants can be gathered up and readily destroyed before the seed ripens. I have often noticed choice farms perfectly free of weeds except for one small spot, which should be at once quarantined as it were

and no crops grown on it until every weed seed in the soil has been made to germinate and the tiny plant destroyed before it seeds. If a crop of grain is grown on this spot some of the weed plants are sure to escape the eye, go to seed and spread all over the farm. It will pay to summer-fallow such a spot for many years.

A distinct note of encouragement was heard at the recent Weed Inspectors' Conference when several farmers stated that they knew of cases where perennial sow thistle had been completely eradicated by means of a thorough summer fallow, of course, the fallow had been kept perfectly black all summer and none of the weeds allowed to appear above the surface.

Canada thistle can also be eradicated the same way but the work must be thorough. About twenty acres is all that one team can summer-fallow in this manner, but it pays.

Wild oats continue to spread, and it is no wonder, for one kernel per acre this year will produce hundreds next season and nearly all of them will shatter out before the wheat is ripe and come up as a volunteer crop.

Clean seed and a regular crop rotation is no doubt the best means of overcoming the wild oat. This rotation must include at least two years in some good grass. A number of our best farmers are now subduing the wild oat by the above means combined with disked stubbles and good fallows. Others can do the same.

The mustard family is well represented among our noxious weeds and some parts of the West is yellow with it just now. In the Red River Valley, chorlock or rough leaf mustard is the most common, further west haresear and false flax are more abundant. All members of the mustard family are prolific bearers of seed of high germinating power, causing them to increase rapidly. All kinds of mustard can be greatly reduced by encouraging the seed to germinate and then destroying the plant when quite small. Grain stubble should be disk harrowed soon after harvest so as to cover the weed seeds and start growth in the fall, when most of the plants will be winter killed, the balance can be killed in spring. Frequently surface cultivation of fallows will also greatly reduce the number of mustard seeds in the soil. The harrowing of the growing crop is another means of eradicating this family of weeds; in fact we can only overcome them by repeated attacks from every quarter possible, this may appear like unnecessary labor and

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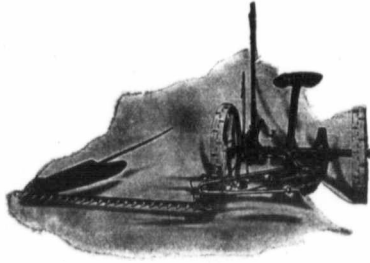
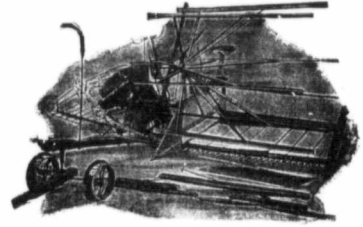
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expense but it will be more than repaid if we can only keep our farms clean.

Couch grass is also making headway in some districts, and where well-established the grain is badly injured. Twenty years ago I saw 60 acres of land perfectly cleaned of this weed, the field was so badly infested that a newly plowed furrow would adhere so closely by means of the root stocks that a rod of it could be drawn all over the field without going to pieces.

Thirty acres of this field was cleaned by plowing and cross-plowing in July and August then harrowing out the roots and burning them. Thirty rack loads of roots were gathered and none has been seen there since. The other thirty acres were plowed the first week in June and at once sown with three bushels of barley per acre. The germination and growth was rapid and the couch was completely choked out and a good crop of barley harvested at the same time. To make this latter plan a success the soil must be moist when the barley is sown for that reason each day's plowing should be harrowed and sown before night.

There are a few comparatively new weeds being introduced at the present time and farmers should learn to recognize them on sight. One is the Darnel. This is already abundant in many parts of the Red River Valley. It belongs to the grass family and the plant somewhat resembles western rye grass, the seed is often mistaken for a small kernel of barley; it is very difficult to separate from wheat, it makes the flour bitter and is strongly objected to by millers. Some authorities state that the seed is poisonous but this has been denied.

Another new weed is Hemp Nettle, a prickly, nettle-like plant spreading badly along the Assini-

boine River. It can be readily identified by its square stem and sharp prickles which protrude from the axis of the leaf.

SASKATCHEWAN

By A. Frank Mantle.

After the first two years or so on a new farm, and before the time arrives when the whole of the arable acreage of the place is under cultivation, there is an interval of several years during which one of the problems of the farmer consists in doing his summer-fallowing at the time when he knows it should be done, and yet getting a reasonable amount of new land broken up. In reality the operation known as "breaking" is nothing more nor less than a summer-fallowing on the prairie. We plow, pack, and drag or disk the prairie in order to rot the sod and store up moisture sufficient for a crop the next summer, just as we plow, pack, and drag the summer-fallow in order to get rid of the rubbish that has accumulated during two or three crop seasons and store up moisture for the ensuing crop. Since, then, these two are essentially similar operations and are performed for almost identical purposes, it follows that the proper time for doing the one is also the best time for doing the other. As few farmers are so fortunately situated as to motive power on their farms that they can put on sufficient force to break and summer-fallow at the same time, one job must wait, as a rule. The problem, then, that must be solved is, shall I summer-fallow first and break afterwards, or shall I go ahead and break while I can, and leave the summer-fallow to be plowed in July?

As a general rule the latter question is answered in the affirmative and the summer-fallow waits. The temptation to do the breaking, get more land under

cultivation, get ready for a possible bumper crop next year, is yielded to, and instead of first working what land we have broken as well as we know it ought to be worked, and as well as it would well repay us to work it, we fall into the error, of biting off more land than we have power enough to properly chew. It is a very natural attitude to take. Any man with any ambition wants to have his farm under cultivation as soon as possible. He didn't buy the land in order to watch the wild flowers grow on the prairie, and he needs the money that crops alone will bring. But just because he wants to see his place under cultivation, and because he wants to make money from it, he should take the stand that it is better to farm well the land that is broken up than to seek to enlarge the acreage regardless of whether he has power enough to work it properly. The trouble lies with our poor conceptions of what constitutes cultivation, and of what returns good cultivation will bring in the way of clean fields, and large yields of high quality grain.

Last fall about this time the writer visited a farm in the Red River Valley in a district where sow thistle had a good hold. The farmer was asked how he was making out with the sow thistle and his reply was that it was getting ahead of him because he was too busy with breaking up new land to plow his summer-fallow until July, or to cultivate it much after it was plowed! Was that farming or was it weed growing? Was that man headed for success or for blue ruin? That incident occurred in Eastern Manitoba, but it might be duplicated a thousand times in any part of Saskatchewan. It may not be sow thistle that is getting ahead of the Saskatchewan farmer who left his summer-fallow until July that he

might break up more land to be half farmed; it may not be any weed but just be poor policy because he is plowing after instead of before the rains. The principle is the same in either case and constitutes one of the grave dangers besetting agriculture in the western provinces. It is better to have a summer-fallow well tilled and a small area of new breaking than a large area of breaking and a poorly tilled, weedy, moistureless summer-fallow.

This business of breaking first and summer-fallowing second is more excusable out on the open prairies than it is in the scrub country. Until a man fully realizes the importance of tilling a summer-fallow right, and has found by experience how well such work is repaid, the temptation to break a large acreage while the breaking "goes good" is very strong. It is true that there are only a certain few weeks during which the sod can be turned with satisfaction to all concerned and the certainty that the work has been done at the right time. To turn the plows on to the summer-fallow during that time and decide to break only as much as can be broken without detriment to the land already under cultivation, requires some strength of mind. If a man cannot bring himself to that point he should at least take sufficient time from his breaking to give the summer-fallow a good double-disking right after seeding and before breaking starts. This will help to keep the weeds in check, and will form a mulch on the summer-fallow that will enable it to hold moisture much better than if left in the natural state.

In the scrub country, however, the situation is different. There the breaking season is much longer, and much is to be said in favor of late breaking. The early breaking is apt to grow an im-

Continued on page 79

THE FUNNY WORLD



The matter on this page lays no claim whatever to originality. The one idea is to amuse, to provoke a smile. If it fulfills this mission we shall feel amply repaid for the time and labor expended in its preparation. Have you read or heard something that has made you laugh? Has it chased dull care away for a time? Then pass it along for publication in our Funny World. Such contributions will be greatly appreciated.

"Do you ever lose that umbrella of yours?" asked the maiden.

"No, I don't," replied the man, sternly; "the person who takes that umbrella will have to take me."

"Do I understand that to be a proposal of marriage or a threat?" inquired the maiden, sweetly.

Young Goadfully, to pretty girl—"Is the seat next to you engaged, Miss?"

Miss—"No, but I am! And he's going to get in at the next station."

"This man is not insane," said the lawyer, "and never has been. To keep him in an asylum is a blow, sir, directed against human rights, an assault upon the sacred institution of liberty, and—"

"But did you not prove last week, when he was on trial for murder, that he had been from birth a raving lunatic?" interposed the Court.

The lawyer smiled in a superior way. "Surely," he said, "your honor would not have it believed that this Court is on the intellectual plane of that jury."

On the notice board of a church near Manchester the other day the following announcements appeared together: A potato pie supper will be held on Saturday evening. Subject for Sunday evening, "A Night of Agony."

The Golfer—"I suppose you get a lot of practice in the winter time?"

The Caddy—"Naw, we dinna. If it isn't rainin', 'tis snawin', an' if 't isn't rain' or snawin', 'tis freezin', an' if 't isn't rainin' or snawin' or freezin' 'tis the Sabbath, and it's fair sickening."

He looked in a store window and saw, "Hats reduced." "Heavens!" said he to himself. "What was their original size?"

A humane sportsman noticed that his gamekeeper attendant suffered from cold ears. So the first opportunity he purchased a pair of ear muffs and gave them to him.

Some months after they were out on the moors again together and the sportsman noticed that the gillie did not wear the ear muffs.

"What's the matter, Archie," he asked, "that you don't wear your ear muffs?" "Well, sir," replied the gillie, "ae day a gentleman asked me to take a glass o' whisky an' I didna hear him, so I have never worn the muffs since then."

He—"Perhaps your father objects to me on account of my shortcomings?"

She—"No, I think it is on account of your late-stayings."

"How on earth did you ever cultivate such a beautiful black eye?" asked Brown's friend.

"Oh," replied Brown, who had unintentionally been illustrating the fall of man on roller skates, "I raised it from a slip."

The Bride—"But why look so blue, Freddy? You know papa has promised he will still buy all my frocks."

The Groom (gloomily)—"Yes—but, I'm wondering what the dickens we shall have to eat."

"Doctor, how many times have you operated for appendicitis?"

"Oh, at least fifty times, I should say."

"And how many cases have you lost?"

"Only two. One of them went into bankruptcy and the other died without leaving a dollar."

Miss Young—"Next week I celebrate my twenty-fourth birthday."

Miss Jubious—"That's singular. So do I."

Miss Young—"I celebrate mine for the first time."

Tommy—"What is the difference between vision and sight?"

Tommy's Pop—"Well, my son, you can flatter a girl by calling her a vision, but don't call her a sight."

Dittersdorf—"Here come two evil-looking rascals. I shouldn't wonder if we were held up."

Heinz—"I'm afraid so. By the by, here's that dollar you lent me this morning."

Lady (on the bank)—"My dear sir, how did you come to tumble in?"

Man (in water)—"My dear madam, to be frank, I didn't come to tumble in—I came to skate."

Knicker—"Time brings strange changes."

Booker—"Yes; the boy whose mother can't make him wash his neck grows up to be a rich man who goes abroad for baths."

Mother—"There were two apples in the cupboard, Tommy, and now there is only one. How's that?"

Tommy (who sees no way out of it)—"Well, ma, it was so dark in there I didn't see the other."

The Man—"Yes, it's a pretty hat."

The Lady—"I bought it on your account."

The Man—"Yes; you generally do."

"Would you," he asked, "care to live to be a hundred years old?"

"Not if anybody knew it," she replied.

Teddy, after having a drink of plain soda water, was asked how he liked it.

"Not very well," he replied. "It tastes too much as though my foot had gone asleep in my mouth."

Little Johnny—"Say, mister?"

Mister—"Well?"

Little Johnny—"Who crossed your eyes instead of dotting them?"

A company-promoter advertised for an office boy. He received a hundred replies. Out of the hundred he selected ten, and with the writers of these ten replies he had a personal interview. His final choice fell upon a bright youth, to whom he said:

"My boy, I like your appearance and your manner very much. I think you may do for the place. Did you bring a character?" "No, Sir," replied the boy; "I can go home and get it." "Very well; come back to-morrow morning with it, and if it is satisfactory I darsay I shall engage you." Late that afternoon the financier was surprised by the return of the candidate. "Well," he said cheerily, "have you got your character?" "No," answered the boy; "but I've got yours—an' I ain't coming!"

"I should think it would be a simple matter to induce a woman to get ready in time to attend an evening performance."

"What's your scheme?"

"Ask her to go to the matinee."

"Pa, what is a dentist?"

"A dentist, my son, is a man who uses other people's teeth to feel himself."

Ma—"Gracious! What's the matter with the baby?"

Pa—"Oh, he bumped his head against one of the pedals of the piano."

Ma—"Poor little dear! Perhaps he's seriously hurt."

Pa—"Nonsense! It was the soft pedal he struck."

He—"Is this a permanent engagement?"

She—"I hope not. I should like to get married some time."

A little boy whose grandmother had just died wrote the following letter, which he duly posted:

"Dear Angels: "We have sent you grandma. Please give her a harp to play, as she is short-winded and can't blow a trumpet."

The Poet—"Poets are born, not made."

The Girl—"I know. I wasn't blaming you."

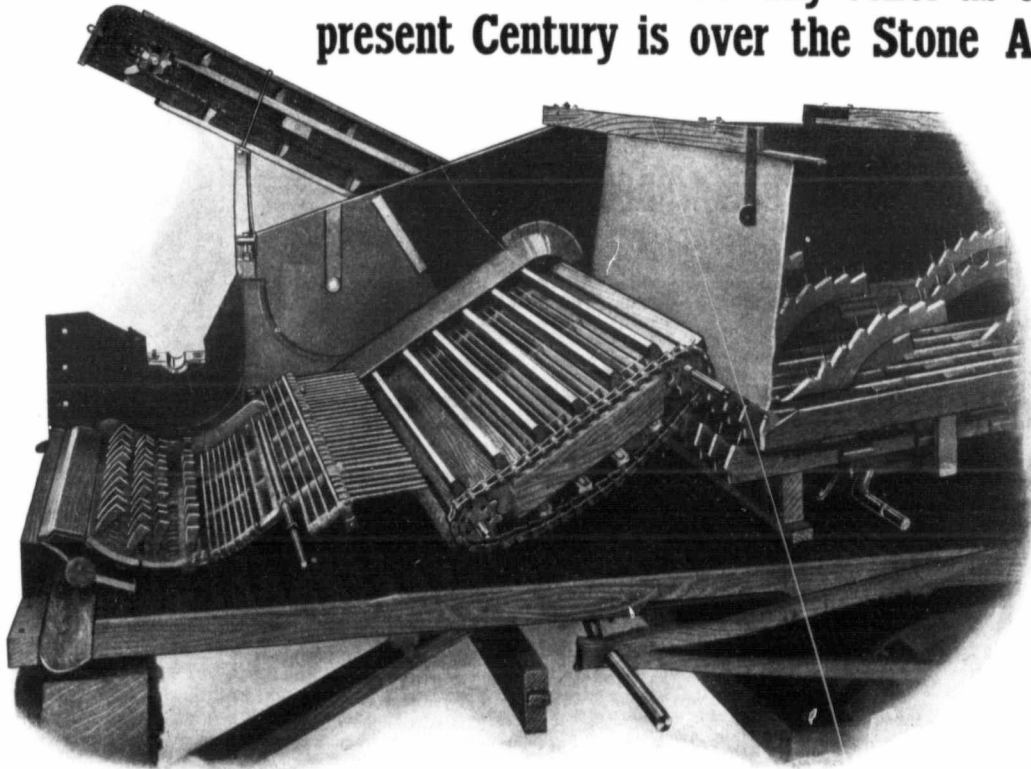
A minister, frequently away from home, was in the habit of getting some one to stay with his wife and small daughter in his absence. Once, however, he went so unexpectedly and hurriedly that he had no time to make such provision for them. The wife was very brave until night came, when her courage began to fail. After exhausting every reasonable excuse for staying up, she put the child to bed with the injunction to pray especially for God's protection during father's absence. "Yes, mother, we will do that tonight," said the little girl, "but the next time we will make better arrangements."

Tourist—"I suppose travelers often fall over this cliff."

Guide—"Nien, nein Herr; never more than once."

.. THE .. New Century Separator

Is as far advanced over any other as the present Century is over the Stone Age



It is generally conceded that both at the INTAKE and DELIVERY ENDS of a threshing machine the straw and grain are handled on the SAME PRINCIPLE BY ALL MAKES.

SUPERIOR SEPARATION MUST THEREFORE BE OBTAINED BETWEEN THE POINTS OF INTAKE AND DELIVERY.

With an OHEN GATE SURFACE, 5 FEET 9 INCHES LONG, in a 27 x 42 N. C., over which the straw must move, we get a SEPARATION OF 95 PER CENT. BEFORE IT REACHES THE STRAW RACK.

The CYLINDER will knock out the grain AS WELL AS ANY CYLINDER OF ANY SIZE OR MAKE.

The Beater, placed in such a position that it ABSOLUTELY PREVENTS BACK LASHING, beats the grain and straw down upon ADJUSTABLE FINGERS, and from there the straw is carried over an ENDLESS OPEN RADDLE for delivery to the straw rack.

The GRAIN PAN extends from the extreme front of the separator and declines towards the shoe, giving an easy, steady natural delivery of the grain to the riddles, which are extremely long and raked their full length by a blast which is at all times sufficient and under absolute control.

The rotary movement of the shakers, having a 5 in. THROW AND STRIKING THE STRAW TWICE AT EVERY REVOLUTION, MOVES THE STRAW 10 IN. WHERE ANY VIBRATING MOVEMENT MOVES 5 IN., THUS CARRYING THE STRAW IN JUST ONE-HALF AS THICK A BED, and allowing JUST ONE-HALF THE OPPORTUNITY FOR GRAIN TO LODGE IN IT, while the RISERS keep constantly LOOSENING and SHIFTING the POSITION of the STRAW.

Compare the PRINCIPLE of the Separator mentioned above with any other, then confirm your judgment by asking ANY OWNER of a NEW CENTURY.

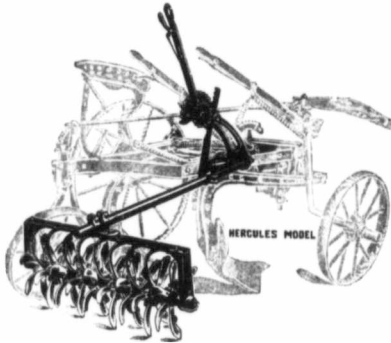
There are over 500 of them in Canada.

If interested, write to the nearest Agency of the
INTERNATIONAL HARVESTER CO., or

J. TAIT HUNTER, CALGARY, ALTA.

The Kramer Rotary Harrow

MEETS ALL SOIL CONDITIONS.

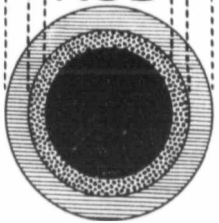


The E. M. KRAMER CO. is the **only concern** manufacturing a **Rotary Harrow** to-day that have made it their business to get into touch with the actual users of such goods—**The Farmers**. They have done this realizing that a machine like a **Rotary Harrow** must work under many different **soil conditions** and that **one type of machine will not meet every requirement**. We are visiting all the big fairs in the United States and Canada where we are getting into touch with **Representative Farmers from every locality**. From them we have learned that certain of our models are not adapted to certain heavy soil conditions and we now introduce our **Hercules Model** which is **absolutely guaranteed** to handle any heavy soil.

WE WANT TO CALL

your special attention to the extra heavy pipe arm provided on this model. The illustration will show that it is made up of 3 parts: First, a 1 1/4 inch tube; second, inserted in this is a 1 1/4 inch tube, and third inserted in the latter is a 1 inch solid rod. (The measurements given are outside dimensions.) Such a pipe arm will stand any strain to which it may be put through the working of the harrow in any soil no matter how heavy it may be. This is the strongest thing on the market to-day in the way of a **ROTARY HARROW**.

1 5/8" TUBING
1 1/4" TUBING
1" SOLID ROD



WE ALSO MANUFACTURE A SPECIAL DISC

That works on the principle of the buzz saw, driving itself into the soil and at the same time tearing itself out. This disc will handle the toughest sod, pulverizing it into a perfect seed bed. It is a wonder and will do its work perfectly.

We manufacture 5 different models, in sizes and design to meet every soil requirement. **Don't forget that the name KRAMER stands for ROTARY HARROW—THE ORIGINAL.**

We are now in a position to take care of the trade in quantity of goods, in quality of goods and in variety of models to meet every requirement. Let us tell you all about this wonderful labor-saving, time-saving, money-making pulverizing proposition.

WRITE OUR SALES AGENTS FOR CANADA—

JOHN DEERE PLOW CO., LTD., WINNIPEG, REGINA, CALGARY,
EDMONTON, SASKATOON.
Manufactured by **KRAMER CO., PAXTON, ILL.**

The Winnipeg Industrial Exhibition in 1910 was graced with an exhibition of farm machinery, more especially threshing machinery, so large that it has probably never before been eclipsed in the history of Western Canadian Fairs.

The Exhibition Association realizing the importance of the threshing machinery exhibit to the Exhibition itself, crowded the Midway to the west end of the grounds and gave the prominence to the threshing machinery that it deserves. In detail the exhibits were as follows:

M. Rumely Co.

2—36 h.p. double simple plowing engines; 1—25 h.p. double simple traction engine; 1—30 h.p. double simple traction engine; 1—25 h.p. single cylinder engine; 2—25-45 h.p. Oil Pull traction engines; 1—24x40 Rumely thresher; 1—28x44 Rumely thresher; 1—32x54 Rumely thresher; 1—32x52 Rumely thresher; 1—36x60 Rumely thresher; 1—40x64 Rumely thresher.

These were all equipped with Ruth self feeder and Rumely wind stackers.

Robert Bell Engine & Thresher Company.

1—30 h.p. single cyl. plow engine; 1—22 h.p. compound traction engine; 1—18 h.p. portable engine; 1—28x42 thresher; 1—32x52 thresher; 1—36x60 thresher.

These were all equipped with Ruth self feeders and Bell wind stackers.

Winnipeg Industrial Exhibition

Gaar Scott & Co.

1—40 h.p. double tandem comp. plowing engine; 1—25 h.p. double cyl. traction engine; 1—25 h.p. single cyl. traction engine; 1—22 h.p. double cyl. traction engine; 1—22 h.p. single cyl. traction engine; 1—16 h.p. single cyl. traction engine; 1—18 h.p. portable engine attached to sawmill. 1—40x64 thresher; 1—36x60 thresher; 1—33x52 thresher; 1—31x49 thresher; 1—28x40 thresher.

These were all equipped with Gaar Scott self-feeders and Gaar Scott wind stackers.

Haug Brothers & Nellerhoe.

1—30 h.p. Avery Special Under-mounted plowing engine; 1—30 h.p. Avery plowing engine; 1—30 h.p. plowing engine; 2—20 h.p. traction engines; 1—25 h.p. single cyl. gas tractor; 1—42x70 thresher; 1—42x64 thresher; 1—32x45 thresher; 1—28x49 thresher; 1—"Yellow Kid" thresher.

These were equipped with Avery Self feeders and J. B. Wind stackers.

Winnipeg Threshing Machine Co.

1—25 h.p. double cyl. Buffalo Pitts plowing engine; 1—38x62 steel frame thresher equipped with Buffalo Pitts self feeders and Russell gearless wind stacker.

George White & Sons. . . .

1—25 h.p. single cyl. traction

engine; 1—36x60 thresher; 1—30x52 thresher.

Equipped with Ruth Self feeders and gearless wind stackers.

Sawyer & Massey Co.

1—32 h.p. compound plowing engine; 1—27 h.p. traction engine compound; 1—30 h.p. compound traction engine; 1—25 h.p. single cyl. engine; 1—19 h.p. single cyl. engine; 1—40x64 thresher; 1—36x60 thresher.

These were equipped with Ruth self feeders and Sawyer & Massey wind stackers.

1—29x50 thresher; 1—36x60 thresher; 1—25x42 thresher; 1—32x56 thresher.

These were equipped with Wood self feeders and Sawyer & Massey wind stackers.

J. I. Case T. M. Co.

1—75 h.p. compound traction engine equipped with tender and 8 bbl. tank; 1—60 h.p. compound traction engine; 1—30 h.p. portable engine; 1—18 h.p. portable engine; 1—36 h.p. portable engine; 1—10 ton steam road roller; 1—110 h.p. traction engine equipped with contractors' tank, fuel bunkers, 48 h.p. drive wheels and cab; 1—36 h.p. traction engine with fuel bunkers and 26" drive wheels; 1—75 h.p. traction engine with 36" drive wheels; —45 h.p. traction engine used on the incline; 1—60 h.p. traction engine

attached to Case steam lift plow; 1—40x62 thresher with Case feeder and gearless wind stacker; 1—32x54 thresher with Case feeder and gearless wind stacker; 1—24x42 thresher with Case feeder and geared wind stacker; 1—18x36 thresher with hand feeder and folding stacker; 3—different sizes of Troy dump wagons; 2—Troy dump boxes and Case farm trucks; 2—8 bottom steam lift J. I. Case plows; 3—Adams road graders of different sizes; 1—Adams road drag; 4—Case 12 bbl. steel mounted engine tenders.

Nichols & Shepard.

1—30 h.p. plowing engine. Attached to Red River Special Separator.

Waterloo Mfg. Co.

The Waterloo Mfg. Co., had three complete outfits on the grounds which were very attractively displayed. One of the features of the Waterloo exhibit was a portable office which could be easily erected and easily taken down to move elsewhere. The various sizes of Waterloo goods were displayed, and on the whole made a very pleasing exhibit.

Marshall Sons & Co.

Under the direction of Mr. F. W. Lambe, and Mr. J. B. Prosser, Marshall Sons & Co. of Gainsborough, England, exhibited one of their 30 h.p. gas tractors. This engine was a model viewed from the standpoint of design and construction and attracted considerable attention.

Burridge & Cooper Co.

The Burridge & Cooper Co. Ltd., displayed in addition to sev-

REASONS WHY THE Hart-Brown Wing Carrier

IS BETTER THAN OTHERS

The Carriers are 15 feet long, the longest made, are extra wide and have greater capacity than others.

The long, wide malleable attachment spikes are hinged to the chain and freely release the grain at the delivery end.

The carrier may be attached to any separator, with any feeder without changing or interfering with any adjustment of either, and will feed the machine up to

its fullest capacity, delivering the grain to the feeder more evenly and correctly than can be done by hand.

The machine has no overhead derrick or bales to catch in trees or wires or interfere with the pitchers, or furnish a place for the grain to lodge. No support to the ground to take up time in moving and setting.

The carrier is under control of the feeder governor at all times. It need not be thrown out of gear or any changes or adjustment made to prepare it for moving; simply swing the wings around by the side of the machine and hook them into position, which does not require more than one minute.

The wings swing about over the stack or load, thereby saving the labor of from two to six pitchers and requiring but one handling of the grain. Threshermen state that by using our carriers they save from ten to twenty-five dollars per day. We have put out a large number of the Hart-Brown Wing Carriers—have not a single dissatisfied customer—have not taken back a single machine—every one paid for in full.

The Hart Universal Thresher Rack

A new departure in rack construction, no derrick, chains or other complicated devices for unloading, but a very simple and efficient pull-off gate and rope. The load can be removed without stopping the team, the operation consists simply in pulling the wagon from under the load. Six wagons equipped with our racks will do as much as twelve ordinarily will. Does the saving appeal to you? If so, ask for catalog giving full particulars.

Illustrated Catalogue Sent on Request

Sold by all the Leading Threshing Machine Companies

Hart Grain Weigher Co.

Peoria, Ill., U.S.A.

oral different sizes of portable and stationary gasoline engines,

1—Gieser 25 h.p. gas tractor. This tractor attracted considerable attention; 2 different sizes of thresher were also shown.

Ontario Wind Engine & Pump Company.

1—7 h.p. portable Stickney gasoline engine; 1—16 h.p. portable Stickney gasoline engine; 1—10 h.p. stationary Stickney gasoline engine; 1—7 h.p. stationary Stickney gasoline engine; 2—5 h.p. stationary Stickney gasoline engines; 1—3 h.p. stationary gasoline engine; 1—7 h.p. stationary Stickney gasoline engine mounted on rollers with the crank boxes removed show the steadiness with which the Stickney engine

runs and attracted considerable attention. 1—40 h.p. Kinnard Haines gas tractor; 1—30 h.p. Kinnard Haines gas tractor. In addition, a full line of Aylmer scales, lawn swings, etc., were shown.

Goold, Shapley & Muir Co.

1—1½ h.p. Ideal gasoline pumping engine; 1—2½ h.p. Ideal gasoline engine; 1—6 h.p. Ideal gasoline engine; 1—8 h.p. Ideal gasoline engines; 1—6 h.p. Ideal gasoline engine attached to wood saw; 1—28 h.p. double opposed portable gasoline engine; 1—28 h.p. double opposed gas tractor; 1—45 h.p. double opposed gas tractor; 1—10" and feed grinder; 1—Concrete mixer; 1—12" Trip Hammer.

Canadian Fairbanks Co.

The Canadian Fairbanks Co. showed a full and complete line of gasoline engines, both portable and stationary. Some of these were attached to threshers for demonstration purposes.

They also showed a full and complete line of Marine engines and supplies.

International Harvester Co.

The International Harvester Co. showed a full and complete line of gasoline engines, stationary, portable and traction, together with cream separators, sawing outfits, pumping outfits, etc., etc.

Parsons Hawkeye Mfg Co.

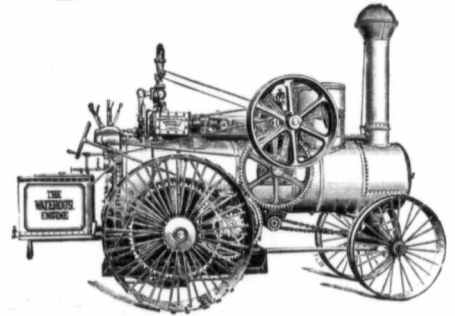
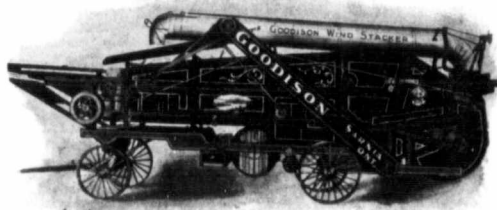
The Parsons Hawkeye Mfg. Co. exhibited a Perfection dump

rack for use in connection with side swing feeders. This rack attracted considerable attention. They also had on exhibit one of the famous Maytag Automobiles which gave daily demonstrations of its ability as a hill-climbing Auto. The same auto carried off practically all of the prizes in the automobile utility contest.

Another exhibit that attracted no small amount of attention was the disc harrow placed on exhibition by Mr. F. Rodgers, of Glen Ewen, Sask. This has many new features as a soil pulverizer and weed destroyer.

In the Manufacturers' Building we found many exhibits along the line of farm machinery, among

Bargains in Threshing Machinery



We have the following second hand threshing engines, threshers and threshing supplies, thoroughly repaired and repainted, all in good working order: boilers re-tubed and all worn or broken parts of all machines replaced with new and we will sell at the bargain prices mentioned below, to clean out our stock of second hand machinery. Call and examine these machines or write us for further information.

TRACTION ENGINES

1—18 h. p. Waterous single cylinder with locomotive return tubular boiler.....	\$ 750 00
1—18 h. p. double cylinder Waterous engine with locomotive boiler.....	900 00
1—22 h. p. Waterous double cylinder engine with locomotive boiler.....	1300 00
1—22 h. p. Waterous double cylinder engine with locomotive boiler.....	1300 00
1—26 h. p. Waterous double cylinder engine with locomotive boiler 36 inch face road wheel.....	1300 00

PLAIN ENGINES

1—12 h. p. Waterous engine with locomotive boiler.....	\$ 450 00
1—12 h. p. Champion engine with upright sectional boiler, wood burner.....	350 00
1—17 h. p. Waterous engine with locomotive return tubular boiler.....	650 00
1—18 h. p. Waterous engine with locomotive boiler.....	750 00

THRESHERS

1—40x60 McCloskey Thresher with side fan blower, and Perfection Weigher.....	\$ 775 00
1—36x60 McCloskey Thresher with Side Fan Blower, Hawkeye Feeder and Perfection Weigher.....	775 00

1—36x60 McCloskey Thresher with Side Fan Blower, Rich feeder and Perfection weigher.....	\$ 875 00
1—36x60 McCloskey thresher with side fan blower, Monarch feeder and perfection weigher.....	775 00
1—40x60 McCloskey thresher with 18 ft. carriers and Perfection weigher.....	475 00
1—40x60 McCloskey thresher with 18 ft. carriers.....	450 00

SUNDRY THRESHER SUPPLIES

2—8 in. 4 ply, 150 ft rubber belts in fair condition.....	each 35 00
1—New 7 in., 4 ply, 150 ft belt.....	50 00
1—New 36 in. Rich feeder.....	175 00
1—New Ham headlight.....	11 00
4—2 hd. Kipp double connection oil pumps.....	each 10 00
3—2 hd. tank pumps with 20 ft suction hose.....	each 13 00
1—New short Glendale weigher.....	20 00
1—New perfection wagon loader.....	55 00
1—2 hd. 12 barrel half round tank.....	15 00
1—Set McCloskey trucks, 34 and 36 in. by 6 in. wheels.....	30 00
1—2 hd. wire cable.....	each 8 00
25—New 1/2 bushel R. & S. grain scoops.....	each 1 00
2—Power jacks.....	each 5 00

WATEROUS ENGINE WORKS CO. LIMITED, WINNIPEG.

which we might mention the following:

The Harmer Implement Co. had a full and complete line of portable grain elevators; J. I. Case Plows in all styles and sizes, J. I. Case disc harrows, Superior Fanning mills, Gilson gasoline engines, Gilson binder attachments and farm trucks.

The Loudon Hardware Co. were on hand with their usual attractive display of barn and hay tools.

Hero Implement Co. displayed a full and complete line of Hero washing machines, Hero grain cleaners, and Hero smut machines. On another place on the grounds this concern also had on exhibit a Nelson dump rack for use with side wing feeders.

The Kramer Rotary Harrow Co., under the supervision of Mr. J. W. Kaufman had a very attractive exhibit of rotary harrows, which was made up of five models including their famous Hercules model which is especially designed for the heavy soil of Western Canada.

THICK, SWOLLEN GLANDS

that make a horse wheeze, have Thick Wind, or Chokedown, can be removed with

ABSORBINE

on any Bunch or Swelling caused by strain or inflammation. No blister, no hair gone, and horse kept at work. \$2.00 per bottle, delivered. Book 2-7 free.

ABSORBINE, J.R., for mankind, \$1.00, in-cluded. Cures Gout, Rheumatism, Varicose Veins, Hydrocele, Variocele. Book free. Made only by W. F. YOUNG, P.O.J., 112 Temple Street, Springfield, Mass. LYMAN'S Ltd., Montreal, Canadian Agents.



The Eastman Mfg. Co., of Walkerville, Ont., had on exhibition, an Eastman Wild Oat cleaner. This cleaner is designed on an entirely new principle and from the daily demonstrations given, performed its work in an exceptional manner.

Beatty Bros. had an attractive exhibit of barn and hay tools. This concern has just recently opened a Branch at Brandon in order to take care of their growing western trade.

The Beeman Mfg. Co. displayed in a very attractive manner their line of Jumbo grain cleaners and smut machines.

The Red River Metal Co. showed a full and complete line of water and gasoline tanks, together with a new gasoline pump which they are just putting on the market.

On the whole, it may be said that in so far as the farmer is concerned the Winnipeg Industrial Exhibition of 1910 surpassed anything that has been held before. The various farm machinery exhibits were complete and well arranged and so displayed that they showed off the goods to the very best advantage.

A Notable Exhibit at the Winnipeg Industrial.

One of the most attractive exhibits in the Manufacturers Building at the recent exhibition was that of John Ambrose, Taxidermist. Mr. Ambrose not only had a very pleasing display but at

the same time carried off some of the leading prizes in his line. He secured one first prize for animal or animal head indigenous to Canada, one first prize for birds indigenous to Canada. One silver medal for collective exhibit for animal heads or birds. In 1909 Mr. Ambrose secured one first prize for birds indigenous to Canada, one first for animals indigenous to Canada and one silver medal for collective exhibit of animal heads or birds. Some of the more notable things among the exhibit included—one elk head, one moose head, one extra fine specimen of black bear mounted entire, one musk ox, one mountain sheep, one eagle mounted on rabbit's back and the usual collection of birds, animals, etc., that go to make up a complete and attractive taxidermist exhibit. Mr. Ambrose is to be congratulated upon the success of his particular line.

Portage Branch of Hart-Parr Co.,

In order to take care of their rapidly growing Canadian trade, the Hart-Parr Co., of Charles City, Iowa, have recently purchased a site just south of the Grand Trunk Pacific Station in Portage la Prairie, Man., and will at once begin the erection of a building 90 by 144 ft. for a branch office and warehouse. The building will be of brick, with concrete floor and so planned that it can

be enlarged later. The expenditure for site and building will be from \$16,000 to \$20,000. Such a building has been needed for some time, but it is only recently that a suitable location could be obtained.

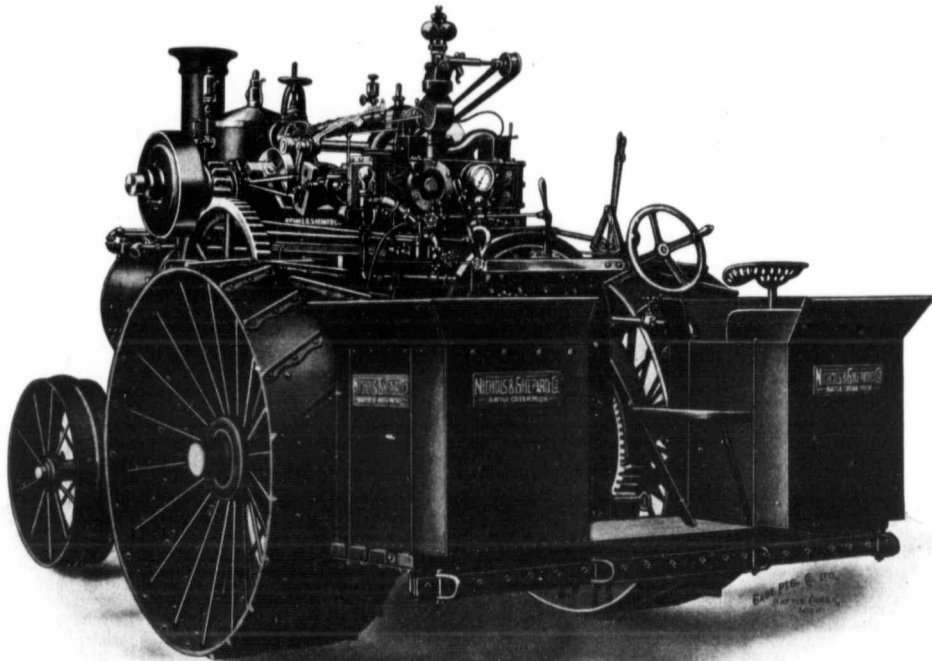
Western Canada Lands a New One;

Recently there has come to our desk a copy of the first issue of a new publication to be known as The Canadian Blacksmith and Wood Worker.

New publications spring up in Western Canada every little while, some to make good, some to have a more or less rocky career, and quite a number of others to fall by the wayside. In the starting of a new publication the men behind it are the ones to be watched, and, for this reason, we are particularly glad to welcome The Canadian Blacksmith and Wood Worker into the publication field.

It is published by the Blacksmith Publishers, Limited, 822 Union Bank Building, Winnipeg, with Mr. F. D. Blakely as manager, and herein lies the keynote to the publication's success. Mr. Blakely's ability as a publisher has been thoroughly vindicated through his success with Canadian Farm Implements, and while his new publication is only yet in its swaddling clothes, the first issue bears the earmarks of success quite prominently.

STEAM PLOW ENGINE



Nichols & Shepard Big Double Cylinder Plow Engine, 25, 30 and 35 H.P.

HALF INCH BOILER PLATE, DOUBLE CYLINDER, SPUR DIFFERENTIAL GEAR, SEMI-STEEL GEARING,
ENORMOUS WATER SUPPLY, ROCKER GRATES, AND HEAVY UNBREAKABLE PLOW HITCH

The Nichols-Shepard Plow Engine has run more days, plowed more acres, earned its owner more money, with less delay from break downs, than any other plow engine made.

Many American builders furnish one engine for the States, and another for Canada. The Canadian Inspection Laws are severe. Nichols & Shepard Company furnish the same engine to customers in this country that they do to Canadian customers. The Canadian inspectors allow the Nichols-Shepard engines the highest steam pressure permitted under their rules to be carried on any traction engine. What is good for Canada is good for the rest of the world. The best is none too good for you.

Send for Our Plow Engine Pamphlet and Large Catalog

NICHOLS & SHEPARD COMPANY

BATTLE CREEK, MICH.

FIFTY Dollars," Frank Truman, peering intently into the machine, echoed the words of his father. "Fifty dollars for just a little fixing. That's likely all there is wrong about it. Maybe some little screw needs tightening; for there is certainly a screw loose somewhere. The one that tightens it gets father's fifty dollars."

In a very impressive way the situation appealed to the boy. There, right before him, among a half-hundred little wheels and mechanisms, assembled together for tying a knot, in a space no larger than his own head, was a worn-out or improperly adjusted part that was causing the self-binder to leave fully two-thirds of the bundles in his father's wheat field unbound. To discover the one or the other, and to replace or adjust a part, was to earn fifty dollars.

"Fifty dollars! It was enough, he thought, to buy him a first-class shotgun, and some to spare.

"I wish I was an expert," Frank said, eagerly. "It wouldn't take me ten minutes to find the trouble—if I was a real one, not like 'Monkey Wrench.'"

Frank was thinking of the self-styled machinists who had come out during the present season to put the binding machinery of his father's reaper in order. They all had not only failed, but convinced Mr. Truman that their knowledge of the machinery was rather limited. "Monkey Wrench," as Frank and his father had dubbed one of them, made himself doubly ridiculous by walking into the field with a pipe-fitter's monkey wrench as his only tool. A compound microscope would have been more serviceable.

In spite of Mr. Truman's efforts, since the beginning of the cutting harvest, he had not been able to secure a competent expert to put his machine in working condition. The local dealer had brought each one of the so-called experts out to the farm; and Mr. Truman had allowed them to overhaul the binder, although he was convinced by the way they went to work that they were only traveling salesmen who thought themselves called upon to assume a knowledge of the machine they represented and an ability to repair it. The last one of the six was in the field that morning, but had gone away leaving the binder working worse, if anything, than before.

At quitting time this evening it was throwing off a larger number of unbound bundles than at any time during the harvest. Mr. Truman had unhitched his four-horse team in great discouragement.

As the animals started alone to the house, the farmer turned and gazed steadily over the forty-acre expanse of standing wheat, plowed by the wind with moving furrows as though it were liquid gold. But the scene of beauty was hardly what he

A LOOSE SCREW

Ingenuity That Paid a Handsome Reward

By DICK DICKINSON

was looking at, or even thinking about. He was noticing that the golden hue of the wheat field was fast changing to a dry husk color. Near at his feet he saw that many stalks of grain had despaired of longer standing up, and, "knuckling" down with their heads on the ground, were yielding up the yellow berries. The dry rasping of the stalks together as they moved in the wind sounded, to the farmer's experienced ears, ominous for the safety of the too-ripe grain.

"If it had worked as it ought to," he said, "there wouldn't be much of that field standing now. I'd give the prettiest fifty-dollar check I ever wrote to anyone

ine, unlike any he had ever seen, was first brought home two years ago, he was not content until he had understood perfectly its intricate mechanisms.

Tripping it again, he gave the binder another turn, holding the twine down with his hand to take the place of the bundle. The machine tied a perfect knot, which Frank examined closely. Both ends of the twine were fairly caught, making an unyielding band.

"I'd just like to catch it missing one," he said as he swung the bundle carrier around and hooked it out of his way. "Then I could tell how she does it."

For nearly an hour he worked at the machine, binding bands

Then, as if to make one more attempt to discover the trouble, he stepped over to a bundle of loose grain and picked up the short piece of twine thrown off but which the machine had failed to fasten around the bundle. He gathered a dozen of them from the near by windrows, carefully inspecting each one. They all had a well-made knot in one end.

"I see," he said confidently, "the other end slips out before it's tied."

He glanced at the sun again, and quickened his speed as he walked to the binder. In rapid succession he bound a half-dozen bundles. He noticed that the holder of the end of the twine seemed to grasp it firmly while the knot was being tied; that it turned after each knot was tied to grip anew the free end after a band was cut off; that the needle put the twine fairly within the grasp of the holder; and that the holder itself yielded sufficiently each time a knot was tied and gave it the necessary amount of slack. There seemed to be not the slightest reason why one end of the twine should escape without being tied.

He was completely baffled. He could not see why it should miss tying a knot, nor could he see why it should not miss when turned by hand as well as when working regularly.

Then he reflected that in all the trials he had given it, the twine had been held down but lightly to allow the band to be tied. "One of those fat bundles of wheat pulls harder," he thought, "when compressed to make the bundle, than when I hold it loose in my hand."

"Look at that sun!" he exclaimed. "I've been here nearly two hours. Just once more, and me for the chores and supper!"

Grabbing savagely at the trip that released the binding machinery, with one vigorous thrust of his right arm against the projecting iron arms of the binder he gave it impulse enough to send it completely through the operation of making a band, while pulling many pounds on the twine with his left hand. But before the machinery had stopped with a jerk at the completion of its work, the twine yielded. When the knife had cut the other end Frank held in his hand a short piece of twine with a knot in one end, precisely like those found with every loose bundle.

He tried it again, but that time the holder held the twine securely. But he could not be easily turned from following this hopeful lead. This, and the lateness of the hour, combined to make him desperately enthusiastic.

In rapid succession he turned out a dozen or more bands, of which, by pulling strenuously on the twine, he contrived to make it miss about half.

On the next trial he watched the holder, a little flat wheel



"I Got Something to Put the Fixings to It!"

who will make that machine work like it used to."

He started to the house, with bowed head and wiping his face with his large red handkerchief.

But Frank, who had left off shocking to assist his father at unhitching, remained at the machine.

After regarding the troublesome knotting machinery for several minutes, he pulled the trip which released it, and, turning it by hand, bound the half-bundle of grain that remained in the machine, watching closely the complete performance of tying and cutting the twine.

It was not a revelation to him. His curiosity had prompted him to do the same thing many times before. When this same mach-

and carefully watching the three mechanical figures as they grasped the twine at the proper time and tied the knot, in order that he might catch it in the act. But he was disappointed. It did not miss a single time.

He even tried turning it with the chain that the machinery might have the same speed as when drawn by horses. But no matter how fast he turned it, the bands came out securely tied. After blistering and begriming his hands on the rough links of the chain, he gave up the plan.

He glanced at the sun, which told him plainly that supper was awaiting him at the farm house. He was about to despair.

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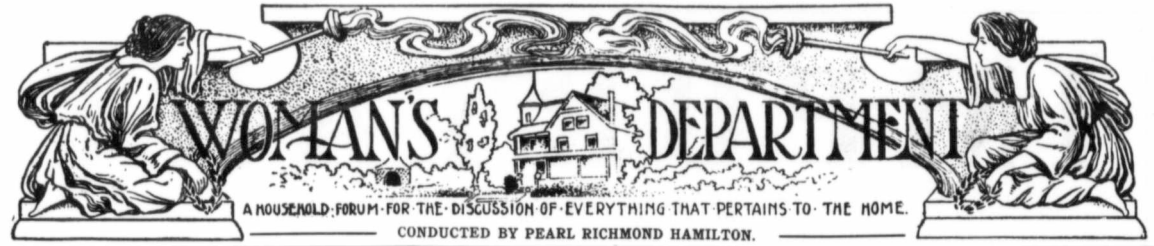
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Worry and Faith

By Mary Starek

Worry brings the darkness,
Faith brings the day;
Worry makes a rough path,
Faith the smoothest way.

Worry, by the furrows
Which it leaves, you trace;
Faith smooths out the wrinkles
On the fretful face.

Worry thinks forever
Something will be wrong;
Faith is always going
Forward with a song.

Worry thinks of human
Life and helplessness;
Faith thinks of God's power,
Always near to bless.

Worry spoils the pleasures!
God has sent to you;
Keep your faith, and gladness
Will your way pursue.

The Little Joys of Every Day.

The little joys of every day,
These tiny grains of gold,
Are scattered on life's road to keep
The heart from growing old.

A word of cheer, a happy song,
The children's merry shout,
Are gleams of love-light close at hand
To banish care and doubt.

Enough of heaven near us bides,
Enough that each may win,
If through the windows of our lives,
We let the sunshine in.

The Victoria League.

Miss Talbot, who has recently passed through Western Canada on her way to England, represented a very worthy society—a non-party association of British men and women. Miss Talbot has made a tour of the British possessions in the interest of the Victorian League, the object of which she explains as follows: "The aim of the Victoria League is to promote mutual understanding, help, and intercourse between all citizens of the British Empire. Its work has been called the 'organization of sentiment.' Few people are without some feeling of sympathy with, and interest, in the distant lands which, equally with their own, make up the King's dominions; and there are few who would not do something, however small, to increase good feeling and serve the great cause of Imperial unity. The League is the outcome of an attempt to focus these feelings and aspirations, and to provide an organization through which members of the Empire may come into personal touch with one another and obtain the understanding which comes of mutual service. The League is so constituted that, while carrying on a permanent organization for hospitality and educational work, it can readily form a special committee to deal with any Imperial question which may be of interest at the moment (such as the Tercentenary Celebrations at Quebec). To become a member of the Victoria League means to join a large body of people, living in all parts of the world, who are seeking to study the problems of the Empire, to exchange hospitality and to become acquainted with all the aspects of life and the different points of view of the citizens of both mother country and daughter lands. The League provides opportunities for everyone of its members to do something to attain these great ends, and to give practical expression to the feeling of Imperial responsibility." Our new queen is patroness of the League.

Miss Talbot is very anxious for the schools to become interested in the cause. The League is a worthy association—any organization that promotes British loyalty should command sincere support.

About Women

The queen of Italy is womanly, unassuming and unselfish.

Mrs. Bryant, who is so well-known in the educational world, was a Miss Sophie Willock, daughter of the late Rev. W. A. Willock, D. D., of Dublin. She was first educated privately, but subsequently studied at Bedford College. While there Miss Willock gained the Arnott Scholarship, and subsequently gained many honors. She was the first woman to take the degree of Doctor of Science.

The London Council has awarded eighteen scholarships in cookery to domestic servants. The winners have the advantage of free instruction in household cookery for twelve weeks at the National School of Cookery in the Buckingham Palace Road, London, S. W. to commence in September. The contestants were required to have one year's experience in some branch of domestic service.

In Japan they do things picturesquely. When a young Jap has made up his mind as to the maiden he desires to wed, his next step is to fasten a branch of a certain shrub to the house of the lady's parents. Should he prove a welcome suitor, the branch is cut down and taken in, while if unacceptable, it is left to wither and die. This system saves lots of trouble.

Miss Anna L. Waring, the hymn writer, who passed away in her ninetieth year, was born at Neath, in Glamorgan. Some of her hymns are sung wherever the English language is spoken. "Father, I know that all my life," has helped many to tread the path to resignation. She published a small volume of "Hymns and Meditations" in 1850, and in 1871 some of her sacred verse appeared in "The Sunday Magazine."

Queen Maud Puts Home Before State.

Queen Maud, of Norway, thinks more of her children than of her high station. At the time of her marriage the Princess Maud rejoiced that she would not be troubled by affairs of state. While her husband was merely a lieutenant in the English army and had no prospect of being the ruler of any nation, the princess passed her hours in the home. After the prince was chosen ruler of Norway and became King Haakon, the queen still looked after her baby.

When the royal family first arrived at Christiania, her son Olaf was only two years old and much afraid of the crowds and noise. Everybody in Norway, it seemed, wanted to kiss the baby, but Queen Maud would not permit this, and for a time she was unpopular. But afterward, when they learned that it was mother love and not pride that caused her to keep her baby away from the crowds, they forgave her, and now she is beloved of the Norwegians. The crown prince of Norway is ruled by affection.

The Fireless Cooker.

As one of our readers has written me asking about the fireless cooker, I am pleased to answer her request.

The main principle of the fireless cooker is simply that of conserving heat, therefore it is a box arranged in such a way as will contribute to the retention of heat for the longest possible time.

There are many foods that will cook if only heat sufficient to just reach the boiling point can be maintained. This heat

can be retained by the fireless cooker. It saves fuel and time.

When the food is once heated, no stirring is required, burning is eliminated and the food does not stick to the kettle. It saves constant attention to the "boiling pot." The best kinds of food for a fireless cooker come in those requiring long, slow cooking, as cereals, dried fruit, vegetables, soups and all meats that would be boiled or stewed. The shrinkage and swelling of the different foods are much different when cooked in a fireless cooker from what it is when the ordinary oven or open flame is used. Meats retain their flavor and juiciness in the cooker.

It is splendid for keeping food hot for a delayed meal.

Food for a bottle-fed baby can be kept warm all night. It is invaluable for the sick room because you can keep hot things hot for many hours, which is especially helpful in summer. It takes the place, in a way, of the old-fashioned brick oven, which gave us long-cooked, and delicious food.

Many women use it for canning and preserving fruit—the kinds that require long cooking. In this respect it is a great help for the woman in the country. The season when berries and fruits are available is just the season when standing over a roaring fire is to be dreaded and the fireless cooker saves all this tiresome and hot work. The flavor of fruit cooked in this way is more natural. This is a strong argument in favor of it.

The boxes of the fireless cooker are made of wood. Each box is divided into compartments which contain kettles for cooking. The boxes are lined with metal. The boxes vary in size according to the price. One of the larger boxes will contain one eight-quart and two four-quart kettles, two large and two small radiators, one baking basket, one radiator rack and a pair of tongs. A book of recipes is always given with each outfit.

I trust I have made the explanation of the fireless cooker clear. If the lady who sent in the request desires further information on the subject I shall be pleased to answer all requests. I wish more would send in requests on any problem concerning the home-work.

P. R.

Correspondence

The editor is very much pleased with the correspondence. The cook-books have all been sent out except one. If M. J. M. will send me her name I will mail her cook-book to her. I lost the piece of paper containing her name. I am sure our readers will find these letters from one another very helpful. Let more of our women readers write to this department.

Oakburn, Man., April 16, 1910

Dear Editor.—I have noticed your offer in the Canadian Thresherman which my husband is a subscriber to. He owns an International Gasoline Engine, 20-h.p., and Belle City separator, and, of course, he is very interested in your paper; in fact he likes it better than any other paper that he gets, and he has found it a valuable paper in many things and it was through him speaking to me about it that I came to read the page for women, which I must say I like very much. We have just been in Canada three years this spring and I must say I like this country very well. We have just taken over my husband's father's farm which is a three-quarter section, one mile from town. I find I have an awful lot of work to do having two men to cook for and my poultry with two cows to milk

keeps me pretty busy, but I always try to accomplish all my rough work by dinner time so as to spend the afternoons in my garden and occasional sewing. One thing that I am most particular about is to be washed and dressed tidily by the time the men come in from the field at night as I believe it tends to make the home brighter and happier and does away with that monotonous feeling that you have so many people saying is the lot of the farmer's wife. But I think a good deal of the atmosphere of the farm home depends upon the women folk. Now I think this is all for the present, wishing your paper every success and especially the Woman's Department which I would very much like to see extended on all phases of the women's lot on the farm. I am yours faithfully, Mrs. C. M.

I like the tone of this letter and I am sure your letter will be an inspiration to many. Please write again.—P. R.

Lone Tree, April 18, 1910

Dear Editor.—I thought that I would write a short letter to the Woman's Department to let the readers know what success I had with flowers and the kind.

First, in the spring get the flower garden ploughed about eight eight inches deep and harrowed, then garden rake and rake off all lumps, and if you have small seeds, such as poppy, phlox, pansy, bellis prennis and many other seeds that are as small they should be sprinkled over the top and pressed down firmly. Larger seeds must have the soil pressed first; then make rows, about three and one-half inches deep, and sow seed in, then rake over very lightly.

Large seeds such as nasturtium and castor beans and horned cucumber vines should be planted at least three quarters of an inch deep and pressed in firmly and perennials should be treated the same as annuals the first year, but the second year plant in a place where they will not be disturbed for three years or till they get pretty well crowded up.

Before planting, dig about one foot deep, half fill it with well rotted manure then put in a little earth then set in your plant, having the top of the root even with the soil, then press the earth in around firmly; I think if anybody interested in flowers follows these rules they will have no trouble in growing good, strong plants with plenty of bloom.

I am putting in a large vegetable garden, also quite a number of flowers, and am setting a lot of geese eggs and other fowl's eggs.

Perhaps I will write again in the fall and tell you what luck I have. I may add that I have four goslings out now.—M. J. M.

Kindly send your name to me for the cookbook. This is a very helpful letter. Will you write again?—P. R.

Ingelwood, April 18, 1910

Dear Editor.—I saw in the Canadian Thresherman where women were wanted to write and tell how they do some kinds of work. I am milking eight cows this summer and I will write and tell how I make butter. I set the cream separator to skim the cream that will test 30 per cent. butterfat. I let the last milking of cream I put in the cream crock set 24 hours before churning. I keep the cream in a warm place till 12 hours before churning then I cool the cream to 60 degrees and churn. I

wash the butter till all the butter milk is out of the utter and put one saucerful of salt to 10 pounds of butter and mix till all the salt is mixed evenly through the butter and all the streaks are out and the butter is all the one color. I have been milking four cows from January 1st till March 31st and I sold \$62 worth of butter, besides running the house, and there are eight of us. I am hatching eggs with a Peerless incubator this summer, if I may I will write and tell how I get along. I will close as this letter is getting too long. I will sign a pen name.—New Beginner.

I am glad to receive this letter as I have heard of Mrs. Clark's splendid butter. I am sure her letter will help others. Notice how much her butter has netted her.

Yes, write again, Mrs. Clark.—P.R.

Moosomin, April 25, 1910

Dear Editor.—In the April issue I noticed your offer of a cookbook in three different ways. I desire to try No. 3. My topic is on poultry. We have three different kinds of fowl—Golden Wyandottes and Brown Leghorns and Plymouth Rocks, and also have some Toulouse geese and some Rouen ducks. We took prizes this year with all of these birds at the Moosomin Poultry Show. I took first, second and third with the Golden Wyandottes and 1st and 2nd with the Plymouth Rocks, and 2nd with the Brown Leghorns; took second with the brama leghorns; took second with the geese and four firsts with the ducks. I find that these breeds of fowl pay us the best so far. I do a lot of hatching by incubators and also have very good luck; we use the Peerless incubator and have had good success with it.

We have a setting of 150 in our Peerless this season, they came out on Sunday. Well, this is my first letter to your paper and I sincerely hope it will be all right, and if it pleases and answers the purpose I will write again. Now I will have to conclude and hoping I will be lucky enough to win one of your cookbooks; if I don't succeed in this way I will try one of the other ways, as I am bound to win one of your cookbooks. I am, yours truly, Christie Paul.

Your letter is just what we want. Write again. Your cookbook has been mailed to you. Let me know if you have not received it.—P. R.

Mother's Corner

Dear Little Hand.

Dear little hand that clasps my own,
Embroiled with toil and seamed with strife;

Pink little fingers not yet grown
To the poor strength of after-life—
Dear little hand!

Dear little eyes which smile on mine,
With the first peep of morning light;
Now April-wet with tears, or fine
With dews of pity, or laughing bright,
Dear little eyes!

Dear little voice, whose broken speech
All eloquent utterance can transcend
Sweet childish wisdom strong to reach
A holier deep than love or friend;
Dear little voice!

Dear little life! my care to keep
From every spot and stain of sin;
Sweet soul foredoomed, for joy or pain,
To struggle and—which? to fall or win?
Dread mystical life!
—Lewis Morris.

Just Hints.

I am sorry to see the wagons that go about our streets filled with peanuts, popcorn and ice-cream cones. Any one who gives a child a treat from this sort of wagon is doing great injury to the child. These men take in money and deal out disease and death. The popcorn is exposed to the dust of the street and all possible filth that flies about in the way of germs. The ice-cream cannot be clean. I have seen the pails from which it is taken, black with dirt and age. These pails are covered by blankets that reek with filth. We cannot be too careful of what we give our little ones. Another very serious injury to children is indiscriminate kissing.

I will not allow a stranger to kiss my child. Even a mother should kiss it on the cheek and not on the mouth. I cannot understand why some mothers will put food into their mouths before giving it to children. It is a filthy and dangerous habit. I think a child's mouth should be carefully washed every day with boracic acid water as children naturally put things into their mouths. One cannot be too careful of the milk for a child. Milk left in the sun propagates diarrhea and death; unwashed milk-bottles cause much serious illness.

Infant deaths are now high because of ignorance of infant-management. Your baby needs clean air, the best milk, sleep, quiet, and a mother who knows.

Teaching Children Truthfulness.

Very many mothers and teachers have been perplexed over this difficult question. Many children suffer from an over-active imagination. I would never punish a child of five years or younger for this trait. Instead, I should try to encourage thought and at the same time teach the difference between the real and the unreal. Be perfectly frank with the child. Watch yourself carefully lest by some word or deed you teach untruthfulness. We busy mothers are unconsciously responsible for many ills which we wish to cure in our children. Young children are great imitators, and if they find that mamma tells them things which are untrue, it will not be long before they will be doing likewise. Never make a promise that you cannot keep.

Personally, if I had a child of five years who was in the habit of being untruthful, I should not appear to notice the false tales at the time they were uttered, but wait until the cares of the day were over. Then, taking him in my arms, I would tell him stories of brave deeds and the men who did them, and incidentally lead up to truth as the greatest virtue, telling him that even little boys could be brave by cultivating this virtue, and how proud the mother of a brave, truthful boy would be. Then might follow a confidential chat about his playmates, always remembering that in that hour he and I are real comrades. A few questions asked—"Does Johnnie Gray always play fair? Do you know of any untruthful boys? Are you always truthful?" etc.

After gaining his confidence I should feel sure of a confession, and that is the first and the main step toward conversion.

Some Causes of Deafness.

Dr. Seaton, an eminent aurist, has recently written a forcible paper on deafness caused by blows about the head. Concussion often causes deafness and in artillery manoeuvres or in battle gunners and their assistants spring on their toes when a gun is fired in order to lessen the force of the concussion. Yet there are thoughtless parents and nurses who think it perfectly proper to box the ears of children, not knowing how often this form of punishment may result in temporary or permanent loss of the hearing. A blow on the head is always dangerous and, if parents believe in administering corporal punishment, there are plenty of places about the body where a blow may be administered without the least fear of any injury to the parts. Another aurist mentions the case of a person who was made deaf by a kiss given by a friend coming up suddenly behind the victim, so it is easy to perceive how cautious we should be about such matters and it is to be hoped that fathers and mothers who read this will not allow the warning to go in one ear and come out the other.

Love of Beauty Dispels Cruelty.

A love of the beautiful, which is natural in every child, should be cultivated. Teach them to observe the bright ribbons of the rainbow, the glory of the sunset's open gates, and "the frail wonder of the flower."

"To see beauty and to love it is to possess one of the chief requisites of a happy and contented mind." Cruelty can have no place in mind and heart that have learned to take note of Beauty, which is the twin sister of Joy!

Mothers, you who are the central figure in the home, you, toward whom the trusting eyes of little children are turned, a matchless opportunity is yours to be a force in shaping the humane sentiment of coming years! Esteem not this oppor-

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tunity lightly. If your children grow up with eyes to see, ears to hear, and hearts to feel for fellowmen and all living things, waves of humane influence will reach far out from their lives. You will have helped to bring the day of mercy and peace of which wrote the great prophet of old: "The wolf also shall dwell with the lamb, and the leopard shall lie down with the kid; and the calf and the young lion and the fating together, and a little child shall lead them."

Recipes

The Happy Wife.

You ask me why I'm happy when so many wives complain, And say their husbands only live to give them endless pain; My secret you demand to know, you've seen my happy nook, And you quiz me not a little, but—remember I can cook!

When other wives are envious, and tell my husband dear My gowns are very out of date, I haven't any fear; I only smile, and worry not, I care not how I look; I know I've but to whisper—"Dear, remember I can cook!"

My love has often said to me, "My dear, I know you're plain, But married life with you, my dear, has brought me nought but gain; Let other women sing and dance, or even write a book, Yet you're above them all in charm—remember you can cook!"

And always when I'm begged by girls to tell them by what art I captured such a handsome man and won quite all his heart, I merely say: "My dears, I'm sure that all the pains I took Was asking him to dinner—for, remember I can cook!"

And all you modern women who are anxious to be wad, Be wise, throw up your arts and crafts, and learn to bake the bread; For be certain that no husband will forget the vows he took If his wife will only please him by remembering how to cook.

The Fruit Canning Season.

Anyone who would be successful in working with fruit must keep in mind two simple truths. The first one is that bacteria abound in the air and on unsterilized surfaces. The other truth is just the opposite one—that bacteria cannot live in sterilized air, and that such a condition must be provided in order that canned goods shall "keep." Cooking the fruit in boiling hot liquid, pouring it at once into hot jars and sealing immediately with hot covers and sterilized rings, will insure complete sterilization. Perfect, air-tight sealing will maintain that condition.

Glass cans are the best, and you will find them the cheapest in the end, for you can use them year after year by replacing new elastics for the old ones, which must be done yearly.

Sometimes it is wise to put two rings on one jar if it does not seal tightly.

For a great many fruits, it is economical to use the pint jars instead of the quart size. In buying new jars it is well to keep this in mind. For a small family the pint jars are just the thing.

Keep your canned fruit and vegetables in a cool, dark place, and be sure the place is dry as well. Strawberries and red raspberries lose their color very quickly if exposed to the light. A good plan is to wrap each can in paper. You must pay strict attention to the following rules in canning. Remember that it is worth while to put up your own fruit, for it is cheaper and better than the fruit you buy; and then good housekeepers are proud of their own work in this line:

First, wash your cans thoroughly and roll them in boiling water; be sure that they are not cracked; fit the elastic firmly around the neck of the can, so when you are ready to screw on the top there will be no time lost, as this has to be done quickly, so there will not be any chance or room for the air to get in. Screw tight; this is important. Have the tops lying in hot water, so that no time may be lost in screwing them on. You must always fill

the cans to overflowing, for the fruit will shrink some as it cools, and that, you know, is dangerous, for it invites the air to enter. Screw the top on immediately. Fill one can at a time, and tighten this one before you go to the next. Be sure to examine each as it cools, then screw tighter.

Throughout everything must be very hot. Caring for a large quantity of fruit is tiresome work at best and should be made as easy as possible by having everything in readiness and perfectly planned. The jars should have been cleaned the previous day.

Kettle canning is the most common form of household canning, and which is simply stewing with the given amount of sugar, then transferring the product to the hot sterilized cans. Small, juicy fruits, such as cherries and berries, require little or no water, while the larger fruits demand considerable. In ordinary canning, any amount of sugar may be used to suit the taste. Berries, currants and cherries require about five or six minutes for their cooking.

The real work of canning begins with the picking over and washing of the fruit. Imperfections should be discarded. Before anything else is done, however, the fruit must be dipped quickly into water and then drained with as little handling as possible. A wire basket or colander is good for this.

In canning fruit juices, like berries, it is much better to make the syrup with sugar and very little water. Cooking one kind of juice in the juice of another is often done. Red raspberries and currants are two flavors often combined; also, currants and cherries.

In general, it is true that a very sweet fruit is improved by a touch of acid, but the flavoring must be done skillfully.

Fruit will keep perfectly without sugar if all other conditions named are provided. This is of practical value to the housewife, enabling her to insure fruit from spoiling until it is convenient to attend to it later. Fruit juices can be canned and made into jelly later, instead of trying to care for it all at once.

White crushed or granulated sugar is best. Cheaper grades can be used, but we think the best is the cheapest in the long run.

Some prefer to put up fruit to be used for pies without sugar, claiming that the pure fruit flavor is secured by adding the sugar when the fruit is used. However, for fruit that is to be served as a dessert by itself, it is generally conceded that the flavor is finer if the sugar is cooked into the fruit when it is first canned instead of adding it when opened.

The amount of sugar used in making the syrup varies from one-fifth to one-sixth as much as fruit, according to the acidity of the fruit. Often a fruit that is not sour is improved by sugar. After all, it is a matter of taste and if one is using sugar it is best not to be too economical.

For canning, have a wide-mouthed funnel, made to set into the can; pour the fruit into the funnel as quickly as possible, and screw down the top immediately.

Never put them away until the following day, and then examine again, screwing them tighter as may be needed.

During the season of canning and preserving, many women stand for hours stirring the fruit to prevent it from burning. If the preserving kettle is placed in a pan of boiling water it can cook all day without burning, and the work is less tiring for the busy housewife.

The Preserving of Pineapple—Select large, ripe fruit, and cut into slices about an inch thick; pare neatly and remove the eyes and cores. Cut the fruit into small cubes or shred finely with a silver fork. To each pound (one pint) of prepared fruit allow one-fourth of a pound of sugar and one gill of water, or if a richer syrup is desired use three-fourths of a pound of sugar to one of fruit. Put the sugar and water into the preserving kettle, and when the sugar is dissolved boil five minutes; skim if necessary; add the fruit and bring slowly to a boil; let simmer gently for twenty minutes, or until tender. Pack in sterilized jars and seal.

Pineapple is delicious preserved in this way: Select small but perfectly ripe fruit. Cut into uniform slices about half an inch thick, pare and carefully remove the eyes and core, leaving the remainder whole. Pack the slices, one above the other, into wide-mouth jars, and pour over the fruit a rich syrup made from sugar and water. Adjust the rubbers and covers, and proceed to cook as directed for preserving

without sugar. Cook thirty minutes, or until the fruit can be easily pierced with a straw, then remove from the hot water and seal.

Strawberries—Remove the stems and carefully pick over eight quarts of fruit; wash under a stream of water in the colander, and drain. Put two quarts of the fruit in a double boiler with one pint of sugar, and heat slowly until the berries are soft; drain through cheese-cloth, and return the juice to the preserving kettle, with one quart of sugar; stir over the fire until the sugar is completely dissolved; boil five minutes and skim, then add the remaining fruit; heat slowly to the boiling point and cook six minutes. Fill each jar to overflowing and seal.

Raspberries and Blackberries—Follow the same method as given for the preserving of strawberries, or they may be preserved without sugar.

Fruit Juice—A number of delicious beverages may be made from fruit juice, and when carefully sealed in air-tight bottles it will keep from one year to the next. Prepare the fruit as for preserving; put into the double boiler with one cupful of sugar to each quart of fruit, and heat until the fruit is soft and broken. Turn into a jelly-bag and drain until the juice has completely oozed out. Do not squeeze. Return the juice to the fire and heat until boiling hot. Stand sterilized bottles in a pan of hot water, and fill; insert the corks firmly, then immediately dip the top of each bottle in melted sealing wax. The same method may be employed for raspberry, blackberry or grape juice.

Currants—Wash in a colander and strip the fruit from the stems. Heat one quart of the fruit with one cupful of sugar, and extract the juice; strain. Prepare a syrup from the juice and three pints of sugar; when boiling hot add five quarts of the prepared currants. Cook slowly for fifteen minutes, or until the mass is boiling hot; jar and seal.

Cherries—Wash, stem and look over carefully, rejecting any that may be decayed or wormy, and remove the pits. To five quarts of fruit allow three pints of sugar. Put the sugar in the preserving kettle with just enough water to dissolve it, and when boiling hot add the fruit and cook slowly for ten minutes. Fill jars quickly and seal.

Peaches—Select large, perfectly ripe but firm fruit. Remove the skins; cut into halves, but do not remove all the stones; leave at least two for each can; they not only add to the flavor of the fruit, but they show up beautifully in the clear amber of the syrup. Prepare a syrup from one pint each of water and sugar to every two quarts of prepared fruit. Heat until boiling hot and add the fruit. Bring slowly to a boil, and let simmer until tender. With a wooden spoon lift each piece carefully from the syrup and place in hot sterilized jars; fill each jar quickly to overflowing with the hot syrup and seal.

Crab Apples—Cook whole, or halve and remove the cores, in clear water until tender without cooking them to pieces; skin out carefully; strain the water in which they were cooked and return to the preserving kettle. Make a syrup from the juice, allowing one pint of sugar to each quart of fruit. Boil until clear; skim and add the fruit. When boiling hot, jar and seal.

Pears—The fruit should not be too ripe; pare, halve and core. Make a syrup from one and one-half pints of sugar, with just enough water to dissolve it. Add the grated rind and juice of one lemon and one-fourth pound of Canton ginger. When the syrup is boiling hot add two quarts of the prepared fruit. Cook slowly until perfectly tender when pierced with a straw. Put in pint jars and seal.

Plums—Select ripe but rather firm fruit, especially if green or blue gages are used; wash and drain; pierce each one with a silver fork, that the skins may not break. Prepare a syrup from one quart of sugar and one pint of water, and when boiling hot add four quarts of the fruit. Cook slowly; skim, and when the mass is boiling hot jar and seal.

Grapes—Separate the skins from the pulp, and remove the seeds by pressing the pulp through a colander; put skins and pulp into a preserving kettle with as little water as possible; cover, and heat slowly until boiling hot; then add one and one-half pints of sugar to every four quarts of

Look Him Right In The Eye

Two sorts of agents claim that disk filled or other complicated, hard to wash, out-of-date cream separators are modern and easy to clean. One sort knows better but hopes you don't, because he wants to sell you that kind of machine. Look that fellow right in the eye—tell him you do know better, and that he can't fool you. The other sort of agent is simply mistaken—he does not know the facts. Tell him to look at a

Sharples Dairy Tubular Cream Separator

Tell him it has neither disks nor other contraptions, yet produces twice the amount of cream, skims faster, skims twice as clean and washes up in less than common separators. Wears a lifetime.

The World's Best. The manufacture of Tubulars is one of Canada's leading industries. Sales easily exceed most, if not all, others combined. Probably replace more common separators than any one maker of such machines sells.

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DOES A WASHING JUST LIKE PLAY!

Six Minutes to Wash a Tubful!

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on thirty days' trial, the same as I got mine. The company will let you pay for it on the same easy terms, they offered me. They offered me the washer actually pay for itself in a very short time. Mine did! I wouldn't take \$100 cash for my 1900 Gravity Washer if I couldn't get another just like it. It does beautiful work—handles anything from heavy blankets to dainty laces. Every housewife who is tired of being a drudge and a slave to the washtub should write to

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fruit. Keep just to the boiling point for twenty minutes, then put into jars and seal. More or less sugar may be used, according to the variety of the fruit.

Citron—Cut the fruit into slices about half an inch thick; carefully remove the seeds; this is easily accomplished by holding each slice before a strong light, using a nut-pick to extract the seeds. Divide the slices into eighths and put into the preserving kettle with the rind of lemons, two to every four pounds of citron. Cover with cold water and cook until tender. Take up; prepare a syrup from sugar and water, using two pounds of sugar to four of fruit. When boiling hot, skim and add the citron with the lemons, sliced thin. Cook slowly for ten minutes, or until the fruit becomes clear.

Cake Made of Bread Dough—When the sponge is light and ready to mix, take out two cupfuls to which add one and one-half cupfuls of sugar, one egg, butter the size of an egg, a cupful of seeded and floured raisins, one teaspoonful of cloves and two of cinnamon, a pinch of ginger and a little nutmeg, one-quarter teaspoonful of soda and add flour enough to make a stiff cake dough. Put in a well greased pan and set aside to raise until the bread is all baked, then bake slowly and you will be pleased with the result. Make cinnamon rolls in this manner. Take a piece of dough, large enough to make a medium sized loaf of bread, add a generous half cupful of lard and a cupful of sugar, work thoroughly, adding flour enough to allow the dough to be rolled into a sheet with the rolling pin. This spread with butter, sprinkle with sugar and cinnamon. Then roll it up from one end, cut off with a sharp knife and put in pan to raise. Sometimes for a change add a few chopped raisins or currants before rolling it up to cut off. These are fine for those who like something sweet with coffee for breakfast.

Queen Pudding—Boil a quart of new milk; stir in a scant cupful of dried bread crumbs, letting them remain about a minute, stir in also a table-spoonful of butter and one-fourth of a teaspoonful of salt. Take from the fire and stand away to cool; then add one-half of a cup of sugar, work thoroughly, adding three eggs, the juice and grated rind of a lemon; pour into a buttered dish and bake half an hour in a moderate oven. Beat the whites of the eggs to a stiff froth with a table-spoonful of powdered sugar and half a teaspoonful of extract of vanilla; heap in large spoonfuls over the top of the pudding when cold, placing a little jelly on top of each spoonful of meringue before sending the pudding to the table. A preserved strawberry, raspberry or cherry may be used instead of the jelly if preferred.

Irish Potato Cake.

Three-fourths of a cup of butter, two cups of granulated sugar, five eggs beaten separately, one-half cup of cold water, two squares of chocolate melted, two teaspoonfuls of baking powder, two cups of flour, one cup of mashed potatoes, one teaspoon each of cinnamon and nutmeg, one teaspoon of vanilla. Cream the butter and slowly add the sugar; add the egg yolks and the melted chocolate. Mix well and add the potatoes and spices. Sift the flour three times and add it with the baking powder and water. Lastly add the vanilla and stiff beaten whites of the eggs. Bake in three layers. Put together with white icing and cover with same.

Striking Girls to Own Co-operative Garment Plant.

According to their representative, J. T. Behrens, an organizer of the American Federation of Labor, 50 garment workers, all girls, who struck at Sedalia when their employers refused to listen to their complaints, will start a co-operative factory. The girls are to set apart a portion of their wages each week in order to pay back the money they borrow from other unions. When any member retires her share shall be absorbed by the remaining members. Other labour unions in Sedalia advanced the girls the money with which to build and equip a plant.



Lightning Got There First

111 fire insurance companies report 2860 fire losses in one state in one year—2185 were caused by lightning—only 736 from all other causes combined. Think of it, 75% of all losses—lightning.



PROF. WEST DODD, President of Dodd & Struthers, is the scientist who has taught the world how to control lightning.



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85 days every year D. & S. Woven Copper Cable Lightning Rod and D. & S. System of Installation afford the only safe and reliable protection against loss by lightning. Think of it, 100% safety.



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Not since the days of Franklin has any scientist done as much to protect life and property from the destructive consequences of lightning as has

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IT PAYS FOR ITSELF.—Leading fire insurance companies of the world (list of them sent on request) will allow 10 to 33 1/2 per cent off your insurance bills when your buildings are protected with D. & S. Woven Copper Cable Lightning Rods. Thus the D. & S. Rod pays for itself and then begins to save you money when your next insurance bills come due.

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Please mail without cost to me Prof. West Dodd's Book, "The Laws and Nature of Lightning." Also tell me how to save money on insurance.

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Fashion Fancies

Foulard and Serge.

A very popular combination is a gown of foulard and a coat of serge. The colors usually combined are a gown of blue and white check foulard and a dark blue serge coat or a black and white check gown with a black serge coat. It is not only a pretty suit, but a durable one.

New Kimono Shirt Waist.

The kimono lines for sleeves have been used in our evening wraps and coats and now we have the kimono shirt waist, which is quite the newest thing in that line. They are made of Japanese prints of a small pattern, and each is cut in one piece, the short, nar-

row sleeve measures the width of the shoulders, and the round-cut top and the sleeves are bordered with a shantung to match the dominating color in the waist material. These kimono waists are selling by the hundreds in the Paris stores. It is an all circumstance that while many of the Japanese women are discarding their own native styles of dress, the women of other nations are adopting many of the Japanese features.

Something About Collars.

The frill is the latest thing in Dutch collars, this being closely plaited to fit the neck then expanding to the outer edge. It is from three to four inches wide and made of linen or of fine nainsook or organdie. Sometimes it is only hemstitched, then again it is edged with

lace or hand worked. To the young, white, round throat it is becoming, but let the thin or shallow girl beware for it will accentuate her defects, and she has plenty of other more becoming neck finishes to choose from. One way for her to make the frill becoming to herself is to have the neck of her blouse or fancy waist completed with a stock collar, then at the base of this insert the frill so that it rests flat on the shoulders.

A Word on Millinery Subjects.

Hats have crystallized themselves into two distinct classes, one being the small-as-to-circumference but large-as-to-fullness-of-crown turban, and the other the wide spreading picture hat which is larger than ever before but be-

ing made of feather light material such as horsehair or mohair does not look as oppressive as when of straw. The black hat with floral garniture which often takes the shape of huge buckles is a great favorite. The new wide brimmed sailor is effectively trimmed with a Persian silk or chiffon scarf carelessly twisted about the low crown.

The newest veils are of very open mesh and exceedingly fine thread. They are much more becoming than the heavy mesh or the two-tone veil of last season. Some have a single figure worked so that when the veil is in place it comes on the left cheek of the wearer. Chantiers, butterflies or a single large flower are among the figures used.

Crochet Buttons.

White buttons, covered with Irish crochet, are very smart as trimming for lingerie shirt waists.

Dress Notes.

Princess dresses are being shirred around the waist line again—a bit of news which will please a woman with a slender figure, to whom the shirred waist is always so becoming.

Make linen shoes for baby during the warm weather. These little boots, when prettily embroidered, are the daintiest thing in footwear for infants.

It would seem that we have decided to embroider every article of wearing apparel which can be embroidered. Fashion decrees that embroidery appear on lingerie, waists, dresses, belts and bags and now even hat pins are embroidered. Of course, if the wearer desires to be real chic she will embroider her hat pin with a design to match that on her gown.

If you use what is called the Russian thread, and get a good make, the colors of embroidery or outline work will not "run" into each other.

Home-Made Coats.

The home dressmaker is often puzzled to know how to finish the seams in the unlined summer coat and many make the mistake of turning in the edge of the seam and hemming it down. While that may look all right from the outside, it does not give the inside of the coat a neat appearance. The best method is to buy the silk facing which comes in bolts; it costs about 15 cents a bolt, and is wide enough to cover the seam in the body of the coat and also to bind the seam at the armholes. This will give your coat the trim, well-finished look so much desired by home dressmakers.

Fashions For Little Girls.

The small girl is now the object of almost as much attention from dress-makers, designers and manufacturers as her mother. She no longer wears a little Mother Hubbard, but the lines of her gown are designed with care. She has her princess dress with straight lines, her semi-princess with panel front, her Russian blouse and her Dutch neck. Particular attention is paid this year to materials as well as to the styles for the small lady. Linen, linene, gingham, reps, galeata, chambrays and percales are among the popular fabrics used and the designs grow prettier each year.

Experience Extracts

A Remedy for Poison Ivy.

Wet the affected parts then rub on salt. Let this dry on then wash off with cold water and lay on cloths wrung out in cold water. Continue this until the smarting ceases, then bathe with a saturated solution of sugar of lead (which is a poison, so keep out of the way of children and pet animals) using about a teaspoonful of the sugar of lead to half a cupful of water. Shake well, bathe the poisoned parts and let dry on. Then in about twenty minutes rub the affected parts with well salted lard. This may seem like lengthy treatment but anyone who has suffered the agony of ivy poisoning will not count time or money to avoid a repetition. This leaves the skin in a healthy condition, but after a siege of the poisoning one should take some inward blood purifier.

A Kitchen Calendar.

I keep a large calendar in my kitchen and find it useful in many ways. Often there is some date that I want to remember for on that time some special thing is to be done. By putting a mark through the figure of that date and, writing a word perhaps, when that day arrives I am sure to take notice and remember. The dates on which my setting hens are to hatch their brood are marked as red letter days, with a small figure indicating the number of hens to be taken off on that date.

This calendar also aids me in keeping my weekly and monthly report in the ledger. The amount of eggs and butter received are jotted down in small figures by the date, also the ones sold. At the end of the month, when the leaf is torn off calendar, I use it to fill out my ledger.

For Burns and Scalds.

A burn or scald is always painful, but the pain can be easily relieved by the use of bicarbonate of soda or common baking soda (saleratus). Put two tablespoons of soda in half a cup of water. Wet a piece of linen cloth in the solution and lay it on the burn. The pain will disappear as if by magic. If the burn is so deep that the skin has peeled off dredge the dry soda directly on the part affected.

A few pieces of horse radish root will prevent mold from forming on top of the liquid in which pickles are kept.

If you are bothered with red ants in your cupboards, a teaspoonful of tartar-emic dissolved in a little sweetened water in a small dish and placed in the cupboard, will drive the ants away. For black ants, use powdered borax.

Use boiling water when it first begins to boil, or the gases escape and the water loses life and flavor.

Scorch stains can be removed by wetting the places with soap and placing in the sun.

The kitchen entrance of a house should be as attractive as the front entrance. A back porch with mops, brooms, buckets, and scrubbing outfit scattered about, is inexcusable. A large box painted any desired color could be used as a closet for them. Plant boxes, filled with flowers, and placed along the porch edge, will add beauty; vines over a door where there is no porch will prove bright and cheerful and cool.

How to Make Geraniums Bloom.

Last year I potted a geranium in a large butter tub. It was not very particular as to soil, only I used the richest I could find, but I think my treatment of soot once a week worked a charm. The plant bloomed freely all spring and summer.

Last fall I hesitated about keeping it in the house over winter and rather neglected it, so that it was reduced to one blossom and looked rather forlorn. I began the soot treatment a month ago and the plant is again full of blossoms.

I apply the soot to every plant. It is particularly good for white geraniums, making them a beautiful, spotless white, with perfect petals. I apply a large spoonful once a week, scrape away the earth from the plant, put in the soot and put the earth back over it, or mix it. It is a wonderful fertilizer and can be used freely.

"May I ask you a question."
"Sure, stranger."
"Why is everybody in this section mixed up in a feud?"
"Well, nobody keeps to take chances on being an innocent bystander."

Father—"So you want to marry my daughter? What are your expectations?"
Suitor—"We expect to elope if you refuse your consent to our marriage, and we expect forgiveness when we get back. Then we expect you to make an allowance."

Hobo—"Kind sir, a quarter will save my life."
Kind Sir—"My dear friend, I am an undertaker."

Little Clarence (in the midst of his perusal of a newspaper item)—"Pa, what is a 'Blue Grass widow'?"
Mr. Callipers—"Why, a grass widow who failed to get alimony, I presume, my son."

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carry an absolute guarantee against lightning damage. Do you know of any other roofing that is sold under a similar guarantee? No, there is none.

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in addition to being lightning proof protect your buildings from WIND, RAIN, FIRE, HAIL. They lock securely on four sides, the combined units forming a secure and everlasting whole.

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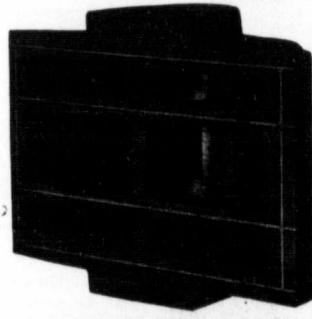
If you intend building this year, see that you get a good Plaster Job.

The Sackett Plaster Board AND The Empire Brands of Wall Plaster are what you will need.

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Are you still in doubt or do you forget that time is slipping away and you have not yet ordered a valve? Read what Mr. C. Olson, of Kasson, Minn., has to say, and send in your order at once.

Kasson, Minn., 4-29-10.
Baker Valve Company, Minneapolis, Minn.
Gentlemen:

I have just made a brake test on my 20 H.P. Northwood Engine with the "J" Slide Valve and the Baker Piston Valve. The results are as follows:

TEST No. 1 with the "D" Slide Valve: length of brake arm 7 1/2 ft.; pounds lifted on scales, 161; rev. per minute, 240; steam pressure, 145 lbs.; cut-off 7/16.

TEST No. 2 with Baker Valve: brake arm, 7 1/2 ft.; lbs. lifted on scales, 210; rev. per minute 240; steam pressure, 145 lbs.; cut-off.

TEST No. 3 with Baker Valve: brake arm, 7 1/2 ft.; lbs. lifted on scales, 260; rev. per minute 240; steam pressure, 145 lbs.; cut-off.

The Valve is satisfactory in every way. Yours truly,

LARS C. OLSON.

What we do for others, we can do for you. Agents wanted in unoccupied territory.

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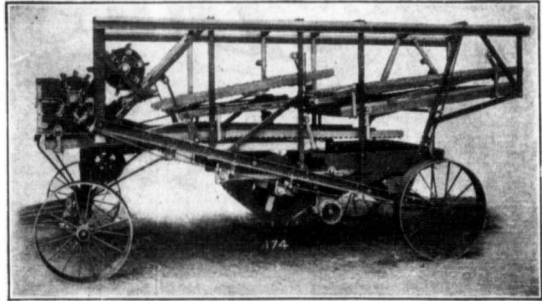
We actually thresh faster, separate better, and clean better than any other machine.

The Niagara Second Steel Frame Thresher is the only thresher having front of solid steel forming the cylinder side and corner support of frame. It is the only thresher which separates 95 per cent of the grain at the cylinder.

It is the only thresher having a separating cylinder which deflects the threshed grain through the grates, separating it from the straw as soon as threshed.

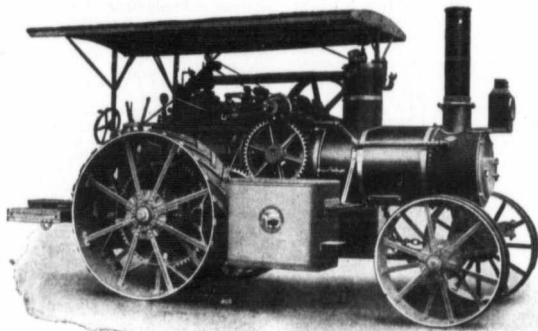
The Niagara Separator is not a one feature separator but handles every part of grain separation in first-class shape.

It is the only thresher having auxiliary fans throwing a blast of wind through the lower bolting rack, separating the threshed grain from the chaff and rough cleaning it before it reaches the shoe.



Sectional View of Niagara Steel Frame Separator

Steam plowing is cheaper than team plowing. The Buffalo Pitts Special Plow Engines are noted for their strength and durability. With proper management the Buffalo Pitts 25 horse power double cylinder engine will plow from 25 to 35 acres per day. The 35 horse power double cylinder engine will plow from 35 to 50 acres per day. The 25 horse power engine will pull from 12 to 15 mouldboard plows, or from 15 to 18 disc plows; the 35 horse power engine from 14 to 20 mouldboard plows, or from 18 to 28 disc plows. The speed for plowing is from 2 1/4 to 2 1/2 miles per hour. The fuel used is coal, wood or straw. Buffalo Pitts Engines are built in all sizes and for any purpose.



The NEW BUFFALO PITTS GAS TRACTOR is a 3 Cylinder 70 h.p. machine with 7 foot drivers. It is built heavy and strong and is a plowing engine in every particular. Write us for further information

Write for Catalog and other Information.

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General Agents for Canada.

A Problem

The barn door would not shut quite tight this morning. You remember how it was. You pulled it back and gave it a slam. The latch did not drop into the catch, in spite of all your pulling and hauling. You said some things you ought not to and thought a lot more.

Something went wrong in the house. You couldn't tell for the life of you what it was an hour afterward. And yet, you said something to your wife that you would give all the world to take back. You saw the quiver in her chin as she listened, and then saw her go away somewhere to hide the tears which would come. It was too bad! You can see it all now.

Just now the wagon wheels all over the country are rattling as they carry to their new homes thousands of men and women who somehow do not stay very long in the same place. Renters, some folks call them. Now and then a family of renters stay a long time in the same place; but many more stop only a single year on a farm and then move on to another locality.

How do you meet these new folks when they come into your neighborhood? Do you take pains to go down as soon as you can and get acquainted with them? Do you say, "I'm very glad you have come to be our neighbors! I know we shall be good friends. Come up and have supper with us. You haven't got your stove up yet. You can

just as well stay with us all night!"

Or do you feel a bit of resentment that strangers should move in, and steel your heart against them?

If you could see the look in the eyes of the dear good woman when you asked her to come over to supper, you surely would not say the unkind word or do the unneighborly act. Tired out with packing up and riding on top of the load so far, over the hubs, with no spring to the seat, she blesses you in her heart and wishes everybody had such a good heart!

The spring's work is now right at hand. Every one is a little unused to work from the long winter's inactivity. The horses feel it. Give them a chance to get toughened to hard work before you crowd them too much.

Speak out sharply to them or hit them a sharp cut and the fur will surely fly. Be a man with your horses.

And especially be fair with the hands. They have not really found out just how you would like your work done. It may be they are newly engaged for the season. It is easy to fire up and say words that cut when things do not go just as you would like to have them. But it is far easier to let the bitter words go till another time, when you will not want to say them at all.

There is that little calf, too. It takes a man to teach a calf to drink. You have been doing it by main strength. Now just hold

on and use a little common sense.

Take a couple of quarts of nice warm fresh milk in a pail. Lift the pail by the bail with one hand; place the other hand down under the bottom of the chine. Hold the pail up so that the calf's head will be in the milk. He will not know what to think of it at first and will move his head back and forth. Go back and forth with him, round and round. Once in a while lift the pail a little higher until the calf's chin touches the milk. He will lick that off. It will taste good. He will wonder where it came from and pretty soon he will think. Calves have a lot of sense about such things. Before you know it, the calf is eating.

Patience is what did it. Human nature is always loaded. Powder in, explosive cap in place. Drop the hammer and away goes the bullet.

But let patience pull the trigger. Sit down and think it over before you get hasty.

Cheap insecticides.

Dissolve two chunks of common whitewash lime for each pail of water used, and add a small teaspoonful of coppers in powdered form. Sprinkle this mixture freely on all growing plants and on the ground around them, and it will kill all kinds of plant lice and insects except cabbage worms, stripped beetles, white grubs and potato bugs. A handful of fine dust from the middle

of the street sprinkled on cabbage settles the worms.

Boiling hot water into which is placed scraped soap and a little kerosene when applied around squash or cucumber vines never failed to kill the yellow striped bug.

London purple is cheaper than Paris green, and does the same work in killing potato bugs.

Lime and ashes, mixed with water, and poured on the ground causes the white grub to curl up for the last time. Poured on manure piles, it kills fly-eggs and many embryo insects.

"D'yez mane! tell me yezd' lave Kelly kape on throwin' bricks over the fence at yez?"

"An' why not? Shure if he kapes on long enough Oi'll be after fixin' me chimbley."

A professor at Cornell University, in some disagreement with its head, was walking over the campus deeply absorbed in brooding thought. He bumped into something, quickly raised his hat, and said: "I humbly beg your pardon," lifting his eyes in time to see only a cow.

The next day, even more absorbed on the same subject, he collided again.

"Get out of the way, you old cow," he exclaimed, and looked angrily up into the livid face of the wife of the president. —The Circle.

He—"I suppose you will erect a handsome monument to your husband's memory?"

The Widow—"To his memory? Why poor John hadn't any. I found his pockets full of letters I'd given him to post."

"Going up to hear that lecture on appendicitis today?"

"Naw, I'm tired of these organ recitals."



THE Girls' Cozy Corner

In the Meadow.
By Ada P. Campbell.

When upon the meadow,
Shines the morning sun,
Little blue-eyed daisies,
Waken one by one.
From some airy region,
If you will but hark,
You can hear the greeting
Of a meadow-lark.
Every dew-drenched grass blade
Growing at your feet,
Helps to make the world seem
Fresh and clean and sweet.
Such a world of beauty,
Such a world of joy,
Makes you glad to be alive,
A happy girl or boy.

GIRL'S PRIZE LETTER.
Taber, Alta.

Dear Cousins:—May I please come into your cozy corner to have a merry chat with you all? Please say yes, for I have already made myself at home. But first let me introduce myself, and then I can go on with my say—so, please excuse me if I stay too long. Hoping I will not wear my voice out while I am making a visit to your cozy corner, I will begin.

I am a girl of 13, have brown eyes and brown hair, nearly five feet tall, and not very fat. I cannot think of anything else to describe myself but I guess, of what I have said, you can imagine me sitting here writing.

I am living on a farm this summer. I have a nice girl friend, who lives within a quarter of a mile from our house. Her name is Berta Jensen. We have dandy times together. She and I are going to start to piece a quilt just to see how it turns out. I like to sew, very well, don't you, girls? I also like to cook. All last summer and summer before last, I cooked for my father on his gasoline plowing engine, with no one to help me but my little sister, 8 years old, and then she did not go all the time, just a week now and then. I did not like it so very well, because it was so lonesome.

Oh! yes, before I close I must not forget to tell you, that we have twin baby girls, eight weeks old, their names are Della and Estella. Both have blue eyes, and are the sweetest little dimpled babies you ever saw. That makes 8 girls for our family. I should think the boys would soon be getting jealous. Don't you? for there are only four of them in our family. My oldest brother is 18 years. I am the oldest girl.

I am a regular little book worm. My greatest joy is, when I can get in a cozy corner all by myself with a book, some of the ones I prize above any I have ever read, is "The Wide, Wide World, Queechy, Little Women. We Two, Aunt Jane's Hero, and I'm afraid if I don't stop now I will fill a whole page of names. So I guess I had better take the warning and stop.

Well good-bye to all, and best regards to Dear Cousin Doris.—May Flower.

What a fine time we do have in this Cozy Corner! Will you write and tell of your experience last summer cooking for your father?—C. D.

Glenavon, Sask., July 14th, 1910.

Dear Cousin Doris:—When the Canadian Thresherman and Farmer came the other day I could hardly believe my eyes when I saw my letter got the prize.

I have not received the book yet but hope to soon as I am very fond of reading. Have any of the Cousins got any strawberries yet? I picked a quart this morning myself and then mama and I went out this afternoon and we got two quarts and one-half more, but they are not very good yet. How many of the Cousins saw the comet last fall, they say it was very pretty, but I was down east then, and did not see it. I saw Haley's comet since I came home but it was not very plain.

Do you like house plants Cousin Doris? I have quite a few. I have a nice Canadian Ivy; it is just a young one and is just starting to climb. I am going to train it around the window on cords. I am going to send you a recipe for a layer cake that I make. I think it is very nice. Take one cup of flour, one teaspoonful cream tartar, one-half teaspoonful soda and a pinch of salt. Mix the powders with the flour, then take four eggs and beat till light, add one cup sugar and then the flour and beat till very light. Bake in a moderate oven. Well I will close my long letter with best wishes from Jean Barb.

(I am glad to know you are interested in flowers, Jean, and thank you very much for the recipe. I hope our Cozy Corner girls will all try it and write about their experience.) Your book has been sent to you. Kindly let me know when you receive it.—C. D.

June 19th, 1910.

Dear Cousin Doris:—I got my book. I think it is a pretty book. I took my book to my teacher. She thought that it was a good book. I have never told you a game. All my games are old and I will tell you a little story. I hope all the children of your club will like it.

Eva's Locket.

Eva is ten years old today and papa gives her a beautiful locket. She opens it, and inside finds a picture of her mother, who died long ago, and a piece of pale golden hair, which she also knows to be her mother's.

"Darling father, how I thank you!" cried Eva as she hung it round her neck; "of all the things in the world that you could have given me, I shall value this the most."

Papa sits down in an arm-chair, and drawing his little girl towards him, takes hold of the locket.

"My dear little Eva," he said, "when-ever you look at this locket, I want you to think of your mother, who died when you were only a few months old. I want you to think of her as an angel watching you from heaven, and looking forward to the time when her little Eva, having spent a good life in this world, shall join the mother she never knew upon the earth."

I can make some cakes and pies. I would like to see my letter in print. Your cousin, Jessie Smith, Rathwell P. O., Box 74, Manitoba.

I am glad for this letter. I am sure the story will do us all good.—C. D.

Clevertville, Alberta.

Dear Cousin Doris:—I saw your offer of a prize for the best letter so I thought I would try for it.

I will tell you about my dog. He is brown with a white ring around its neck and a white tip on its tail. It is only a small dog but is growing every day. I had a little white rabbit which would eat out of my hand, but it got away and was very near killed.

Well I can't think of any more so will close. Your Cousin Laura Schmeelke.

Your letter was very nicely written, Laura.—C. D.

Kaleida, Manitoba.

Dear Cousin Doris:—As my last letter went to the waste basket, I thought I would write again hoping to see it in print. I have seven brothers and two sisters. One of my brothers takes the Canadian Thresherman. We live on a farm and have eighteen horses and twenty-five pigs and fifteen cows and my brother has a threshing machine. I have two pet cats. One is gray named Minnie and the other is black named Jim. We have a dog; he is black and white and his name is Watch. My sister and I drive two miles to school. I am in the third book. I am ten years of age. I remain your cousin, wishing your paper every success. Ruth Moloney.

No letters go to the waste basket, Ruth. Your letter must have been lost. I am very sorry because you write nice letters.—C. D.

When I was a Little Girl
By Marion Foster Washburne

The Day I Did as I Liked.

There was one sovereign remedy for domestic disorders and disasters in the Redfield family. When Richard had the mumps; when little Elizabeth was fractious; when Kenneth was disobedient; when a picnic had been planned, but a rainy day spoiled it all; when there had been too many visitors, and too much talking about the children, and too much candy; whenever, in short, there was trouble among the inhabitants of the nursery, Mother Redfield knew of one unailing cure. She would sit down just where she was, fold her hands in her lap, her eyes would take on a far-away look, and she would begin to murmur: "When I was a little girl—"

No matter how softly she would quote the words, somehow they penetrated to the ears of the children, and at once toys were flung aside, and all three of them scrambled toward her, trying to get into her lap at once. Of course, Richard knew that he, being the big older brother, had to give up and be content to sit on the hassock at her feet; and Kenneth was beginning to understand that the throne of mother's lap belonged always to the reigning baby. But sometimes Mother Redfield held him in one knee and little Elizabeth on the other. Then rocking a little, gently, so as not to disturb Richard at her feet, she would begin to tell her story—that wonderful story about when she was a little girl.

"When I was a little girl one thing puzzled me dreadfully," she said once. "I couldn't understand why in the world, when I wanted anything very badly, I couldn't have it. Somehow it seemed as if the nicer a thing was, the surer it was to be forbidden. Whenever I wanted to go anywhere, there was some special reason why I couldn't go. When I wanted to stay at home, somebody wanted me to go out walking. When I was hungry it wasn't dinnertime, and when it was dinnertime I wasn't hungry for anything except dessert. When I wanted to play dolls the other children thought it was stupid; when I wanted to romp and riot they wanted to play dolls. Everywhere, all the time, something seemed to get in the way of my doing what I wanted to do, no matter how simple and innocent that want might be.

"In fact, I didn't seem to myself to want to do naughty things at all. All the things looked right and reasonable. But by the

time my desires had reached the ears of the older people, who had power over me, I often found out, to my astonishment, that they were considered very bad ideas, indeed.

"Now this made me pretty cross. I felt that I couldn't give up. I just went on trying and trying, and when I couldn't succeed I flew into a temper.

"I don't see what's the matter!" I exclaimed one day; "I only want to do nice things, and yet nobody will let me do them. Why can't I have my own way? What's my own way for?"

"We were at the breakfast table, where I had arrived late with an unwashed face. First, my mother made me go away and wash before I could eat. Now, what in the world did she do that for? Next, when I came to the table I began to gulp down my milk in great, big swallows, because I was in a hurry to get out to play. My mother stopped me, and she said:

"Wait, Mary! Drink your milk more slowly. It will be in one great, big ball rolling around in your stomach if you drink it so fast. Take little sips, and take time."

"I want it all in one ball!" I cried out, angrily. "I don't want a lot of little balls rolling around in my stomach. 'Tain't neat!"

"I couldn't see for the life of me why everybody laughed at this. But while they laughed I gulped my milk down just as I liked, and then waited to feel the big ball roll around in my stomach.

"After a few minutes my mother grew quiet. She looked at me a long time, and then said:

"My dear little girl, don't you see that no one has his own way all the time?"

"You do," said I.

"Goodness," said my mother, in a sharp loud tone, as if she was awfully surprised. "Does it look like that to you? It doesn't to me. Do you really think I have my own way all the time?"

"Of course," said I. "You have your own way, and you have my way, too. Anyhow, I don't have it."

"My dear, do you think," said my mother, "that I really wanted to get up and help you dress this morning? Do you think I wanted to cook this breakfast? Do you think I want to go to market right after breakfast? Do you think I want to rip up that old dress of yours and make it over?"

"Why, of course," said I. "If you don't why do you? Nobody makes you."

"Yes," said my mother, "Someone does. Someone very strong, Someone who is always right, and whom I dare not disobey. But I'll tell you what we'll do. We'll all like to have our own way once in a while, and we will just try for today having it. We will all do for this one day just exactly as we like."

"Goodie! goodie! goodie!" I cried, jumping up from the table and spilling the crumbs out of my lap on to the floor. I knew that this time nobody could make me brush them up again. "Oh, goodie! goodie! goodie!" I sprang round like a little top. "I'm not going to eat another bit of breakfast, but I'm going right over and ask Sadie Barrett to come and spend the day with me."

"As I ran out of the room I heard my father say, with a little laugh, 'All this sound interesting. But it rather leaves me out, for I'll have to go down to business, whether I want to or not.'

"I'll have quite a story to tell you, I expect, when you get back," said my mother, laughing.

"Sadie's mother was willing to let her come to luncheon with me and spend the afternoon, but she wanted to keep her at

home in the morning, so as to try on her new dress. Also, she would not agree to let Sadie have her own way. So we played together during the morning such as usual. When luncheon time came we ran over to my house together, and I cried out as I came into the house:

"Oh, mamma, Sadie's here! Please set a place for her at the table!"

"There was no answer to this, and, realizing that I was at length come into my freedom, I began to shout and whistle and call, knowing that nobody could stop me. After a while I went up into the nursery. But mamma was not there, nor Bertie, my little brother, nor anyone. So I went downstairs again, Sadie following close behind. All the rooms had a strange, empty feeling. I went out into the kitchen, but there was no one there. Mamma was evidently away, and papa and Bertie, and even Anna, our 'girl,' there was no luncheon ready. The soiled dishes for breakfast were piled on the shelf at the end of the sink. There was even no fire in the kitchen stove. And where in the world was my mother? After a while I thought I heard a sound of singing, and sure enough, there she was, out on the side veranda in a hammock, reading a story-book and eating a banana and a sandwich.

"Where is Anna?" I asked.

"She's taken Bertie and gone to spend the day with her cousin," mamma said.

"My face fell. 'Why didn't she take me?' I asked.

"She didn't want to," said my mother, briefly.

"But she ought to!" I cried. "She promised."

"It isn't 'ought to' day today," said my mother, "it's 'want to' day. Anna was to have her own way, you know."

"But where's luncheon?" I called again.

"Sadie's come to stay, you know."

"Yes, I know. You can do anything you like about luncheon," my mother said.

"But won't you get it for me?" I asked.

"No," said mamma, "I want to stay here and read. For this is the day I do as I like, you know."

"Goodness!" said Sadie. I suppose never in her life had she heard her mother say such a thing. I know I never heard myself say it, since I became a mother.

"Well, we went out into the kitchen and looked at the things to eat, but everything good was locked up in the storeroom. There was not a thing we could get but cold oatmeal left over from breakfast, and crackers and bread without butter. I guess mamma had eaten up all the better things. I started to say, 'Mean thing—'"

Then I remembered that this was the day on which she, too, was to have her own way. So we heroically choked down this unpalatable meal. Sadie was pretty cross, and said she didn't see what fun there was in having your own way, if it worked like this.

"Just then I saw mother going through the hall in her pretty gown, with her sewing-bag over her arm. I rushed out.

"Where are you going?" I cried.

"Over to Aunt Blackwell's," said she, to the Reading Circle."

"But I'll be all alone!" I cried, feeling very forlorn.

"Oh, no, Sadie is here; and besides, I want to go."

"Well, go then!" I cried, suddenly. Then I rushed back into the kitchen and stood looking out of the window, fighting back my tears. A pretty kind of a mother this was, to want to do so many things that left her little girl out! Then I did begin to have a dim sort of a suspicion that the things I wanted to do usually left my mother out.

"Are you having your own way now?" asked Sadie, in a hateful tone of voice.

"Gracious! I should think not! Here was half of this precious day gone, and I hadn't had a speck of fun yet. I began to think of all the things I wanted to do, and hadn't been allowed to do, and I was determined to find out the very biggest and worst of all the forbidden things. At last I thought about a bonfire.

"Come on!" I shouted. "I'll show you some fun!" So we rushed, and soon had a fine pile of brush with a large newspaper and some shavings underneath. I ran into the house to find so matches. How still and empty were all the rooms! Supposing I should take fire, as my mother often told me I might—who would put me out? I might burn up before she got home. Very slowly I went back to Sadie, but before I reached her she called out:

"I don't think my mamma would like me to play with fire. I might get burned."

"Well, then let's fix the hose so we can put it out quickly," said I.

"So that's what we did. We went to the barn and tugged hard at the heavy doors, and at length got out the long coil of hose. It was hard to fasten it to the faucet, and we got our hands pretty black and all scratched. But we managed it and had a fine stream of water running, bright silver, through the green grass. We had a fine time with the hose. We sprinkled the lawn, and then we sprinkled the tops of the trees and let the water spray all around us in a fine shower. Of course, it made our dresses all limp and damp, and our feet got very wet indeed in the damp grass. But that only gave me a brilliant idea. We would go barefooted.

"I hastily took off my shoes and stockings, but Sadie was afraid to. She thought perhaps her mother wouldn't let her come to see me again if she did. But I wasn't thinking about to-morrow. I meant to get all the good I possibly could out of this strange today. So I began to sprinkle her a little.

"You mean thing!" said she.

"Call me mean, and I'll sprinkle you more," said I.

"Mean! mean! mean!" cried Sadie, running away. But I was too quick for her. I turned the hose full on her, and the strong stream of water leaped after and caught her. She was soaked. At once she turned and ran back at me, her eyes blazing through the wet. I dropped the hose and fled, but she picked it up, and quick as a flash, turned it full on me. In an instant I was just as wet as she was. Then she dropped the hose and ran home crying.

"As for me, I had no home to go to except that empty house, without even a kitchen fire in it. The afternoon began to grow chilly, and my wet clothes felt horrid. I tried to turn the water off, but I couldn't. I hated to see so much water slopping about in the yard. It didn't even shine any more, because the sun had gone under a cloud. I felt that I would rather have had mamma at home scolding me than to be all alone and forlorn, wet myself, in that wet yard.

"Well, anyhow, I could go after her. As this idea occurred to me, barefooted and all wet as I was, I went over to Aunt Blackwell's. When I got there, I was ashamed to ring the bell. What a dreadful little girl they would think I was if they saw me! Perhaps they would even blame my mother for the way she was bringing me up, and I didn't really feel that that would be fair. So I hid under the front steps, and stood there shivering. Ladies came out of the house and went down the steps over my head and scattered up and down the street, and clean, and dry they looked!

"Presently my mother came, but there was another lady with her, and as I didn't want her to see me, I crept along in a shadow, following them, like some forlorn street dog. At the door of our house they stopped to talk, while I slipped in through the back way. When my mother came in alone I threw myself upon her, crying, 'Please take me. I don't want my own way any longer. I'm so tired.'

"Dear little daughter," said my mother, very tenderly, never pushing me away, though I must have made her pretty wet. Then she helped me upstairs in the dark. Soon she had the logs on the hearth in a blaze, and even before she laid aside the lace wrap she had thrown over her head she undressed me, as if I were a baby, and laid me in bed with a hot blanket around me.

"Anna had come home while I was away at Aunt Blackwell's because poor papa, who hadn't had his way all day long, must have his dinner. And pretty soon I was eating a big bowl of soup, thick with crackers, and nothing ever tasted so good to me in all my life."—From *The Mother's Magazine*.

THE
Canadian Boy's Camp

Evil Words.
(By Deborah Ege Olds.)
Evil words are like the thistles,
Flying on their downy wings;
Some they are, yet, when they're planted,
Grow to ugly, hurtful things.

Dear Boys of Our Camp:—I am afraid you are letting the girls get ahead of you

as they are writing the most letters. That will never do. Write and tell the other boys about your work, your adventures or about anything that interests you.—Cousin Doris.

Boy's Prize Letter.

Grenfell, Sask., WWW
Dear Cousin Doris:—This is my first letter to you. My father has taken the Thresherman for three years. I like to read the letters and made up my mind that I would write. I go to school every day. There are 24 children to my school. I am 11 years old in August. Our teacher's name is Miss Roberts. I am in the third reader and my sister is in grade one. I have a mile and a half to go to school. I wish to get a book. I hope my letter is in print this time. We are 7 miles from our nearest town. There is going to be a big day in town on the 24th. I am going in and expect to have a good time. I remain your Cousin Ross Lyer.

Lisle Manitow, Sask.
Dear Cousin Doris:—This is my first letter to the Canadian Thresherman and Farmer. I hope to see it in print. I live 3 miles southeast from a town named Young. It is a very nice place but it is very small. It has one elevator and a store, a lumber yard and a few other small houses. I have been up there three times this winter. I am 12 years old and when I go to town I go horseback. I have a pony that is 4 years old. We have a half section of land and last summer when my father and brother were out in the field working I took my pony and went over to them to tell them to come home for supper. We had a very good crop last summer. The wheat went 1/ bushels to the acre and the oats went 25 bushels to the acre and we had lots of flax, too. It went 19 bushels to the acre. The land is very nice around here. It is flat as a floor. We have a lake 3 miles away from here. In the summer we go down there and pick berries and sometimes when it is very warm and calm we go in and swim. The lake is one mile wide and 16 miles long. The water in it is so salt that the horses can't drink it. From your cousin, Alfred C. Letruds.

The Aerial Scholarship

(Continued from July issue)

CHAPTER III.

"I'm going to the machine shop," Robert told his mother as soon as he had eaten his breakfast Saturday morning.

"I want to put in a full day today."

"How is the airship coming along?"

"My experiments are almost over. It will be only a week or so now before I'm ready to begin on the actual construction work. My plans and diagrams are just about done."

"You'll be careful now, won't you?"

"Don't worry, mother. Aviation is safer than walking about the streets—a whole lot."

He started briskly down the street, and soon was across the bridge and at the door of the machine shop.

"Tom," he called, "Oh, Tom."

"Morning, Bobby," greeted the old fellow.

"Hope you didn't let anybody blow open the strong box and steal the plans," laughed the boy.

"I guess not," grinned Old Tom, "I ain't heard any explosions, anyhow."

"I'm going to figure up some tables of weights, and test some materials," Robert told him. "I studied up a lot on equilibrium last night, and I guess I know what was the matter with that glider yesterday. Come in—I'll show you."

Robert threw back the cover to the box where his designs and figures were kept. Then he turned to old Tom with a smile.

"Thought you'd play a joke on me after what I said about watching last night, eh?"

"Tom came closer, wearing a puzzled look.

"I ain't played no jokes, Bobby," he answered.

"But the plans and all my figures are gone."

"What's that?" cried the old fellow, leaping toward the box. "Gone?"

The blank expression that came over that old mechanic's face assured Robert that this was no joke—that Old Tom had not removed his papers in sport.

"Gee whiz," he exclaimed with a whistle.

Together the man and boy rummaged all about the corner to see if Robert had mislaid them the night before.

"I'm sure I put them in the box," Robert stated positively.

"You did," corroborated Old Tom. "I saw you put them in."

"Then they're stolen!" cried Robert.

"Stolen!"

He thrust his hands ruefully into his pockets and stared straight in front of him. Slowly his expression of dismay faded. His chin seemed to push forward, his lips drew into a straight, determined line and his eyes flashed.

"It won't do them a bit of good," he said, vehemently. "Whoever took those plans did it so I couldn't enter this contest. It was a low down trick; but it shan't do them any good. I'll re-draw the plans and figure out the tables again, and I'll have an aeroplane done by the day set. They can't beat me this way."

Old Tom slapped him on the shoulder.

"Good for you, Bobby. But who on earth would have done such a thing?"

Robert opened his mouth, then closed his lips tightly. "I've an idea," he said softly, "but—well, there's no good talking about that now. The thing to do is work."

If Robert had worked before, he now labored doubly. Of course, a great deal that he had already accomplished did not have to be gone over again. He remembered much of importance, yet there were dozens of drawings and long columns of mathematical computations to be re-made, and the time was all too short.

"The prize will be awarded the twentieth of June," Robert reflected. "I have already been at work seven months, and I'd have been all right if this thing hadn't happened. I'll have to hustle."

The rapidity with which weeks and months could fly by and yet leave no great accomplishment behind them started Robert. Work as he would, he

THRESHERMEN'S PRIZE CONTEST.

We are offering the following prizes for the best pictures of threshing outfits showing the Barth Jack in actual use. Pictures and the names of the prize winners will be published in this publication. Each photograph entered should bear the name and address of the sender on the back. One person can make as many entries as desired. Photographs need not be mounted.

The following subscriptions to the CANADIAN THRESHERMAN will be given as prizes.

- First prize, 5 years subscription.
- Second prize, 3 years subscription.
- Third prize, 2 years subscription.
- Fourth to fifteenth prize, 1 year subscription each.

Editors of this publication will act as judges. Contest closes October 15th.

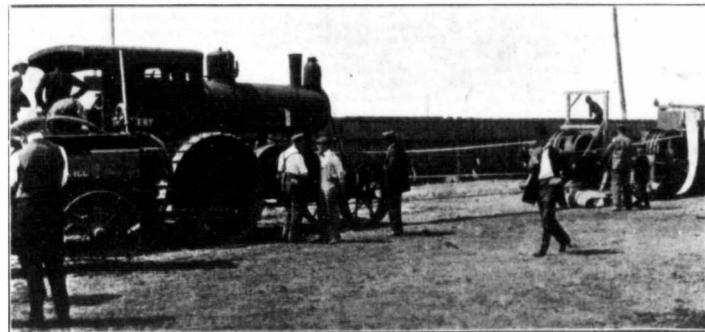
Get out the kodak and help us show the other 10% why 90% of the threshermen use Barth Jacks. Every thresherman finds a new use for this handiest of tools. Show yours.

Mail the photographs to the BARTH MFG. CO., 51 L Street, Milwaukee, Wis.

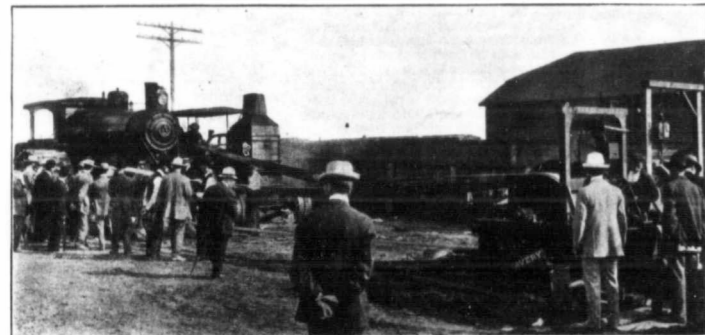
If you have not received a copy of our booklet 20 illustrating new uses for this tool, write us at once.

BARTH MFG. CO., 51 L Street, Milwaukee, Wis.

Avery 20 h.p. Double Undermounted Engine Wins Highest Points



The Avery 20 h.p. Double Undermounted Engine pulling the Biggest Load proportionately of any Engine in the Contest



The Avery 30 h.p. Double Undermounted Engine making a Wonderful Record for Fuel Economy in the Brake Test



Pulling a Nice Load with the Avery Tractor in the Belt Power Contest. You can use it for Threshing with a Small Machine, for Sawing, Hulling and other kinds of Belt Work around the Farm

**in 20 to 30 h.p. sizes
Winnipeg Agricultural Motor Contest—Avery 30 h.p.
Undermounted Engine
Wins Second Highest
Points in 30 h.p.**

They show up strong in Fuel Economy, in Endurance and in Design. Here are some of the special things that showed up:

The Avery 20 h.p. Double Undermounted Engine pulled over 64 h.p. on the Brake in the Economy Test—the biggest load proportionately of any engine in the contest—and in the 30 minute Maximum Load Test beat all records by developing over 94 h.p. or nearly 5 times its rated horse power.

The Avery 30 h.p. Double Undermounted Engine, made a wonderful Record in Fuel Economy. Only 3 1/2 pounds of coal per brake horse power hour. The Lowest Fuel Economy Record ever made by a Double Cylinder Engine in these or in any other contests we know of.

In Endurance Avery Undermounted Engines show up way ahead of any. Both Avery Undermounted Engines went through the entire contest without a single adjustment or repair, while others had to roll and calk flues, had hot boxes and other troubles. This is one of the most important things to a man buying an engine, and this contest shows that with an Avery Double Undermounted Engine you can start at work and **keep at it**. When Avery Undermounted Engines will go through such severe tests as these were (much harder than ordinary field work) you can depend upon them **standing right up** under your work.

This Contest and Field Tests show that there are no Machines that all around are like Avery Double Undermounted Engines and the Avery Tractor in their Design, in Quality of Construction, and in Fuel Economy. Be sure you see them at the Fairs, and also write us for a Catalog right away

**Steam Engines at Winni-
peg Agricultural Motor Contest—Avery 30 h.p.
Undermounted Engine Wins Second Highest
Points in 30 h.p. and over sizes.**

They show up strong in Fuel Economy, in Endurance and in Design. Here are some of the special things that showed up:

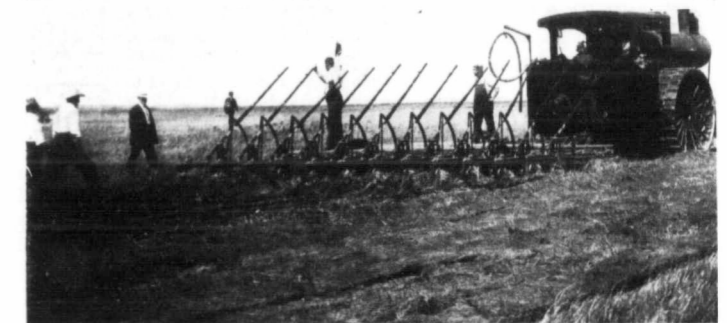
Fletcher & Son, of Reford, Saskatchewan, bought the Avery 30 h.p. Contest Engine while the Contest was still on. John Roberts, of Regina, placed his order for one just like it. Everywhere men are finding out that the Avery Double Undermounted Engine fills the bill for all round work in Threshing, Plowing and other work much better than any other engine, and that's why the Avery Company is right now having to double its factory capacity to take care of the business.

The Avery Tractor won the Silver medal in Economy and for all round work was the biggest winner of anything in the contest. It showed itself to be just what it was designed for—an all round machine to take the place of horses at all kinds of work. It pulled a nice load in the belt, pulled 3, 14 inch breaker bottoms in the plowing contest, hauled tanks of water and loads of coal, ran into town ten miles every night and out again in the morning and carried its operators back and forth to work when the operators of all other engines had to leave their contest machines in the field and use automobiles or buggies to go back and forth. It was the big attraction of the Contest. Every one wanted to see it and it did its work right straight along all the time. It was doing some kind of work almost every hour of the day. No other engine in the contest showed up anywhere near like it for an all round machine.

This Contest and Field Tests show that there are no Machines that all around are like Avery Double Undermounted Engines and the Avery Tractor in their Design, in Quality of Construction, and in Fuel Economy. Be sure you see them at the Fairs, and also write us for a Catalog right away



Plowing with the Avery 20 h.p. Double Undermounted Engine, and Pulling 8 14-inch Plows. One of the very best jobs of Plowing in the Contest



The Avery 30 h.p. Double Undermounted Engine pulling a 12-Gang Breaker Plow in the Plowing Contest



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seemed not to be able to make the headway he ought to have made. Little things held him back; small mistakes were made that required days of study to remedy; yet he persevered. Not for a moment would he acknowledge that he was beaten.

"No, sir," he told himself, "I'm going to finish this machine. I may be beaten at the contest, but I'll have an aeroplane there anyhow. There will be some honor in that."

Rumors came to him from time to time of the progress made by Emory Taine. No such difficulties seemed to have beset the path of that lad as had impeded Robert. In the first place he had almost a free hand as to expense. His father's pocket-book was long and deep, and Emory had but to ask for what he wanted. Mr. Taine had set his heart on his son's success, and did all in his power to achieve that object.

"How are you getting along?" was his repeated query, and Emory always assured him that he need have no fears.

"I have better things to work with than anybody else," he told his father. "You have bought me all the books and tools and materials I need, and I don't see where anyone has a chance against me."

"Don't be too certain, son," Mr. Taine advised. "I have heard a lot about Robert Hammond. People seem to think he is a sort of boy wonder at this mechanical business. From all I hear, you will have to turn out a pretty good machine to beat him."

"Oh, pshaw," sneered Emory, "don't worry about him. He's a good machinist but he's slow—and careless. I would have been bothered about him if I hadn't known him so well. Maybe he could get an aeroplane done if he had another six months, but he'll never have one ready by June 20th."

"When will you have yours ready for a trial?"

"It's a little hard to tell, but I don't see why I shouldn't be ready to see what she'll do a month ahead of time. That will give me plenty of time to fix up anything that is wrong."

True to his word, Emory was ready for his initial flight near the middle of May, but Robert was far from it. The most amazing mishaps had befallen him and delayed the work, and they were not accidents which could be laid to ill-luck or his own carelessness. Little parts of machinery were lost. At first Robert laid this at his own door, but when the same thing repeated itself again and again, and when, three different times, he found castings and parts upon which he had spent days of effort cracked and broken over night, he was sure that the same person who had stolen his plans was taking this means of hindering him and preventing him from finishing his machine.

"We'll have to keep a sharp watch," he impressed on Old Tom Sands. "Somebody's sneaking in the shop and smashing things every little while. I didn't think there was a person on earth mean enough to do such a thing, but it looks as though there was."

"I'll watch," growled the old fellow. "I'll watch all right, and I want to tell you that if I get my hands on him he'll never want to meddle with any more such doings. He'll have something to think about for a right smart spell."

"Maybe it would be a good idea if you could bring your bed into the shop and sleep here," suggested Robert.

"That's a good idea," agreed Old Tom, slapping his knee. "I'll move in to-night, and if anybody comes prowling around here he'll get a surprise party that will be a real surprise."

So it was arranged, and Old Tom slept in the machine shop from that night. And it was noticeable that no more deprivations were committed. Robert's work went along smoothly, and every day his aeroplane drew nearer to the point where a trial flight would be possible. It was now the first of June, and but twenty days remained before the day of the contest—only twenty days to finish and perfect an aeroplane; to bring satisfactory completion a mechanism involving as many intricate and delicate details as do these man-made rivals of the birds.

"If nothing happens I'll be able to try her out in a week," Robert informed Old Tom, and there was a glow of happiness in his face as he spoke. "It did

look as though I were going to fall down on the job, but now—well, we'll hope for the best anyhow."

But for one reason and another it was nearer two weeks before Robert threw down his tools and cried to Old Tom he was ready for the test.

"Tomorrow morning we'll wheel her out and see what she'll do," he almost sang. "Finished, so far as I can finish her, and there is almost a week to spare. If she'll only fly now."

"She'll fly," Old Tom was confident. "I wish I was as sure of finding a thousand dollars on the sidewalk as I am of her flying."

"I wish I could feel as sure about it as you do. Well, I'm going home now. Don't let anybody run off with the whole thing."

"I'll keep a sharp lookout," laughed Old Tom, as he lighted his pipe and sat down to read the evening paper. For half an hour he puffed away, blowing great clouds of smoke all about him. He was enjoying himself to the utmost. Gradually the smoke clouds grew smaller and thinner, and the old fellow thrust his hand into his pocket for his pouch, intending to refill the pipe.

"Huh," he grunted as he thumbed the empty bag. "I forgot to get a fresh supply today." He arose impatiently and looked about him. "Guess I'll walk over to the store. It won't take but fifteen minutes, and nothing can happen in that time."

Whistling to himself, he trudged off to the little store, made his purchase, and after chatting a moment with the clerk, began the return walk to the shops. As he drew nearer to the big buildings he thought he saw a figure steal around a corner before him and disappear toward the bridge.

"Wonder who that was," he muttered nervously. "Who'd be prowling around the works tonight?"

With quickened step he continued to the machine shop and unlocked the door. He glanced quickly through the dusk to the spot where Robert's aeroplane stood, and in the dim light it appeared to be all right.

"Hum," he sighed with relief, "I was afraid for a minute some scamp had come to meddle with that again."

He lighted his lamp and stepped over to the machine to satisfy himself fully that nothing was wrong. When the bright rays fell upon the spreading planes the lamp almost fell from his startled fingers.

"The rascal," he grated. "Poor Bobby; this will just about break his heart."

Someone had smashed off with an ax the lever that operated the elevating plane, and wantonly had sent the blade crashing through half a dozen of the slender braces of the upper plane.

"Poor Bobby," Old Tom almost sobbed. "And it's all my fault. I went off and left it when I should have watched every moment. It's all my fault."

The old fellow sunk his face in his hands dolefully. He had no desire now for his pipe; there could be no pleasure for him in his evening smoke, and when he went to bed at last he lay awake long hours blaming himself for his dereliction.

"Poor Bobby," he kept repeating. "What will he ever think of me?"

Old Tom's sleep was not of the soundest or of the pleasantest, and he awoke in the morning unrefreshed and depressed. Over and over again he heaped blame upon himself for his failure to keep watch, and it seemed to him that he could not bear to face Robert when he came, and tell him this fresh disaster.

From a distance he heard the merry sound of his young friend's whistle, and went to the door to meet him. Somehow he could not bear to meet Robert's eye or to reply to the cheery greeting of "Morning, Tom." And when the boy added, "How's the bird? Did she try to fly away last night?" Sands wished he could have turned and run away. But he did not run; instead he dropped his head further on his breast and said shakily:

"I don't know what to say, Bobby—I don't know what to say."

Robert was startled. Something in Old Tom's bearing told him that all was not right. "What's the matter, Tom?" he cried. "What has happened?"

Old Tom shook his head sadly. "I went to the store last night to get some tobacco and somebody sneaked in here and smashed things with an ax. It's



MANITOBA ELEVATOR COMMISSION

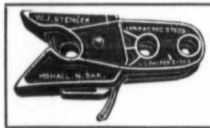
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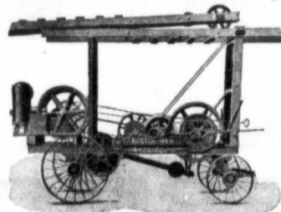
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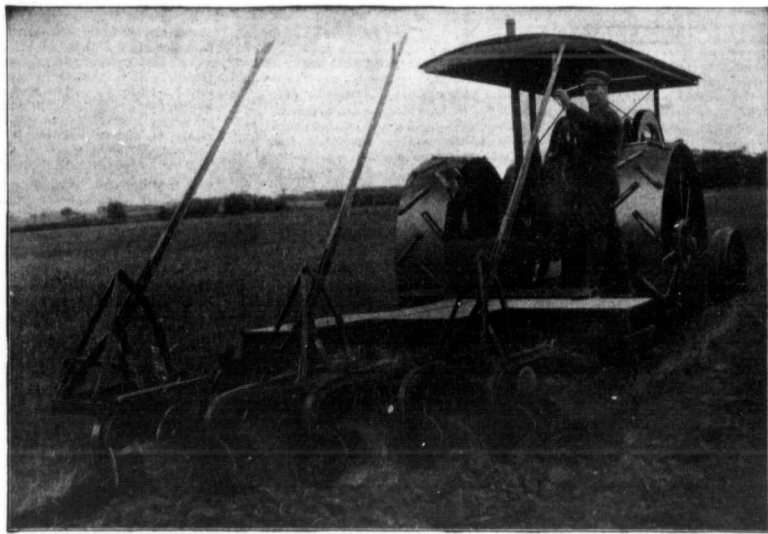
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all my fault. I let him do it. I was on watch, and I left my post."

Robert ran toward the machine, but touched by Old Tom's grief, he returned and laid his hand on the old fellow's shoulder.

"Don't you go blaming yourself," he said bravely, though his chin trembled, and a tear sparkled in his eye, "It wasn't your fault, Tom. And it may not be so bad after all. Come, let's take a look at her. Whatever has happened you mustn't think I blame you. It isn't your fault that the sort of a person who would do a thing like this exists. Come on, maybe it will be all right anyway."

But when he examined the smashed lever and the shivered braces his heart fell. For a moment he acknowledged defeat, and a sob struggled to his lips. It was a hard blow to the lad to see all his work, all his studying, and delving, and planning go for nothing. It was a condition that would have made many an older man lose heart. But Robert was no coward, and, too, the buoyancy of youth, the resilient spirit of boyhood came to his rescue, and matters grew brighter instead of darker. He thrust his sleeve across his eyes half angrily, then he bent over the wrecked machine again.

"Brace up, Tom," he exclaimed with determination, after a minute survey of the damage. "Maybe we aren't beaten yet."

"You don't mean that you can fix it, do you, Bobby?" the old fellow cried hopefully.

"I can make a hard try for it," determined Robert. "If it hadn't been such a miserable, mean thing I think I'd give up, but I'm not going to let a fellow who would be guilty of an outrage like this get any benefit from it. I'm going to have this aeroplane ready on the twentieth if I have to work day and night at it, with no time off for meals."

Old Tom sighed contentedly. A leaden weight was lifted from his heart, and he almost smiled. "You'll do it, Bobby. You must do it for my sake. If you can't I'll never forgive myself."

"In that event," Bobby said, accompanying his words with the first smile he

had been able to muster up, "I guess I'll have to, for I can't have you go through life forgiven."

CHAPTER IV.

"A few hours' more work on that lever and she'll be finished again," sighed Robert exhaustedly, as he threw his wrench on the ground with a tired gesture and sank beside it himself. A tired looking boy he was, and worn with worrying. The days since the last attempt to destroy his aeroplane had passed all too swiftly—but now he was upon the very eve of the day of the trials, and the machine was almost ready for its initial flight.

"It means that I'll have to enter the competition without even an attempt at a trial flight. I don't know that this plane will lift herself from the ground, but I'll have her there to try it anyhow."

"Better go home for a nap and something warm to eat," advised Old Tom Sands. "You've got to finish tonight, and even a few minutes' rest will do wonders for you."

"I guess you're right," agreed Robert. "I'll go home now, but I'll be back by eight o'clock and see the end of the work."

With weary feet he trudged homeward across the bridge. In the falling light he could see the fence about the school athletic ground on the river bank across from the "hops, and he knew that there all was in readiness for the event next day. His eye traveled up to the sky and swung anxiously toward the westward, looking for signs of approaching bad weather.

"By the Great Horn Spoon," he exclaimed, "I do believe we're in for a hard storm. I must hurry home and back before it gets here. Probably it will be just a thunder shower, and we will have a nice day tomorrow just the same."

After he had eaten a warm supper and stretched himself on the sofa for a few minutes' nap he was soon fast asleep, his exhausted body doing its utmost to repair waste and to get itself into fit condition again. So he slept on uninterruptedly for more than an hour, and when he did open his eyes the clock informed him that it was a quarter past eight.

"I must hurry," he called to his mother. "It's beginning to rain lightly now and I want to get to the works before the storm breaks."

He dashed from the house and ran all the way to the bridge. Rain was beginning to fall, and the bellowing, inundating storm cloud seemed almost overhead. Far to the westward vivid flashes of lightning disclosed the angry coppery sky, and the intermittent gusts of wind that snatched at Robert's cap told him that he would have to hurry if he would come dry to shelter. The electricity-charged air set his skin atingle; he was awed in the face of the impending tempest, and, involuntarily, he increased his pace. The darkness that precedes the first onrush of the storm fell over the river, and Robert was unable to pierce the murkiness with his eyes except when a nearby flash of lightning seemed to lift the curtain. In one of these momentary bursts of vivid light he saw the figure of a boy far ahead of him running along the road toward the works.

Breathlessly, Robert sped for shelter, but before he reached the door of the machine shop a powerful gust of wind whirled about him, bringing with it a beating, blinding volley of rain. Then the scene became burningly bright as a great cable of lightning hissed across the sky. The machine shop leaped from the enveloping blackness and stood for an incredible space of time before his eyes. Robert stopped as if rooted in his tracks, then he uttered a wild yell, which was blotted out in the terrific reverberations of thunder, and sprang toward the door. He had seen someone forcing his way into the shop through a window.

"Quick! Quick!" he muttered to himself as he fumbled at the handle of the door. "Hurry! Hurry!"

A chill of fear that almost amounted to terror possessed him and made his legs quiver with weakness. His aeroplane was threatened; he knew it; he was as certain that the person who entered the shop did so with the intention of snatching success from him at the very moment when he was about to realize it, as if that person had told him.

Clumsily he thrust the door open and

staggered within. "Tom," he called. "Tom!" But his voice was covered by the detonations of the thunder without. Forgetting the light, he leaped toward his machine; at all costs he must reach it and protect it—he must be in time—he must! A glare of lightning filled the room for an instant with a wierd, uncanny radiance. Before him, Robert saw his aeroplane, and he saw beside it the figure of a youth, an ax swung high above his head, in the very act of bringing it down on the frail braces of the planes. Even above the peal of thunder that followed, Robert fancied he could hear the crash and the snapping that told him his study and labor of twelve months was gone for naught.

His hand touched the wall and encountered the electric switch. Automatically he turned it and the room was flooded with a light that dazzled the eye after the dense darkness which had preceded it. In a very agony of dread he turned his gaze toward his machine. He opened his mouth to call, but joy choked his words.

"Tom! Tom! Good old Tom," he whistled dazedly. "Good old Tom!"

For he saw his aeroplane unharmed, and at the opposite side of it, Old Tom holding the struggling figure of a youth with a grip that was not to be broken. Kicking and plunging, the boy tried to free himself, and in his struggle he turned his face toward Robert.

"Emory Taine!" Robert cried. "I knew it. I was certain of it."

White of face, and with strained, bitter lines around his mouth, Robert walked slowly toward the struggling figures. "Be quiet, Taine." His voice was low and even. "Be quiet. You can't get away."

Taine glanced at Robert; then, suddenly all his courage, all his fighting spirit, deserted him, and he surrendered limply to Old Tom. He did not look at Robert, neither did he have the grace to hang his head and blush with shame, he was afraid—afraid of the possible ill consequence of his detection. He squirmed nervously and glanced furtively about as though calculating chances for escape.

"It's no use, Taine," Robert said iron-

ically. "You're tight and fast." Emory gave him a glance that was not good to see but uttered no word. "You're the fellow who has been making me all this trouble are you? I've thought so all along. I've thought so because I didn't know another fellow who would do such a miserably cowardly thing." Robert doubled his fist menacingly and Taine shrank backward a pace.

"Don't be afraid," went on the angry lad pitilessly. "I'm not going to thrash you. I don't know what I shall do with you. What would you do with a sneaking scoundrel like this, Tom?"

"I'd—I'd—smash him," rated the old fellow.

"No, I won't touch him. I'm not sure that I'll do anything at all! If I were a low down sneak like this I'd be thankful to any decent person who would touch me to thrash me! Let him go, Tom."

"What's that Bobby? You don't mean to let this thing off soot free?"

Robert nodded, then he pointed to the door. "Git," he snapped. "There's one punishment you can understand—a public humiliation. Tomorrow is the contest. You be there and fly your best, but I'll beat you. I'll beat you before that crowd, and beat you so badly that you'll be a laughing stock. And don't you dare to sneak off. If you aren't on the grounds with your aeroplane at the hour, I'll make this whole thing public! Now, git."

Emory slunk through the door and disappeared into the driving rain. For a few moments the watchers caught glimpses of his figure when the flashes came, then he disappeared into the blackness. Robert sighed with relief.

"I'm glad he's out of sight," he muttered. "I couldn't breathe freely while I could see him."

"And you let him go!" gasped Old Tom. "You caught him in the very act and let him go!"

"I wanted to beat him tomorrow," Robert interrupted. "There would be no fun in winning the prize if there was nobody to contest against."

"Just like your dad," ejaculated Tom, "always a good sportsman."

Robert grinned happily. "Now that the excitement is over, I guess I'll go to work." And he was soon in his overalls, toiling away at the repairs that must be finished ere his aeroplane would be ready to attempt a flight on the morrow. Unmindful of the storm that raged without; not realizing the awful power of the tempest that shook the old building until it cracked and strained as though its timbers were about to be driven in, Robert fitted and screwed and tinkered. Once a crash sounded over the noise of the storm and he raised his head to listen, but it was only a momentary distraction, and his eyes returned to his task. It was well past midnight before the last screw was driven, the last brace was in place and every joint and part of the air craft ready to undergo the test of flight.

Robert took his place in the aviator's seat, and operated levers and steering gear to see that all worked smoothly and performed their several offices. The elevating plane moved freely; the rudder answered readily, and the warping control by which the wings were operated did its duty without a hitch. Then the lad started his engine. There was no failure here; the "put-put-put-t-t-t" of the explosions came in a smooth, regular purr, without a miss or an interruption.

"She's right," crowed Robert. "Right as I can make her—but will she fly?"

"She'll fly, asserted Old Tom.

Robert laughed aloud. "I'm going to believe you," he decided. "It will make me sleep more soundly—and I'm going to sleep right here by the side of this machine. I'll take no more chances. You go and get some rest, Tom. You really need it worse than I do. Good night."

"Good night," responded the old fellow, as he turned his lagging feet toward his cot.

The storm passed suddenly as it had come. All was silence about the shops save for the drip-drip of water from the roof without, and this sound soon lulled Robert into a dreamless sleep.

Tom awakened him in the morning and called him to help dispose of a bubbling pot of coffee, together with some bacon and other good things.

"That was a fierce storm," Tom began.

It's done a heap of damage all about here. And the worst thing is the bridge. The wind tore a big lumber schooner from her moorings up stream and dashed her against the middle span. Would you believe it, but that old boat smashed right through—carried away the swing. The bridge is out of business."

For a moment they discussed the accident without seeing what bearing it had on Robert and his aeroplane, then the lad's face grew grave.

"Tom," he faltered, "how am I going to get the plane across?"

Tom's chin fell. "Well, of all things! I never thought of that. You'll have to take it across in a boat."

"Boat," snorted Robert. "Where will I get a boat big enough to carry my aeroplane? Why, those planes are forty feet wide."

"And there's no other bridge for ten miles in either direction," bemoaned Tom. "I'd would take a day to cart it around. You'd never get there in time for the contest!"

Robert rushed outside followed by the old machinist and together they investigated the wrecked bridge. It was evident at a glance that it would not be possible to get the huge machine across the broken space. It was one blow too many for Robert to bear, and sobs struggled upward as he buried his face in his hands. "Beaten! I'm beaten," he moaned.

The time was already late, for, exhausted by their vigil of the night before, both Robert and Old Tom had slept late. The hour of the contest was set for ten o'clock, and already the crowd was gathering in the athletic field across the river. Only a few hundreds of yards separated Robert and his aeroplane from the scene of the flights, but to bridge that distance and arrive in time to compete, seemed impossible to the lad. He raised his head and looked longingly across at the stands and fences.

"If I only were a huge bird," he thought, "I'd fly across and carry the plane." Then he leaped to his feet. "Tom, oh Tom," he shouted gleefully. "What a nimny I am. I don't need a bridge or a boat or anything else. Why, Tom, I've an aeroplane—an aeroplane! Don't you understand? If the contraption is any good it will fly across, and if it isn't any good there's no good taking it there at all. Come, quick, we've no time to lose!"

"But, Bobby," expostulated Sands, "you won't try to fly across that river. What if something should go wrong. You'd fall in the water and drown. You musn't try it."

"What, give up my only chance? I rather guess not. Come on. Help me wheel her out. See, the crowd is already gathering; the stands are filling. Yes, and I can see Taine's aeroplane there by the fence. I've got to make it." He looked at his watch. "It's half-past nine now. Only half an hour to roll the machine out, give things a final test and get across the river. Hurry."

Old Tom became infected with the lad's enthusiasm, and ran toward the machine shop. Laboriously they rolled the huge plane out of the big opening that had been made ready in the wall to permit its exit. Carefully, yet with all the haste he could muster, Robert went over again every lever and joint to see that the mechanism was ready for the great test.

"Only ten minutes," he panted. "Wheel her into place."

Between the aeroplane and the river was a stretch of green some two hundred feet in width. How long his machine would have to run on the ground before it received the impetus to raise it into the air, Robert did not know. Other machines had gone aloft in less than a hundred feet.

"Mine ought to rise in two hundred," he argued, as he mounted his seat. "All right, Tom," he called to the old fellow who stood by trembling with fear for his young friend's safety. "Wish me good luck."

He started the engine, and the huge propellers began to hum. Then he threw in the clutch that connected the driving power with the wheels. The plane moved forward, then the engine coughed, the propellers stopped and the whole came to an ignominious standstill.

Frantically Robert knelt before his

engine searching for the trouble. Minute followed minute; now the strains of a band travelled across the river to his ears. He snatched his watch from his pocket. "Ten o'clock," he cried, and renewed his frenzied efforts to locate the trouble. At last, in the battery box, he found a loose wire. The connection was broken by the jar of starting and he had gotten no spark. It was the work of a second to attach the wire. Once again he mounted the seat.

"Now or never," he yelled to Tom. Forward moved the big aeroplane, gaining in speed every instant. It bumped and rumbled over fifty feet with elevating plane set at the proper angle; seventy-five feet were covered, eighty-five; then the dull, heavy mass seemed to become endowed with life. It grew light; it skimmed over the ground and slowly rose into the air.

"Hurrah," shouted Old Tom quaveringly. "Hurrah."

Higher and higher rose the plane, and onward it traveled. Its course was unsteady; it wavered from side to side for a few moments, then Robert seemed to grasp the handling of the craft and she shot straight for the park.

As he passed the last reach of water and was again sailing over dry land he heard a great crash of the band, and looking downward, perceived that Taine was about to begin his flight. Robert saw the other aeroplane speed over the ground and rise into the air. For a hundred feet it flew jerkily; then it twisted to the left and bumped dully to the ground. A great sigh of fright arose from the assembled crowd.

Robert saw Taine struggling amid the wreckage and heard the lad's voice in a cry of pain. Men rushed toward the spot frantically to aid the injured aviator. Suddenly a peculiar purring sound in the air above arrested their attention, and they glanced involuntarily upward. Then, for the time, they forgot the accident; forgot the boy that needed their aid, for there was Robert's aeroplane soaring above their heads. Astonishment rooted them to the spot, and the people in the stands, following the gaze of those in the field, perceived this new contestant and greeted him with a mighty shout. To the far end of the grounds Robert skimmed; then he turned gracefully and came back at full speed. Higher and higher in great spirals he forced his craft, only to descend with a disconcerting swoop almost to the ground. For ten minutes he continued his evolutions before the crowd; then he brought his machine lightly to the ground and leaped out.

In a second the throng was upon him and hoisted him to enthusiastic shoulders which bore him to the platform where the great inventor sat. There was no question as to whom the prize belonged. Cheer after cheer crashed upward as the great man shook hands with Robert and congratulated him warmly, at the same time presenting him with the certificate of his victory. It was a proud moment for the lad—proud and happy.

Far over the heads of the crowd Robert saw a slight commotion. Two men carrying a stretcher, were forcing their way to the gate.

"It's Taine," somebody cried. "Leg broken, but nothing serious."

Taine turned his head toward the platform and his eyes met Robert's. The injured lad flushed, then turned pale, and his body shook with angry, humiliating sobs. In that minute, as he witnessed the victory of his rivals, he suffered a punishment that made even his broken leg appear trivial. It was a punishment that burned into his very heart—the punishment which only the very proud may know in the moment of their downfall.

"I'm glad I didn't thrash him," Robert thought. "He's getting all the punishment he deserves."

Then Mr. Hammond struggled up to his son's side.

"Bobby," he cried, "I'm proud of you—proud of you."

Robert's eyes were wet as he clasped his father's hand.

"This is the best prize," he murmured. "Better than a dozen scholarships. Now I must help you to win."

"I've won, too, Bobby," smiled Mr. Hammond. "The mills open Monday."

A Loose Screw
Continued from page 66

with notches on its edge to catch the twine and wedge it securely in the deep iron groove that fitted over half of the wheel as it turned.

As he pulled the twine the little wheel slipped backwards, and the twine escaped from where it had been wedged into the groove by the forward turning of the wheel.

"Oh, I see!" he said, joyfully. It took but a minute to see now the seat of the whole trouble. The backward turning of the wheel, when under a strain from the pulling twine, allowed the twine to escape before it was tied by the knotted.

But why should it be pulled backwards at times and not at others. That was very mysterious, but only for a short time.

Examining the holder-wheel from all sides, he discovered on the under side, partly concealed by dirt and grease, something he had never noticed before. It was a little mechanical "dog" which fitted into a ratchet of the holder-wheel to prevent it from turning backwards.

At a glance Frank saw that the screwbolt which held the dog had loosened several turns. This gave it enough play to work clear of the ratchets, which it did about half of the time, with the result that the holder-wheel turned backwards, causing the twine to escape and the bundle to be thrown off loose.

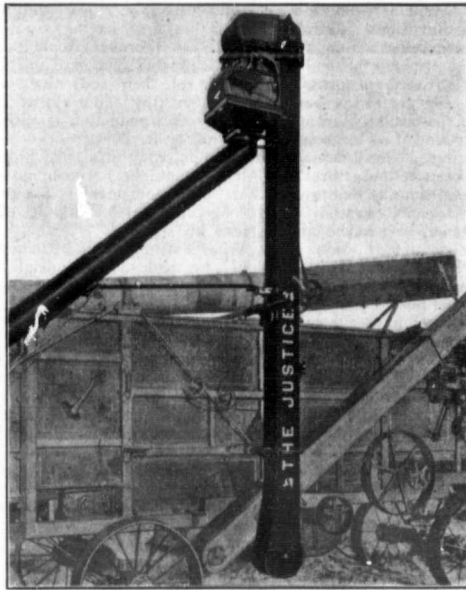
Frank almost jumped for the screwdriver. But when he attempted to tighten the screw he discovered that it had been loose so long that the working of the dog up and down had worn the exposed threads until the screw could not be turned and tightened. But he did not despair.

"A new screw! That's the dope!" he shouted. "Hurray! Fifty dollars!" Then, picking up his hat, he dashed out of the field on a run to the house.

He fully intended to go to the village, a distance of nearly four miles, that evening; but his father reproved him slightly for remaining so long in the field and neglecting the chores, and his big sister, Ora, was inclined to scold him good-naturedly for keeping her waiting on the supper dishes. Not caring further to ruffle the household, and because it was late when he had finished the chores, he postponed the trip to the village until morning.

In the meantime, and during the night, his confidence in the efficacy of his plan of making the binder wheel had cooled not a little. The binding machinery was as complicated as a clock. What he had discovered might prove to be only a small part of the trouble. At any rate, he thought it best to keep it all to himself.

Nevertheless, he persuaded his mother the next morning that she was expecting important mail, and his father that he would be back from town in



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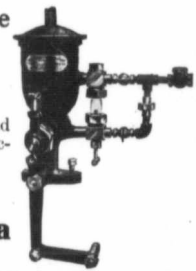
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time to begin shocking as soon as enough grain was cut for him to work on.

On his way to the village he met Burns, the local implement dealer, driving into the country, accompanied by a corpulent city-bred gentleman.

"How's that binder working?" Burns asked, stopping his horse. "Is it bucking yet?"

Frank, divining at once the reason for the stranger's presence, said feebly that it was binding about half of the bundles.

"I've got a man this time," Burns said boastfully, slapping his horse with the reins, "that'll tune it up in short order." He looked at his companion, who smiled modestly.

Frank had been urging his pony on a gallop, but after Mr. Burns passed, he held him down to a walk. What if the stranger was a real expert? He would reach the field before he could return from the village with the new screw, especially if Mr. Burns drove to the field by way of the cross-road instead of first going to the farm house.

"Frank," he heard some one shout in his rear. He turned and looked. Burns had called him.

"Can we get to the field without going by way of the house?" he asked.

"Yes," Frank answered, reluctantly. Then he added with more spirit: "You'll have to open five wire gates, though."

Frank knew how distasteful opening gates was to the aver-

age man who lives in town, especially the tangling wire ones which he had mentioned.

Feeling certain that what he had said would discourage Burns from taking the shorter road to the field, he touched the flanks of his pony lightly with his heels, and was soon galloping down the road, determined to make the most of the small hope that remained.

In less than twenty minutes Frank flopped off his pony before it had made its last jump in stopping in front of the implement store, and rushed into the building.

"You'll have to wait until the boss comes back," replied the clerk whom Burns had left in charge of the store during his absence. Pleading ignorance of "all the bally binders," he resumed sweeping the floor.

"Can't you let me see the repairs?" Frank urged, breathlessly. "I'll know it when I see it."

The hardware attendant walked several steps and leaned the broom against a stove. Frank started immediately for the back room, where the clerk found him carefully scanning the walls lined with boxes and drawers.

"It may take me," he began, "a whole day to—"

"There they are on that top row," Frank interrupted, pointing to a box marked "binder repairs." "Let me get it," he said, jumping upon the bench. In a few seconds he had it down and was running over the contents

for the precious screw.

"Charge it to father," he called to the wondering clerk, and dashed out of the room.

At the edge of town Frank met Al Rogers, who told him in the short time he was able to detain the boy, that he had met Burns, that the stranger was an expert, and that he "knew a binder like a book." He was the same man who had repaired the Rogers' binder the year before. Al had also seen Mr. Truman before he met the implement man and the expert, and had repeated to the latter the farmer's offer of fifty dollars to the one who would repair his machine.

"That'll be like finding it for him," Al commented.

There was now certainly no time to throw away. He put his pony to the limit of his speed.

It occurred to Frank that the expert would first give the machine an overhauling. He must not only reach the machine first but also be in time to give it a trial. There would be no telling after the expert was through who had been the means of making it work. It also occurred to him how much easier it would all have been if he had taken his father into his confidence.

But Frank took the cross-road in spite of the gates, but Blix, his pony, was well trained at opening gates. He galloped at full tilt to each one of the gates, stopped suddenly and sidled to the fence. Frank, without dismounting, unfasten-

ed the upright bar, and the pony, without a word or touch of rein, bolted through, backed and turned with his side against the fence for the bar to be re-fastened. At a word he was off again to the next gate, where the same operation was repeated with equal celerity.

It was all done so quickly that the time lost in opening the five gates was much less than that many minutes. The distance saved, by taking the cross-road was nearly two miles.

As he dashed out of the road through the tall corn into full view of the entire wheatfield, he saw Mr. Burns and his companion sitting in the buggy at the farther corner of that end of the field. At the other extremity, his father had just turned the reaper at the last corner and had started back on the side next to Frank.

He was too late, he thought. The machine had been put in order, and Mr. Burns and the expert were waiting at the corner while his father tried it another round. But if the expert had not worked on the binder, luck was in Frank's favor.

The reaper was fully a quarter of a mile distant. He would have time to intercept it, put in the new screw, and give it a trial of many rods before it reached the corner where the machinist waited.

He was on a diagonal cut across the bundle-covered stubble, straight towards the binder, approaching slowly with its big



reel revolving like huge arms tossing in air.

What if the expert should come to meet the binder as he was doing? If he did there would not be a second to spare. The pony took the slack rein he gave it and went bounding over the soft ground, jumping bundles and windrows which lay in his path.

At first he was too far away to tell whether the bundles, as they were thrown from the machine, were bound or loose.

Coming nearer, he saw one fall which he was certain was bound. Breathlessly, he watched for the second. It was, and so was the third. But the binder often tied that many in succession, he thought.

Then the fourth broke and went sprawling over the other sheaves on the carrier. The next fell in the same way.

He was now within a few rods of the machine.

"Whoa!" Frank shouted loudly above the noise of the clamorous sickle, as much to his father's team as to his own pony, which stopped beside the reaper in two stiff-legged jumps.

"I got something to put the fixings to it," he said joyfully, as he turned off his pony, reached in his pocket and, with screw-driver in hand, went to work.

Mr. Truman, overcome by the boy's enthusiasm, sat motionless on the seat. In disjointed sentences he soon learned what his son was attempting.

When the machine started Frank held his breath. The stream of straw rolled down from the canvas elevator and was packed for the bundle against the trip. There was a click, the arms started around, and out came the bundle, bulging big at both ends but securely tied in the center!

But a few steps more and another fell, then another, and another, all in perfect form.

"What did you do to it?" Mr. Truman called to Frank above the rattle of machinery. All the while he had been craning his neck over the top of the binder and saw every bundle as it fell.

"You owe me fifty dollars," Mr. Truman was surprised to hear his son answer.

The binder went twenty rods without missing a single time. Here it was met by Burns and the expert, who had given up waiting at the corner.

"You found the loose screw, all right," the expert said after he had looked over the machine and Frank had explained to him what he had done. Turning to Frank, he continued, "Were you working for that fifty, too?"

"Is he working for it?" Burns exploded from the buggy. "Look at that foaming pony; he's been working, too. They've been to town and back. Didn't you see those dagger-eyes Frank held on you while we were talking to him in the road? He's been working for it and he's going to get it. Truman, write out a

note for fifty dollars, payable to me."

"To you!" the farmer exclaimed in great surprise.

"Yes, to me," Burns answered, reaching for his pocketbook. Before Frank could understand what was going on, Burns handed him fifty dollars in bills.

"Haven't you got that note drawn up yet?" Burns called to Mr. Truman. Then he drew a small book from his pocket, made a few scratches with the pen, handed them to Mr. Truman, commanding in feigned sternness, "Put your name to that."

"It's a good investment," Truman said as he handed the pen and note-book back.

Problems of the Farmer.

Continued from page 53

mense amount of rubbish which is very hard to keep in check or get rid of. There is little or no sod to rot, so that it is less important that the land lie inverted during most of the summer. Here, then, there is ample time to do the summer-fallow first and the breaking second, and the two jobs do not conflict to the same extent. The farmer on scrub land has his troubles, one of which is get his crop to ripen ahead of early fall frosts, but he has not this problem of how to make the claims of the summer-fallow and the breaking harmonize.

ALBERTA

By G. H. Hutton.

Breaking Timothy and Brome Sod.

The area under cultivated grass is increasing quite rapidly in the central portion of Alberta where timothy, brome and other grasses are found to do particularly well. These grasses, while not having the virtues of clover or alfalfa to commend them to the farmer as a means of storing nitrogen in the soil, provide such an increased yield of fodder over prairie hay that they appeal strongly to the stockman who can bear annual witness to the gradual restriction of the range. Timothy has not the merits of Brome grass for pasture, but for hay it is more valuable in that it is not so difficult to cure well and it is more salable should there be any surplus over what is needed for home consumption. For horses I like timothy hay better than brome, but prefer the latter for cattle if well cured. Brome grass has developed many enemies in the West because of the persistency with which it maintains a foothold in our soil when once it has been given the opportunity of establishing itself. It is certain that brome grass should not be sown on land intended to be used in a regular rotation, but should be reserved for that section of the farm intended for permanent pasture. Brome grass becomes sod bound in two or three years, but its renewal is simple as this can be accomplished by ploughing in May or June or in fact later in the season, then thoroughly cultivate leaving a

level surface, when the brome will come up again thinner, but vigorous and persistent as ever. For early and nutritious pasture brome is not excelled among the grasses.

Both the varieties of grasses under discussion are rather hard on moisture, particularly brome, which on account of its large leaf surface requires a great deal of water. The best method of breaking land out of timothy or brome sod is, therefore, a question of some importance. When the land is under a regular rotation in which timothy is being used for the production of hay it will be found advisable not to take more than two crops of hay as a rule. By breaking immediately after the hay crop is out of the way, going over the fresh ploughing with a packer followed by the disc sufficient moisture will be retained and induced to rise from the lower levels to germinate seed that fall. Winter wheat may be sown on timothy sod and counted on to grow if this method is followed. In our experience we have had both fall and spring grains germinate both quickly and evenly on both brome and timothy sod handled in this way, though the precipitation for the year might only be 14 inches. Grain on similar land not handled in this way germinated very slowly and unevenly.

Last fall Prof. Alway of Lincoln, Neb., took determinations of moisture content in both brome and timothy sod ploughed after the hay crop was taken off and cultivated as indicated and was surprised to find in both cases such a large percentage of moisture in the soil.

The motto: CONSERVE SOIL MOISTURE should be written large in the minds of all interested in securing maximum crops, for without it we can do nothing.

Lightning Rods are Absolutely Necessary

That an old line fire insurance company should make an emphatically exclusive endorsement of properly installed lightning rods will probably be a matter of surprise to many of our readers who are inclined to be skeptical on this subject. Yet this is just what the Central National Fire Insurance Company of Chicago has done. Their endorsement is as follows:

"We believe that lightning rods properly installed effectively protect buildings against lightning, and where a property owner has so protected his property he should be entitled to a reduction in rate. While there are many firms manufacturing lightning rods and putting them up, yet so much depends upon the manner in which they are erected that we do not believe it would be proper to make a general reduction of rate regardless of whose rods were used.

"Having gone into the matter by way of investigation, we have decided to make a reduction of 20 per cent. from the regular fire and lightning rate where

buildings are rodded with Dodd & Struthers' rods and system, manufactured at Des Moines, Iowa, this firm having studied the subject thoroughly and taking such pains and care in the erecting of their rods that we give them this endorsement in the way of a reduction in rate."

Think of it, 20 per cent. reduction in your insurance rates. But it should be borne in mind that this endorsement is for the D. & S. system alone—it excludes all so-called "systems."

What stronger endorsement could be made as an indication of the great value this leading fire insurance company places upon the D. & S. system as safe protection for life and property from lightning.

The prejudice against lightning rods is fast disappearing as their value becomes better known.

The prejudice that does remain, and always will, is against those numerous ignorant and unscrupulous concerns which endeavor to make the sale of lightning rods a vend towards filling their own pockets regardless of the ultimate protection received by the purchaser.

As the greatest factor in driving these frauds out of business and re-establishing the lightning rod as a safe protection to life and property against lightning, we commend Dodd & Struthers to all property owners.

Dodd & Struthers have manufactured D. & S. Woven Copper Cable Lightning Rods for 26 years. They have an enviable reputation for honesty and fair dealing.

The greatest scientists and over 2000 Mutual Fire Insurance Companies of the United States and Canada endorse Prof. West Dodd as the greatest authority on lightning protection.

Prof. Dodd's wonderful invention, D. & S. Woven Copper Cable Lightning Rod and System of Installation, is endorsed by all these fire insurance companies as the only lightning protection. They emphatically declare that the D. & S. system of Installation insures safe protection against lightning.

The president of one of the largest of these companies recently said: "The great work accomplished by Dodd & Struthers is little short of marvelous. By installing their rods, they are abolishing all loss by lightning. Our fire losses are reduced 75 per cent."

Many insurance companies now grant a reduction of 10 to 33-1/3 per cent. in insurance rates when buildings are rodded by D. & S. Woven Copper Cable Lightning Rods.

A list of companies making these large reductions can be had by sending a request to Dodd & Struthers, Des Moines, Iowa.

One of Dodd & Struthers' most successful representatives, Mr. E. R. Stotts, recently made a statement which greatly interested us. It was to wit: "Without exception the most intelligent inhabitants of any commun-



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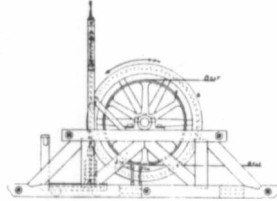
Western Canada Factory
797 Notre Dame Ave., Winnipeg.

ity are the ones most willing and ready to adopt the D. & S. System of lightning protection after carefully investigating it."

Having met Mr. Stotts, we feel sure this statement was made without prejudice and especially so when we know that many of the finest farm, government and city buildings in this country are protected by D. & S. Woven Copper Cable Lightning Rods. Upon request the booklet, "The Laws and Nature of Lightning" will be sent you free of charge. Send your request to Dodd & Struthers, Des Moines, Iowa.

1910 Winnipeg Motor Contest
Continued from Page 9

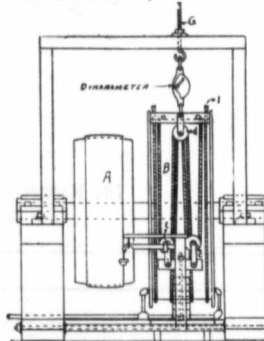
to be desired. In the first place a larger test would be more desirable in order that the reliability of the various engines could be brought out. The rules and classifications should be so worked out that each and every engine manufactured today could come in wholly and solely on its merits regardless of type, construction, or of fuel used. Such contests are supposed to be open to



Brake, Side View

the world and unless the rules are so arranged that every engine manufactured today can enter and show its strong points as well as its weakest the best results cannot be obtained.

The farmer of today buys three kinds of horse power when he buys a traction engine. First, he buys ordinary horse power; Second, he buys economical



Brake, End View

horse power, and third, he buys reliable enduring horse power. Let us hope that any future contest that may be held will be so arranged that it will bring out in so far as possible all three of these and that each and every engine manufactured today can have no possible excuse for staying out on account of not being able to show itself up as it really it. Then and only then will a motor contest mean what it should to both farmer and manufacturer.

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The Crops and Live Stock of Canada

Ottawa, July 12. The Census and Statistics Office today reports on the condition of field crops and the number and condition of farm animals of the Dominion at June 30. For the three years 1908-1910 the field crops range in condition from 82.16 for spring wheat to 91.42 for hay and clover this year to 80 for spring wheat and 82 for rye and peas in 1908. Fall wheat is 85.47 this year compared with 77.28 in 1909 and 89 in 1908. Oats was 90 in 1908 and 93.81 in 1909, and this year it is 86.29. Peas is 86.94 this year; last year it was 84.40 and in the previous year 82. The condition of mixed grains is nearly the same, being 84.53 this year, 86.58 last year and 84 in 1908. Hay and clover is better this year than in either of the previous years, being 91.42 compared with 76 in 1909 and 87 in 1908. The condition of alfalfa has been recorded this year for the first time and its average is 88.94. Pasture has a condition of 89.02 this year, compared with 99 in 1908 and 87.74 last year. The conditions of all field crops are good in Ontario, the highest being 94.29 for fall wheat and the lowest 84.79 for spring wheat. Quebec crops range from 74.45 for mixed grains to 102.58 for hay and clover. Peas is 84.42 and its condition is the next above mixed grains. In Prince Edward Island and Nova Scotia all field crops are reported for a condition above 90 except alfalfa, which is 83.33 in the Island. Hay and clover are 104.31 in the Island and 105.79 in Nova Scotia. Wheat, oats, mixed grains and alfalfa are reported in a condition above 90 in New Brunswick, and all other crops between 83 and 89 except alfalfa, which is 97. Hay and clover are reported at 109.68. Manitoba, Saskatchewan and Alberta have low averages throughout owing to a light rainfall in June. The general condition of crops in Manitoba is much below the average. Correspondents in nearly every district report no rains—only a few light showers and hot dry winds that absorbed the moisture and withered the crops. The lowest average condition is reported from around Brandon and Morden, and the highest from Marquette where it is placed at a standard. In Saskatchewan the crops do not appear to have suffered from climatic conditions to the same extent as in either Manitoba or Alberta, as there have been many local showers. The reports from Lloydminster, Battleford, Indian Head and Qu'Appelle are very favorable, the condition of wheat being placed at 100 and over. The prevailing condition of crops in that part of Alberta south of townships No. 30 is below the average in consequence of drought and hot winds. In the Edmonton district the grains, although suffering to some extent from the same causes, are in much better condition.

PUMPING WATER

for Stock uses Time and Strength. Both are worth Money and can be Saved by the use of a



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Some Motor Trials of 1873.

Continued from page 13 day attacked the problem at the wrong point, and that, on the common road, the transportation of heavy loads by steam being accomplished with economical success, under ordinarily favorable circumstances, it may prove introductory to the use of steam in carrying passengers and light freight at higher velocities.

Having examined in detail the capabilities of the road locomotives, and determined the value of steam traction on macadamized roads, and having obtained the measure of its economic superiority over horse power, there remains to be considered the conditions which favor or retard its introduction, and to determine where it may be adopted without apprehension of failure. One of the most important of the pre-requisites to ultimate success in the substitution of steam for animal power on the highway, is that our roads shall be well made.

As the greatest care and judgment are exercised, and an immense outlay of capital is considered justifiable, in securing easy grades and a smooth track on our railroad routes, we may readily believe that similar precaution and outlay will be found advisable in adapting the common road to the road locomotive.

It is undeniably the fact that, even when relying upon horse power, far less attention has been paid to the improvement of our roads than true economy would dictate. With steam power, the gain by careful grading and excellence of construction of the road-bed becomes still more important. The animal mechanism is less affected in its power of drawing heavy loads than is the machine. With the horse, a bad road impedes transportation principally by resisting the movement of the load rather than of the animal, while with the traction engine the motor is as seriously retarded as the train which follows it, and frequently much more, on soft ground.

Steam, therefore, cannot be expected to attain its full measure

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We have found by our experience with steam fire engines, with the elevated railroad on Greenwich street, New York, and with railroads throughout the country, that the frightening of horses is but a temporary and a comparatively insignificant inconvenience. It would seem to the engineer that the natural obstacles generally supposed to stand in the way have, after all, no real existence.

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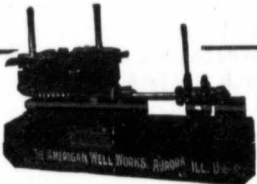
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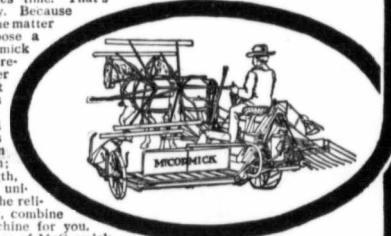
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We own and operate a 20 h. p. portable International Harvester gasoline engine, which we use for threshing and chopping feed. We have been threshing two seasons with our gasoline engine and I think it is way ahead of steam. Our engine consumes about 18 gallons of gasoline in a ten hour day of threshing.

The cost of gasoline in our locality this year was 26c. a gallon, making the expense for gasoline \$4.68 a day and 15c. worth of lubricating oil and grease, which makes the total running expenses \$4.73 per day.

I have not had any experience with steam, but I do know that there has to be an engineer, which costs about \$5.00 a day, and there has to be a god fireman which makes another \$2.50 or \$3.00, and you must have a tankman and team, which makes still another \$4.00 at least, making his expenses for running a steam engine about \$12.00 a day. Then you have other troubles, such as leaky flues, injector troubles, lubricator troubles, etc.

I think the gasoline engine is the coming power for the farmer and thresherman as it is always ready when wanted.

Hoping this is worthy of your consideration, I remain,
Yours truly,
Albert Carlson,
Windthorst, Sask.

Anxious to Learn.

We have a 15 h. p. International Harvester gasoline engine and a 23-inch Belle City separator. We had plenty of power and our engine was quite easy to operate.

We also own and use a 6 h.p. vertical Stover engine, driving a ten-inch plate Fleury crusher, and crush and clean oats from 20 to 24 bags per hour, barley or wheat about 12 bags per hour. We also saw wood and are thinking of adding a lime crusher and a cement mixer to our plant. We find the little upright engine very simple and easy to start. In cold weather a kettle of hot water poured in the jacket will warm and dry the cylinder, so that the gasoline will vaporize and the engine start without any trouble in cold weather. In the winter time we keep battery in the house when not in use. This is a point often neglected and as a result many find their batteries short lived and inefficient. Gasoline here at the present time is 25 1/2 c. per gallon.

We are anxious to learn all we can about operating gasoline engines and shall be glad to have the book you name if you consider this letter merits it.

We hope before long to see gasoline tractors of moderate price, and become general, thus reducing the cost of wintering so many idle horses, a serious and ever recurring problem in the country. If we can be of any further use to you we shall be glad to answer any questions.

Yours truly,
Cutting Bros.,
Carnegie, Man.

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PORTLAND CONN., U.S.A.

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- 1—ALBERTA PORT HURON CO., Calgary, Alta.
 1—AMERICAN-ABELL ENGINE & THRESHER CO., Winnipeg, Calgary and Edmonton.
 2—AMERICAN SEEDING MACHINE CO., Winnipeg.
 3—BAILEY SUPPLY CO., Winnipeg.
 4—BEEMAN MFG. CO., Winnipeg.
 41—BELL B. & SONS, Winnipeg.
 5—BELL ROBT. ENGINE & THRESHER CO., Winnipeg.
 6—BRANDON MACHINE WORKS, Brandon.
 7—BRANDON PUMP & WINDMILL WORKS, Brandon.
 8—BRANDON & ROBERTSON, Brandon.
 9—BURRIDGE-COOPER CO., Winnipeg.
 10—CANADIAN FAIRBANKS CO., Winnipeg, Vancouver.
 11—CANADIAN MOLINE PLOW CO., Winnipeg.
 12—CANADIAN PORT HURON CO., Winnipeg.
 13—CANADIAN RUBBER CO., Winnipeg, Vancouver.
 14—CANADIAN STOVER CO., Brandon.
 15—CARBERRY IRON & WOOD WORKS, Carberry.
 16—CARBERRY STACKER CO., Carberry.
 17—J. I. CASE T. M. CO., Winnipeg, Regina, Calgary.
 18—CHAPIN CO., Calgary.
 19—COCKSHUTT PLOW CO., Winnipeg, Regina, Calgary, Edmonton.
 20—CRANE & ORDWAY, Winnipeg.
 21—DEERE, JOHN PLOW CO., Winnipeg, Regina, Calgary, Edmonton, Saskatoon.
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 24—EMPIRE CREAM SEPARATOR CO., Winnipeg.
 25—GAAR, SCOTT & CO., Winnipeg, Regina, Calgary, Edmonton.
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 28—HAUG BROS. & NELLERMOE, Winnipeg and Calgary.
 29—HARMER IMPLEMENT CO., Winnipeg.
 30—HART-PARR CO., Portage la Prairie.
 31—HELGESON, H. T., Winnipeg.
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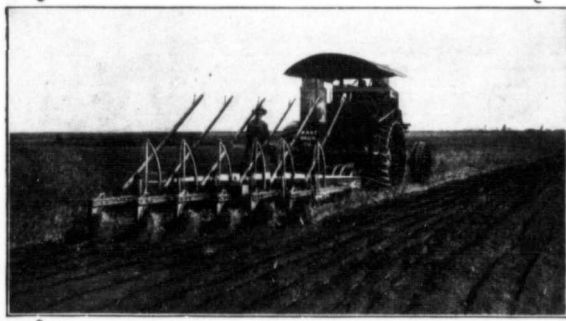
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The Hart-Parr Uses 11 Cent Kerosene for Fuel



THRESHING

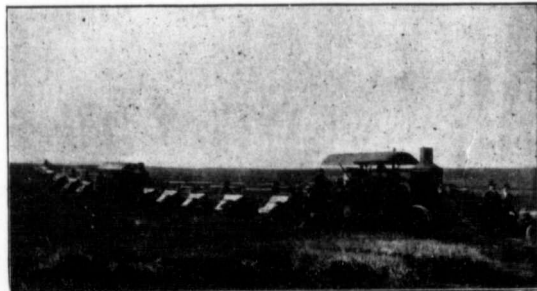
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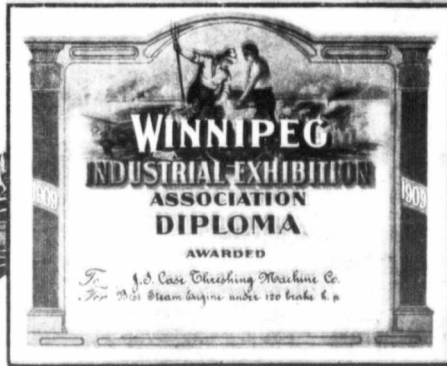
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