THE CANADIAN THRESHERMAN AND FARMER

CANADA'S FARM MACHINERY MAGAZINE

WINNIPEG CANADA

APRIL - 1910

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E.H. Heath COMPANY LIMITED Publishers

JOHN DEERE ENGINE GANGS

4, 6, 8, 10, 12 AND 14 BOTTOMS

BIG PLOWS for a BIG COUNTRY

Why turn a Single Furrow when you can turn from 4 to 14 furrows at the same time

Canada is a country of big farms, big possibilities and big profits—if you are a big farmer.

A general couldn't fight much of a battle with one soldier, and a farmer can't raise much wheat with a one-furrow plow.

Get the Right Gang

Bottoms in pairs give great strength and make the plows run steady. The beams can be braced and each plow steadies the other. You notice these features on a two-bottom horse gang—you can't beat that construction.

Don't Clog

Curved frames give great clearance, and the JOHN DEERE Engine Gang will go through straw, trash, weeds and scrub where other gangs clog and cause trouble.

Screw Clevis

In addition to the regular clevis adjustment, each beam is fitted with a screw clevis when attached to the frame. A man can stand on the platform and adjust any one plow with a wrench while the engine and gang are working. This saves time and is a most important feature.

Works with Coulters

Rolling Coulters can be used on the JOHN DEERE Engine Gang just the same as on a sulky plow

Level Platform

The platform is roomy, free from obstructions and so arranged that the levers are all in reach.

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.

ILLUSTRATED BOOKLET FREE

Write us to-day for Free Booklet showing JOHN DEERE Gangs being used with all kinds of steam, oil and gasoline tractors. Don't fail to get this book and learn all about engine plowing. A post card will bring the book. Mention this paper when you write.

John Deere Plow Company, Limited

Winnipeg Regina Calgary Saskatoon Edmonton

LIGHT DRAFT
JOHN DEERE GANG PLOW

HOW TO SELECT A PLOW---THE RULE OF FOUR

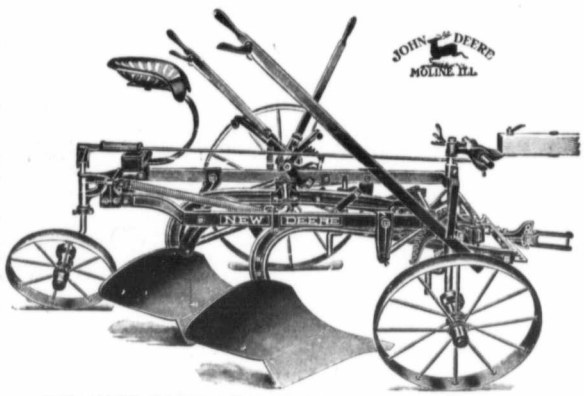
Plow quality does not improve with age.

An inferior plow does poorer work, is harder to pull, and costs more for repairs every year it is in use.

Because certain things about a plow cannot be changed for the better **after** you buy it, care and study **before** buying, is important.

Judging the real worth of a plow is not difficult if four things are kept in mind:

First—Quality of work.
Second—Ease of management.
Third—Lightness of draft.
Fourth—Strength and durability.



THE LIGHT DRAFT NEW DEERE—WHY IT PULLS EASY

Consider five things when judging the draft of a plow:

First—The shape of the bottom. **Second**—Material out of which it is made. **Third**—Equal weight on all the wheels.
Fourth—Proper adjustments. **Fifth**—Staunchness of the plow.

WHY THESE FOUR QUALITIES ARE THE TEST

First—Nothing takes the place of good work. Unless a plow does perfect work you cannot afford to own it, no matter what the price.

Second—Have regard for your own comfort—that pays. Get a plow that is easy to ride, and that can be operated with little effort on your part.

Third — Never work horses harder than necessary. Horse-flesh and horse-feed cost money. An extra one-eighth horse power added to the draft will cost you the price of a plow—very soon.

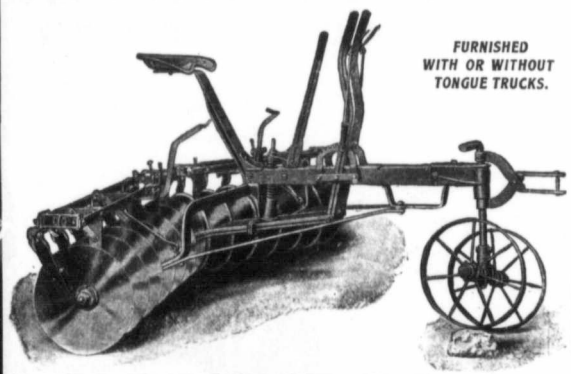
Fourth—Repairs are expensive. A good plow lasts longer than a poor one.

Write for Literature, Prices and Terms.

JOHN DEERE PLOW COMPANY LIMITED

CALGARY REGINA **WINNIPEG** EDMONTON SASKATOON

Deere Model B Disc Harrow



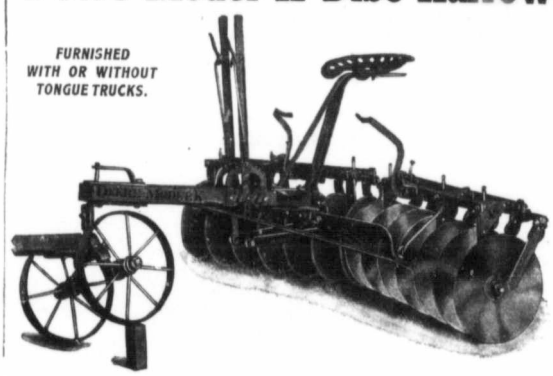
FURNISHED WITH OR WITHOUT TONGUE TRUCKS.

It is the Only Real Flexible Harrow.

PROGRESSIVE Farmers know how much more satisfactory our **Model "B" Disc Harrow** does **its work** of **pulverizing** the soil **evenly**—without skipping rough places in the "middle"—because our **Third Lever** with **Spring Pressure Yoke** and **coutrolled** draw bars. enables you to **govern** your disc. They can't push up in centre, as with ordinary machines. You pull the lever and it locks automatically with discs **working** through dead furrows or over ridges always cultivating **thoroughly.** Special features besides superior malleable iron parts and **extra durable construction,** are : Easy, Double-Spring Seat—High Frame out of dust—Abjustable Disc Scrapers—Lighter Draft, etc.

Write for Catalogue.

Deere Model K Disc Harrow



FURNISHED WITH OR WITHOUT TONGUE TRUCKS.

A STRONG substantial two-lever harrow, slightly lighter than Model "B," but having many of its points of superiority. **The Frame** is made from a single piece of heavy steel. The frame bars, crosstrees and braces are all steel, very securely reveted and bolted together.

The Scrapers are of the improved oscillating style, and can be easily removed or replaced. **Hard Maple** oil-soaked **bearings** are used on this harrow. **Disc Blades** are made of the every best quality steel, thoroughly polished and sharpened. Double **Angling Levers** on this harrow ensure a convenient machine for lapping lands and for hillside work.

Write for Catalogue.

Both of the above styles of Disc Harrows are excellent Tools to pull behind a John Deere Engine Gang.

JOHN DEERE PLOW COMPANY LIMITED

CALGARY REGINA **WINNIPEG** EDMONTON SASKATOON

The Acme Grain Pickler

ACME GRAIN PICKLER

Capacity 100 Bushels Per Hour

"The Crop Insurer"

The Acme is an endless screw machine. Thoroughly pickles all the grain and is proof against destruction from bluestone solution; equally effective with formaline. The easiest operated, most efficient and perfect pickler offered the trade. To complete your line handle the Acme.

Order Now

The Fosston Grain Cleaner

is the Grain Cleaner that will Clean Your Grain

Here are Fosston Facts

THE only **Patented Feed Device**—which allows grain in Machine only when running—Feeds full width of sieves.

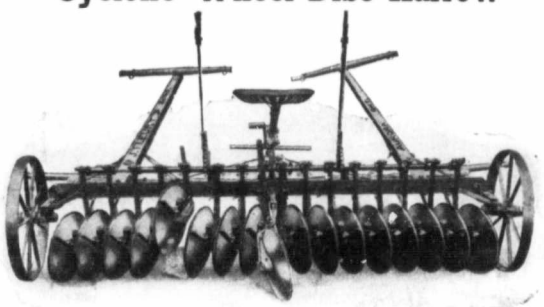
A **Patented Gang** for separating wild or tame oats from wheat. Compose of a series of nine perforated zinc screens.

A **Bottom Screen** thirty-six inches long. Under this screen is arranged a patented cleaning rack to keep bottom rack clean. Special attachment for separating wild or tame oats from barley. Screens for cleaning all kinds of grain. Bagger can be attached in five minutes.

JOHN DEERE PLOW COMPANY LIMITED

CALGARY REGINA WINNIPEG EDMONTON SASKATOON

Cyclone Wheel Disc Harrow



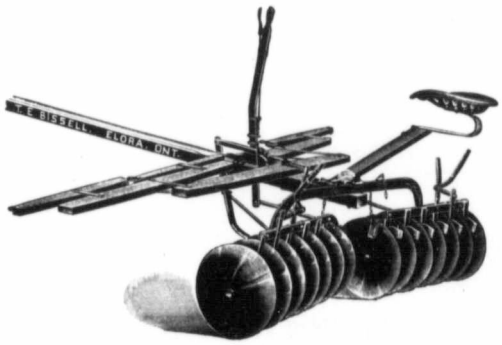
EASY to move from one field to the other. No danger of dulling disc on hard road. Can be backed or turned anywhere. Each disc is independent and equipped with a pressure spring, the same as a grain drill.

More or less pressure can be applied at the will of the operator. For discing stubble fields, summer fallowing, or plowed land, it has no equal."

Can also be used as a weeder or cultivator, being so constructed that the discs can be set at any depth desired; the space between discs being thoroughly worked and much lighter draft than a cultivator.

WRITE FOR CATALOG.

Genuine Bissell Disc Harrow



THE Disc that farmers want. **Some good features are**—CORRECT BALANCE—Stays down at its work, does not buckle, bind and hump up in the center.

Shape of Disc—Cuts, turns and stirs the soil, where others only scrape the ground.

Light of Draft—Forty hard Anti-friction Balls used in every "Bissell" Harrow relieve the horses.

Ease on Horses' Necks—The HITCH is well back, the seat projects at the rear of frame; no weight on necks.

JOHN DEERE PLOW COMPANY LIMITED

CALGARY REGINA WINNIPEG EDMONTON SASKATOON

NEW DEAL WAGON

New-Deal Wagon

Is made of air-seasoned lumber.

Is equipped with double collar skein.

Skeins are dust-proof, therefore will hold grease longer and run easier than others.

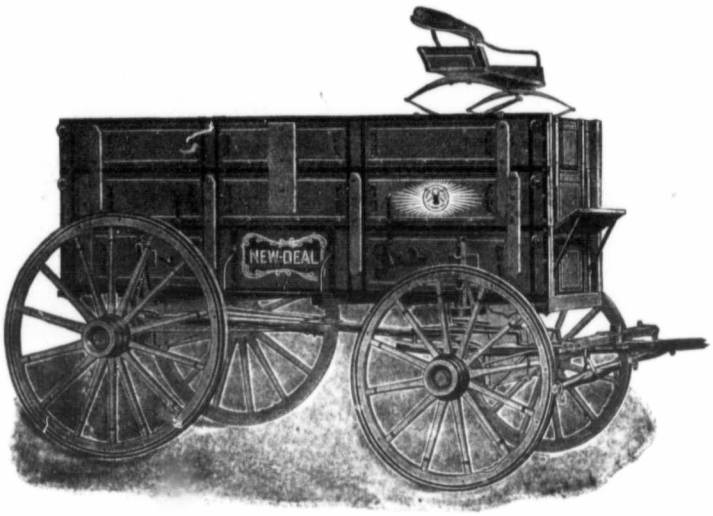
Skeins are heavier; bell is longer and larger, taking more axle.

Has riveted grain cleats (not nailed or screwed).

Bottom of box is reinforced both front and rear.

Has clipped gear, both front and rear.

Box is made flax tight



New-Deal Wagon

Spring seat with 3-leaf springs (not single leaf).

Steel bolster stake plates on side of box.

Neckyoke 48 in. long (not 42 in.)

Has trussed tongue, cannot break or warp.

Has channel iron reach really indestructible.

Is extra well painted, striped and finished

Possesses a great many distinctive features of merit.

JOHN DEERE PLOW CO. LTD.

WINNIPEG REGINA CALGARY EDMONTON SASKATOON

THE FLEURY PULVERIZER

Pulverizes and Packs the Soil

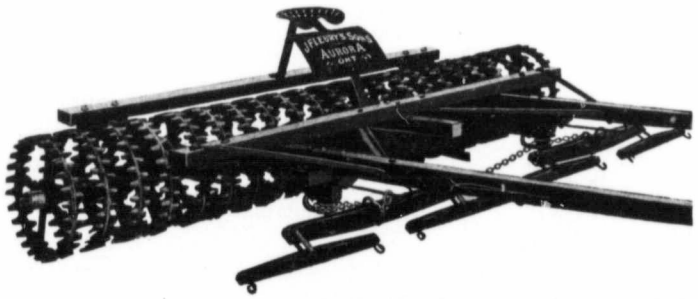
How a Pulverizer Helps

A good seed bed is composed of a fine mellow soil well packed to insure capillary connection with the subsoil.

Such a seed bed will produce better crops than a lumpy one of the same chemical composition.

This is why a good pulverizer should be a part of your equipment. Other things being equal it insures better crops.

It is often necessary to plow land when it will break up into large chunks or clods. In such a case, a pulverizer is indispensible for fining the soil.



The fact is, almost any soil is benefited by being pulverized and packed after plowing, regardless of its condition.

Light, loose soils are kept from drifting by being treated in this way.

The Fleury Does the Business

In the first place it is sufficiently heavy for its work, there is no necessity for weighting.

The sections are so constructed that they pulverize all lumps and pack the soil so it is in good seed bed condition. At the same time, it helps to produce a surface mulch which holds moisture.

It does the work of both a pulverizer and a land roller.

Also, this pulverizer is sufficiently flexible to accommodate itself to rolling land.

Besides this, it is very durable. It has bushings that take the wear instead of the wheels.

The ends of the wheel hubs are chilled which reduces the end wear on the wheels.

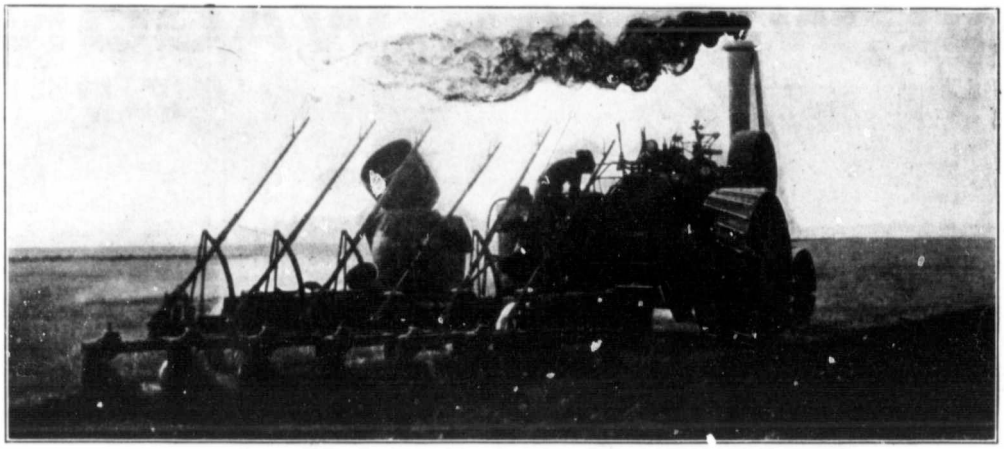
These are a few of the excellent features of the Fleury Pulverizers. Ask us for further information.

Fleury Pulverizers are made in the following sizes:

16-section, 1-pole
22-section, 1-pole
22-section, 2-pole
24-section, 2-pole
22-section, 2-pole, pulley hitch, with doubletrees
24-section, 2-pole, pulley hitch, with doubletrees

JOHN DEERE PLOW CO. LTD.

WINNIPEG REGINA CALGARY EDMONTON SASKATOON

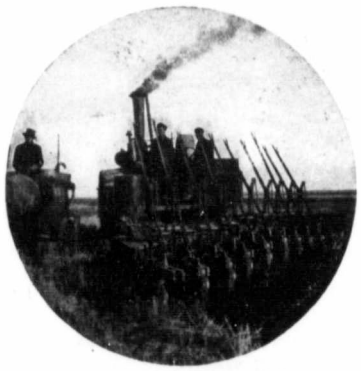


S.-M. Outfit of W. A. Kilgour, Moose Jaw, Sask.

If the Plowing of a Quarter Section, or 160 acres of land, means a furrow 1300 miles long, it is readily seen that Farmers having this amount, and in some cases several Quarter Sections of land to plow and break up, cannot expect to do it with horse-flesh. There is too much to bedone, and the Seasons are too short, therefor, for allowing the average Farmer to undertake Plowing with horses hereafter.

What he properly will require is a strong, general purpose Steam Traction Engine, ranging from about 23 to 32 Horse Power, capable of readily handling 6, 8, or 10, Plow Bottoms or even more, according to the amount of land to be prepared and the time in which it is to be accomplished.

Sawyer-Massey Company have an ideal Line of Steam Tractors, this Spring, which will be found second to nothing on the market for Plowing purposes. The Company has been in the field exploiting Engine Plowing from the first, with the result that they will, this Season, practically take the lead. In addition to their having all the strong and desirable features necessary to do successful and economical Plowing, they can be applied and utilized for Threshing and all general work required of Traction Engines. Their latest type of Engine is stronger and better built in every way than heretofore, and the Farmer or Thresherman, contemplating the purchase of a Steam Tractor, will not be thoroughly alive to his own interests if he fails to see their new Line this year and compare its merits and prices with the best to be found on the market. A letter to our Office at Winnipeg will bring all the desired information.



S.-M. Outfit of J. McKenzie, Morse, Sask.

S.-M. Outfit of Donald McInnes, MacDonald, Man.

YOURS FOR VALUE

Sawyer-Massey Co. Limited.

HAMILTON, Ont. WINNIPEG, Man.

A MAGAZINE FOR THE FARM AND HOME

THE CANADIAN THRESHERMAN AND FARMER

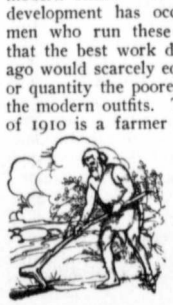
Vol. XV. WINNIPEG, CANADA, APRIL, 1910. No. 4.

Traction Cultivation in 1910

By A. FRANK MANT

WHAT changes a decade has seen in the status of traction farming! It might almost be said that the 20th century witnessed the birth of this industry. Ten years ago the use of the traction engine in farming was confined to the driving of the threshing separator and the drawing, in a few isolated instances, of some gang plows behind an engine ill-adapted to, and poorly equipped for the work. Skeptics abounded on every hand who predicted the speedy decline of an infant industry. Steam plowing was regarded as an expensive fad, costly in itself and ruinous to the land it was practised upon. No reputable agriculturist could be found who would endorse the idea or predict for it anything of a future. It was regarded as a short cut to a large acreage, and was condemned as the slip-shoddiest of a number of slip-shod methods characteristic of the West and its haste and greed for wheat and wealth.

"But once again the scene was changed," and the discredited infant industry of 1900 has become the esteemed ally of the farmer of 1910. The scoffers are silenced by the evident improvement in design, materials and workmanship of the modern outfit. A corresponding development has occurred in the men who run these new rigs so that the best work done ten years ago would scarcely equal in quality or quantity the poorest showing of the modern outfits. The tractioner of 1910 is a farmer as well as an engineer, and he has regard for both ends of his work — the engine ahead and the plowing behind. As such, he has won the confidence of the body of farmers and the very men who heaped scorn on the early efforts of the steam plowman are now bargaining to have their breaking, summer-fallowing, and fall plowing done by traction power. They realize what has come to pass and see that it is to the best interests of their work to have as much of their plowing as possible done by mechanical power; economy, efficiency, and the exigencies of the work alike demand it. Thus, from the conversion of a few bright and intrepid spirits, the traction plowing idea has spread until it includes almost every thresherman and large operator. Now it possesses nearly every progressive farmer of the western prairies and not a few unprogressive ones.



This idea, too, now has the sanction and endorsation of the leaders in scientific agriculture. All the plowing done last summer on the 1200 acre farm of the new College of Agriculture of Saskatchewan, located at Saskatoon, was traction plowing and the same will probably hold true of the coming season.

The Horse Gang on the Large Farm is Doomed

Keeping pace with the ever-widening circle of its friends and adherents, the traction plowing idea broadened in scope until to-day, when it has few avowed enemies, there are also few power requirements of the farm that it does not aim to, and claim to, fulfil.

Traction plowing is further advanced and more solidly entrenched in popular favor than it ever was, but now it is only one part of the traction idea and ideal as applied to farming. Traction cultivation is a more correct term now than is traction plowing. Almost every outfit in these days prepares a seed bed and even sows the seed as well as merely plowing the land. Who will say that a decade hence traction farming will not be as correct a term to use as is traction cultivation to-day? Already the horseless farm is freely spoken of in advertising, at least one or two companies claim to offer so complete a line of tractors that the services of the horse on a farm equipped with them can be entirely dispensed with. To most, the idea of a horseless farm does not appeal, and there is small likelihood of such a thing becoming at all common, for the horse has entwined himself around the heartstrings of humanity in general. Then, too, there are certain classes of farm work that never can be done so efficiently and economically by any form of mechanical power as by the horse.

That same College of Agriculture to which reference has been made, is planning to do a large part of its field work by traction power of some kind and much of the work around the buildings, too, but, at the same time, provision is being made for keeping a fair number of excellent farm horses of various types. That humanity loves the horse, though, and the farm work demands his presence, are no reasons why he should be made a drudge of or be set to do work that can better be done by mechanical power. As well destroy the binder because men are more companionable than it is and can do its work at a pinch!

This brings us to the threshold of 1910 then, with traction cultivation an established fact, an important factor in western development, and an addition to prevailing farm practice that is rapidly becoming en-

trenched in the popular regard. The first decade in the life of the industry, with all its faults and failures, its achievements, and its glorious successes, is gone. What of the second decade that will be opening up in a few weeks? Remarkable strides have been made in the past. Will as great advances be made in the coming years? Creditable and almost incredible history have been made. Will this be true of the year now opening and its successors? We believe the coming decade will witness as great developments and make as big a mark in history as did the first. The advance may not be so spectacular, but it will be as real and more mighty. The flames may not leap so high, but the deep glow and steady heat will be there. Nor may the advance be along the same lines as it has been.

"Efficiency and quantity" was the unspoken motto of the makers and operators of traction outfits during the period from 1900 to 1909. "Economy and quality" is to be the motto of the second decade of the industry, if the signs of the times are read aright and may be trusted.

This is evolution, and this order of progress is written over the face of our history. Glance for a moment at the development of such an organization as the Canadian Pacific Railway. In the early day the prime necessity was mileage, and the emphasis was placed upon the quantity of the work done—grading, tracklaying, etc.—and upon the efficiency—the capacity of getting things done—of the contractors. Later on, when mileage had been secured and competition was cropping up, economy of administration and quality of service, road-bed and equipment became the primary considerations. The building of the road in the early days was more spectacular than is its operation to-day, but the latter involves and represents much more skill, administrative ability, and complex organization. As a result, a higher, broader, and finer type of man is required for president of such a corporation to-day than was required in the early stages of its history.

Such will be the development of our industry of traction farming, and the alert, watchful men will recognize this tendency and be prepared for it. Traction cultivation must advance along the lines of economy in operation and quality of work.

"Money saved is money made," and to reduce operating expenses is much more sensible and popular than to increase prices. Never forget that mechanical power and animal power are competitors and it is up to the man who wants to sell machinery to the farmer and the man who owns an outfit and wants to sell its services to the farmer, to make as low a price as is consistent with profitable business.

What are the chief items of expense in the day's run of an outfit? Fuel is one. Be it coal or gasoline, both are expensive on the western prairies. Yet, right at hand are inexhaustible fuel supplies for both steam and internal combustion engines, which only need developing and harnessing. Enough wheat straw is burned each year in the West to fire all the outfits in the country the year round. The problem is to overcome the labor cost of firing with straw. There is indeed some way of compressing the straw so that it may be handled in smaller bulk and yet will burn freely. Measured beside the problems that have been solved in the past ten years, this one appears almost childishly simple. Surely it will not baffle inventors for another decade. If the early winter could be utilized in compressing the straw for next summer's fuel supply, so that it only had to be hauled like so much cordwood and piled upon the tender, what an economy in traction cultivation would have been effected!

The West is a great country in which to grow vegetables and field roots. And field roots—potatoes, turnips, mangels, etc., are splendid raw materials from which to make denatured alcohol. This, in turn, is a fuel superior to gasoline for internal combustion engines. All that is needed, then, is that some convenient and suitable form of still may be devised in order that each operator of a gas engine may *grow* his own fuel, just as the thresherman of to-day burns the straw he threshes.

Thus, the cheapening of the fuel supply of both classes of engines only waits upon the skill of the inventor. The changes are bound to come, and that soon. Will they come during 1910?

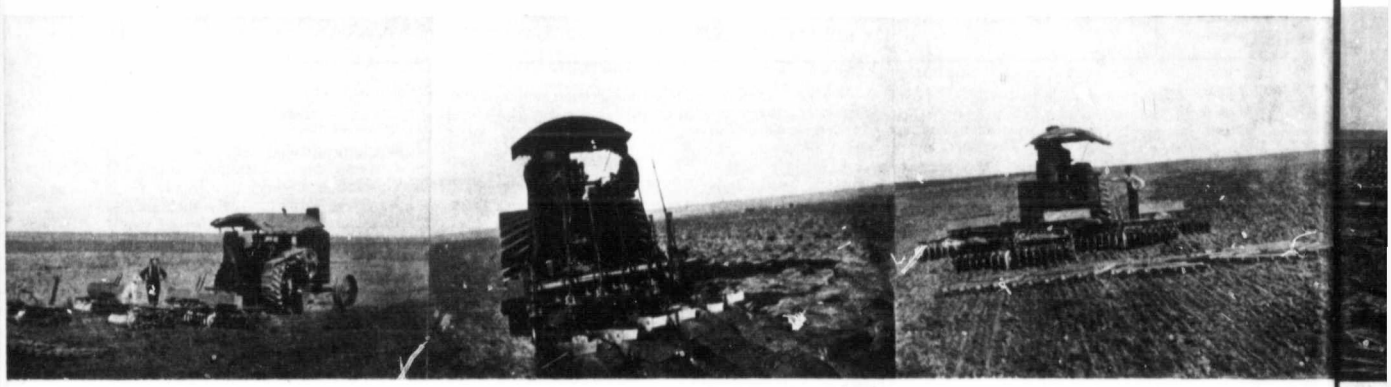
Next to the fuel item, wages bulk up large. Sometimes they overtop the cost of fuel though, if the cost of hauling is deducted from the wages and charged to the price of the fuel when delivered, as should be done, the fuel will usually be found to represent more money even than the wages. How may the wage item be reduced and further economy effected? The cash outlay may be greatly reduced by each owner learning to be his own engineer. This should not affect the price quoted for custom work, as the owner should count his own time as part of the cost when he runs the rig, but when the owner is working on his own place a good saving is effected.

By comparing the performance of different outfits and buying the style that requires the least number of men this item of expense may be regulated to some degree. By having plenty of fuel hauled from the railway during the winter and placed in cheap bins where it will be protected from the weather, labor cost may be reduced. The outfit, too, should be placed in first class repair before work starts, so that delays may be avoided. When the acreage plowed or cultivated per day is increased by steady running, the labor cost per acre is reduced. The land to be worked should be cleared of all possible obstructions that the outfit is not calculated to overcome, such as stones, roots, and straw piles.

A complete repair outfit and blacksmith shop should be maintained, that the inevitable breakdowns may be as short as possible and that the plow shares may be kept in proper condition. Another direction in which there is room for economy is in the purchase of oils and grease. A number of different kinds are required for the modern outfit. There is hard oil for the cups, black oil for the gears, special oil for the cylinders, be they steam or gas driven, axle grease for tenders, wagons, etc., lubricatcating oil for 191 bearings, and coal oil for lanterns and headlights. Of each of these there are a variety of grades put up by different firms and the keenest competition will be found to exist in the trade. Every plowman and thresherman who can possibly afford to do so, should prepare a statement of his probable requirements in this matter of oils, greases, etc., for the entire season and submit it for quotations to two or three of the oil companies. If in addition to these he is using gasoline for fuel purposes, this step is fourfold more necessary. All the machine oil and coal oil need not be delivered at the beginning of the season. It may be held for instructions and ordered in 5 or 10 gallon lots as required. A standing order for so many barrels per week may be placed for the gasoline. Any oil company would be pleased to make such an arrangement and much better prices would be secured thereby.

It is by watching these smaller opportunities for economy that the great corportations of to-day make their huge profits fully as much as by securing special privileges and control of prices. Do not let economy run to seed, however, and become short-sighted meanness, and petty niggardliness. At one time some railroads thought to further economize in the use of oil by placing their engineers upon an allowance of so many pints per 100 miles. All oil over this allowance used on a trip was charged to the engineer. The result of such a policy naturally was great damage to the locomotives through excessive friction and wear due to insufficient lubrication. The engineers took no chances in exceeding their allowance and oil was about as valuable as water in Tophet. A fireman on one of these roads was undergoing examination for an engineer's license. "If you were travelling at a fast clip and suddenly saw that a head-on collision was inevitable, what woud you do?" was one of the questions asked. Quick as thought came the reply, "Apply the air, *grab the oil-can*, and jump!"

Such, then, are some of the directions in which we expect to see considerable economies effected in the practice of traction cultivation during 1910 and the succeeding



Discing and Harrowing Sod

Breaking
The Hart-Parr Outfit of Dr. M. Beck, Hanley Sask.

Seeding, Discing and Harrowing

years of the second decade of the history of this young industry.

"Quality," is the other important word in this motto for 1910. Econ- only affects a man in his relation to his business. Quality in the work affects him in relation to those he is dealing with or working for. The biggest handicap the industry has been up against in the past was the slovenly character of much of the early work done by the big outfits. Steam plowing came to be synonymous with poor plowing and weed infested farms. This, of course, was due in part to the clumsy equipment with which the pioneers in the industry had to work. It was also due, though, to a "more haste, less speed," slapdash-go-as-you-please policy and attitude upon the part of the early operators. They were concerned about quantity but untroubled about quality.

There has been a gradual change in this attitude of the operators of outfits and, while quantity is not lost sight of or neglected, a much greater measure of quality is looked for, striven after, and achieved. There will be still greater advances towards a high quality of work in the coming decade and it is necessary and right that there should be.

The hold of traction cultivation upon the public favor and its growth therein will depend quite as much in the future upon the quality of the work done by mechanical power as upon its quality or cheapness. More and more men are asking for good work rather than cheap work. The bane of Western Agriculture to-day is the craze for area of land and acreage under crop, rather than yield of grain and quality of product.

Traction cultivation has several advantages over team work that the adherents of the former should not be slow to urge upon the attention of the prospective customer. Plowing can be done by an engine to any depth required instead of at the depth the horses can draw the plows at when working day in and day out. This is very important. Not enough deep plowing is done in the West. The depth of the original breaking is too often never exceeded and the same old land is flopped back and forth from year to year. As a result the sole of the furrow, or top of the sub-soil becomes tramped and packed harder and harder. Moisture cannot percolate from the surface into the sub-soil during wet weather or rise from the sub-soil to the surface soil during dry weather. A great gulf is unwittingly fixed where none should exist. The plowed-in stubble lies on this hard, smooth surface unrotted, and adds to the width of the gulf. Many men realize all this but are powerless to plow any deeper than they have been doing. They have not sufficient power on the farm. An extra inch of soil brought from below the depth the plow is usually run at means a great addition to the draft of the plow, and they fear to tax their horses to that extent. Traction cultivation will change all this and it will be possible for a man to plow 6 inches deep and the sub-soil six inches below that at one operation—a very much to be desired method on many farms that have been under cultivation for a number of years.

Another advantage of traction over horse cultivation lies in the oportunity it affords of plowing and cultivating rapidly. There very often is a proper and improper time at which to plow. Land should not be plowed when too wet nor, if avoidable, when very dry. When reasonably moist is the proper time at which to plow. Very often the pressure of work and the tedious character of horse plowing force a man to plow when his land is not really in proper condition. With a traction outfit that could be secured upon occasion, if one did not form part of the farm equipment, this plowing could often be done at the proper time, to better advantage, and more cheaply.

Traction cultivation affords little or no opportunity for the spreading of weed seeds on clean new land. This risk is always present with horses, especially if the oats being fed to them were not grown at home. In 1910 this aspect of the question will weigh more with many farmers than it did before. Strenuous efforts are being put forth by many men all over the country to beat out the wild oat and other noxious weeds. More men than ever before are trying to grow clean and pure seed grain. Any method, plan, or scheme that will assist them in keeping their farms clean will receive their earnest consideration. The tractioner of 1910 who purposes doing custom work, should not be slow in urging this advantage of traction over horse cultivation upon his patrons.

The question of soil packing and its value in the conservation of moisture is attracting wide notice. There is a tremendous demand for all kinds of packers. Yet what packer exceeds the broad wheels of a traction engine? How much packing does stubble land need that has been disced, harrowed and drilled with an engine? This constitutes another alvantage in favor of traction cultivation which should not be lost sight of.

In many of the minor details of his work, too, it is possible for the operator of a traction outfit to put more emphasis upon quality in his work than has been placed in the past. The industry is past the experimental stage and is bound to forge ahead. To be permanently and increasingly popular, quality first must be the keynote of the work. Plowing must be done straighter, for, if it is hard to do good work with a horse plow when the furrow is not straight, it is quite impossible with a traction outfit. The adjustment and alignment of the plows should be as perfect as possible. Much of the evenness of the work depends upon this. The manufacturers have done their part and have provided magnificent implements. It is up to the plowmen to do increasingly good work with them.

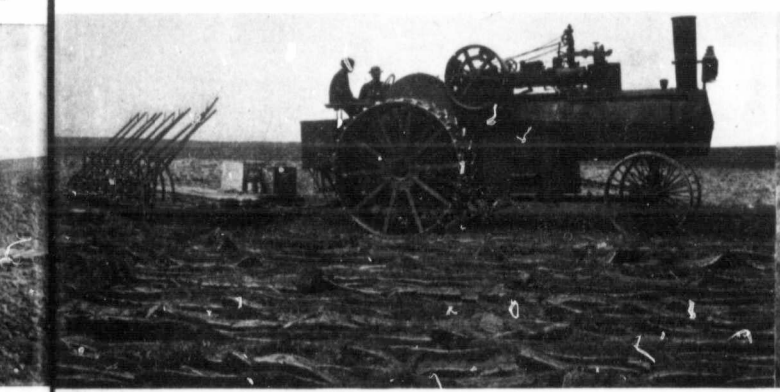
There is also room for improvement in the character of many finishes and in the work done at the ends. These latter should not be left to the last. A headland should be plowed at either end of the field before a start is made and then a tidy appearance will be given to the field.

Attention to these details of workmanship will do much to make friends for traction cultivation, while their neglect tends to throw the industry into bad repute.

It is said by Sir Wilfrid Laurier that the nineteenth century was the United States' but that the twentieth will be Canada's. This remark has been hailed as a true and pithy saying from one end of the country to the other. May it not with equal truth be said that, whereas the nineteenth century was Industry's and immense strides were made in mercantile, commercial, and industrial pursuits, the twentieth century will be Agriculture's and in this field of human endeavor there will be the general activity and achievement? Mechanical power is bound to play an increasingly important part in this development. Traction cultivation, as a method of increasing production per acre, and per capita of those engaged in agriculture, must continue to grow in favor. The dawn of the second decade of the history of this industry is rosy with promise. With "Economy in operation and Quality in work," as their motto for 1910, those having in their keeping the future of this industry will be in a fair way to turning that promise into fulfilment.

The above article by Mr. Mantle is worthy of careful reading by every farmer in Western Canada. Mr. Mantle, who is now connected with the Agricultural Department of the Government of Saskatchewan, is a man who has had a large amount of experience in the cultivation of the soil. He is, moreover, a man who has looked at soil cultivation in its broadest sense, watching carefully and with the eye of the trained agriculturist, every development that would tend toward better farming.

The man who has been following the traction plowing letters in The Canadian Thresherman and Farmer for the last four years cannot help but be convinced of one thing and that is that traction cultivation is getting down to a real practical basis. Our letters in 1905, and even in 1906, were full of such expressions as, "I think I use so much coal," or, "I believe it costs me so much per acre," but in 1909 and 1910 there are many men who say "I know that I use so much coal" and, "I know that I can plow for so much per acre" and "I know that I have made a profit or a loss."—Ed.



A Rumely 30 h.p. Steam Tractor Pulling a 10 Bottom 14 in. Cockshutt Engine Gang in Saskatchewan.

A Universal (English) Gas Tractor Plowing at a Depth of 12 inches in England.

The Importance of the Farm Tractor on the Farm

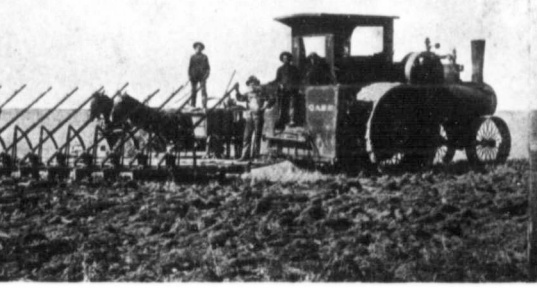
By E. WARD JONES

Second Prize Essay in "Canadian Thresherman and Farmer" Prize Essay Contest at the Manitoba Agricultural College.

THOSE having the good fortune to be still in the springtime of life in this, the beginning of which will surely be the most progressive century in the history of the earth, may rest assured that, if Providence is kind and we attain our four-score years, we will behold the advantages of the coming great and distinct era of mechanical power, which era, in relation to agriculture, is just commencing to emerge from its state of repose to bloom in brilliant splendor, and in due time be crowned king of farm power.

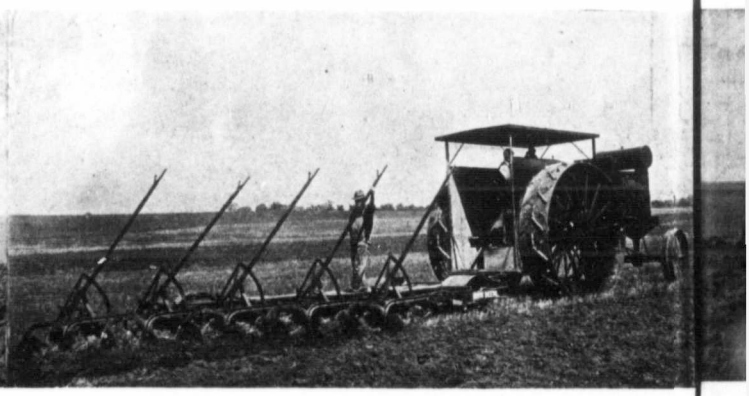
The past decade has certainly seen more real progress and improvement in agricultural pursuits than any period of twice the duration preceding the dawn of the twentieth century and, in consequence of this change, the farmer wins the necessary bread for humanity more through the cultivation and application of mental abilities than, as was formerly, by almost total physical exertion. However, inasmuch as the former is true, we now find that the perfection of labor-saving devices, applicable to either grain-growing or mixed farming, which tends towards the production and improvement of either commodity, are demanding increasing, careful, and intelligent study.

Not a great amount of education was necessary, or mental ability required, to operate in order to fulfil the complete function of the primitive hoes, rakes, and spades used as agricultural implements by Lord Selkirk's first settlers, who colonized at Point Douglas in 1812. Nor yet was deep brain work required to manipulate the crude plows which displaced the former tools in 1819. These plows were considered by all at that time to be wonderful machines and most important for the welfare and advancement of agriculture in Western Canada. As the coming and going of a breeze, they have passed into oblivion, not answering at all for the ever-advancing methods of tillage, being supplanted by a larger, more complicated machine, clearly illustrating the fact that to the same extent as the change of cultivation, our soil is demanding the improvement of farm machinery has kept pace, the present day finding the importance of farm machinery greater than it has ever been in previous history.



Even twenty years ago internal combustion tractors or steam engines were not used in Western Canada for field work, as plowing, etc., yet the present day finds them quite common upon both the old and new fields of Manitoba and Saskatchewan. With such progress to look back upon, it would not be safe to predict that, in twenty years hence, even a machine that would cut, thresh, plow and harrow all at one time would still be in a state of infancy.

To say that such a machine would either be practical for Western Canada or efficient from an economic standpoint would be speculation, yet, as the present-day farm motor which tends in the direction of amalgamating the smaller operations into larger ones, has had a fair trial, I shall in this article endeavor to render my conclusions as nearly as possible gained from a slight experience with different outfits in actual field work. These outfits collectively represent four powers and three manufacturing houses. My conclusions are that, although internal combustion tractors are not out of the experimental stage, they have clearly demonstrated that they are not only going to hold their recently-obtained grip upon farm work, but increase it many fold during the decade. In another ten years I am satisfied that there will be fifty used for every one in use to-day.



A Case 32 h.p. Steam Tractor Pulling a 10 Bottom 14 in. Cockshutt Engine Gang.

A Flour City Gas Tractor Doing a Nice Piece of Plowing with a 10 Bottom 14 in. John Deere Engine Gang

At present, for certain work, steam has, and always will have, advantages over internal combustion engines, but for farm traction work, which this article is purposed to deal upon, the latter appears to be answering the call of the West and is pushing its way towards the goal of dominating power. They have great and ever-increasing advantages over steam, of which the principal are:—Their readiness for work; a couple of hours are not required every morning steaming up, which certainly is a great factor on the farm. The time is not only wasted, but the fuel taken to get steam to the working point is a dead loss. The internal combustion motor would be merrily going up and down the field turning every molecule of fuel into motive energy, and immediately the work is done the expense stops, having no large fire to burn out. They have no ponderous boiler to make a load within itself, so are much lighter to propel and also they are much safer as there is no danger of disastrous explosions. A boiler explosion, if by mere chance does not cause death, at least shatters the owner's bank account so badly that for a few years he is reluctant to purchase another.

The water problem also confronts the operator of a steam outfit and while we find a large number of localities in which there is practically no water obtainable, we find equally as many in which the water is unfit for boiler use. In such districts it is either totally impossible or in the least very expensive, for steam motive power to be practical.

Not only does the operator of the internal combustion engine dispense with the services of a man and team or, as occasion requires sometimes, two tanking outfits, but requires only one man in operation. The tractor does not require a skilled engineer, but the operator should have a good general understanding of both the theoretical and practical problems of the running of his engine and as well, should be a naturally handy man.

As to practicability in actual work, where every necessity is furnished, results show that at the Winnipeg Exhibition in 1908 a fifteen horse power tractor won the sweepstakes prize in the plowing test, fuel and expenses considered, in open competition, steam included, and from experiments conducted by Prof. C. A. Ocock, of Wisconsin University, he determined a day ratio of expenses of twenty dollars for steam, as against twelve seventy for gasoline, while the steam outfit lost twenty-four per cent. of the working time in the replenishment of fuel and water.

The steam engine is more perfect in construction, being much older, thus having had more research work done upon its improvement and it certainly has almost been phenomenal in the development and improvement of humanity, by bringing countries together, opening up new territories that would have remained unexplored for a considerable time; has reduced the cost of transportation greatly, and for all these we pay our honor to it. I cannot and do not predict that the internal combustion engine is going to completely supersede steam for large work, but the former, especially from the fact that it is more practical and economical, is going to be within a short time king of power on the farm at least.

The tractor is also more economical than horses at the present time for a part of the farm work. I do not mean to infer that our friend the horse is to lose in popularity or that the intrusion of mechanical power is going to retard the horse breeding industry of Western Canada, but I do mean that there are certain parts of farm work which are better handled by engine power.

Does it not appear logical that engine power should be practical on farms from even the one fact that it is altogether superior to horses in factories? Fifteen years

ago the old horse power was used in elevators for handling grain, but to-day the gasoline engine has completely outclassed it. From the progress the tractor is making it would appear that when ten years more have elapsed it will not be a stranger in any good district in Manitoba or Saskatchewan.

All accurate experiments and continued operation show that land can be broken much cheaper with internal combustion engines than with horses. The average of over twenty results produces the fact that it requires nearly two horses to break one acre or, as the figures indicate, fifty-two to average twenty-seven acres; while as many experiments with gasoline engines proves that an average of one acre per horse power is not uncommon.

The man with a tractor can go out into a new district and the next day should be ready to commence work while the one with a large outfit of horses must provide shelter and feed, both of which are often expensive and not convenient to obtain.

The advantages of engines upon improved farms are increasing each year as more "getting down" and more thorough cultivation are required, thus necessitating a greater amount of power. If this additional power, which our older farms are now demanding, is to be supplied by horses, an enormous amount of feed will be required which in turn will necessitate a large acreage for the growing of cereals and grasses for that purpose. Our land is becoming too valuable to have a large percentage set aside every year for the growing of fodder, and horses are so high in price that if one or two die the whole profit derived from the crop or the work of the others is lost.

A farm tractor costs less than the number of horses required to perform the same amount of work in the same time. The cost per unit of labor, too, is less as the following accurate example will show:

Internal combustion engine costs in operation, per day—

42 gals. kerosene at 26c.	$11.00
Lubricating oil and gasoline for starting	1.00
Labor—engineer and steersman	6.00
Board for above	1.00
Repairs (average)	2.00
Depreciation (life estimate at eight 60-day years)	6.50
Interest on cost ($3400 at 7 per cent), divided into 60 working days	4.00
	$31.50

This outfit averaged 22½ acres per day at an average cost of $1.40 per acre.

The horses used as power cost—

52 horses, eating 5 gals. each per day=32½ bus. at 30c.	$ 9.75
Hay, 728 lbs. at $12 per ton.	4.36
Each man drives 5 horses, 10 men at $1.50	15.00
Board for above	5.00
Depreciation in harness	2.00
Depreciation in horses, taking 9 years' work as an average, 200 days per year, and $180 value per horse.	5.00
Int. at 7 per cent. on capital, considering 200 workings days per horse.	3.25
	$44.36

This outfit averages 27 acres per day, or $1.64 per acre and, considering the life as stated before of the engine as 480 days, plowing 22½ acres, saving the difference between $1.64 and $1.40=24c. on every acre, amounts to $2563.20 which is saved over horse power while it is completeing its life history of actual work.

The foregoing table provides only for the food and care during the two hundred working days and from the cost of Sunday and winter feeding another large feature in favor of the iron horse must be credited.

We who have used horses for power know the time, expense and trouble required fitting them for spring work and the slowness with which they should be driven when the seeding should be rushed. Generally speaking, an engine can be operated upon a field as soon as it is in proper condition to receive seed. Nearly all operations are successfully done by engine power but the principal are plowing, packing, discing, seeding, harrowing and threshing.

The engine performing the foregoing operations is a practical machine, during the entire summer and in the late fall may be used to crush grain, saw wood, cut feed, etc., while the horses would be standing in the stable commencing their period of total expense to the owner.

Up here at the Agricultural College where young men from almost every good district of Manitoba, and several from Sasatchewan, are thrown together so much, such questions as the practicability of tractors are certainly thoroughly discussed, yet, presumably from the fact mentioned before, that the tractor can yet, and soon will be, improved upon we hear a great variation of opinion.

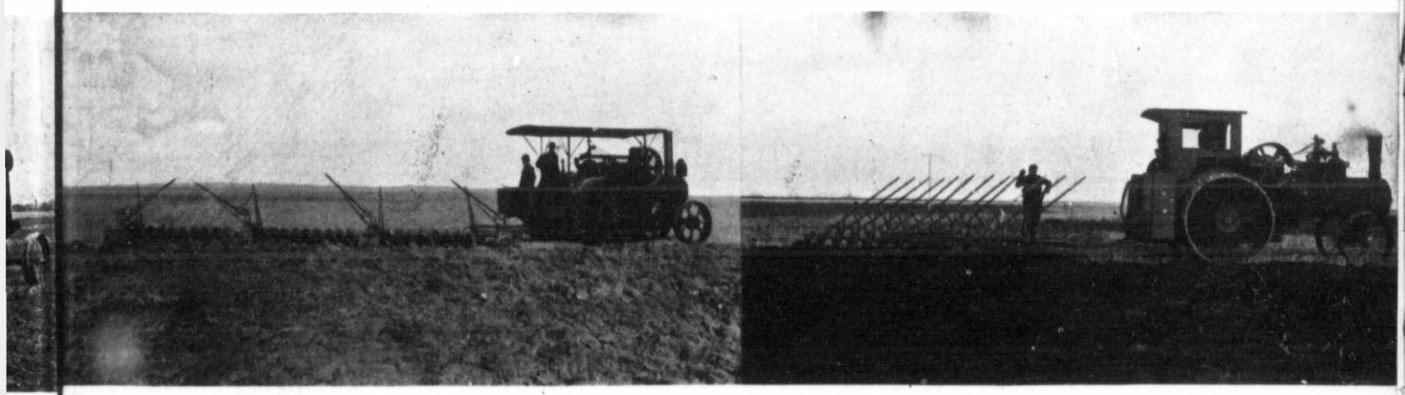
Not many days since I heard one practical, ingenious man say: "Well, boys, I am never going to depend on horses for sole power to draw my binders any more. Last year we cut with a gasoline engine and it didn't sweat or have to stop at short days. Horses may be able to work when they are cool but there is a little fortune in it for the man who can get his crop harvested as soon after it is ripe as possible, and the weather is, generally too hot to push horses."

Another will say: "Gasoline engines are no good. Just when their services are most required they wouldn't move for a farm. They are just a bill of expense. The first cost is only a small consideration." Yet his neighbor across the road plowed three hundred acres of stubble land with his engine without the least break, and all after he had finished his threshing. However, the same rule applies where horses are used, for I am acquainted with men who have farmed for more than twenty years, keeping as many horses, yet have lost practically none, while other men lose on an average five or six each year. We will find when the engines in use become numerous, that generally speaking the man who is successful with horses will be successful with an engine.

A large majority of the failures with tractors are due to inexperienced or careless men doing the operating. No engine is so perfect that it will oil and care for itself, as one would almost imagine was expected of them, judging from the worn condition of some engines only having been used one year. Such incidents and conditions answer to a great extent for their divided popularity.

It is yet unproven which—gasoline or kerosene—will predominate as fuel, but at present prices kerosene is less expensive per horse power generated, works fully as well after the engine is warmed up, and shows less signs of the supply ever being diminished.

The importance or usefulness of the importance or usefulness of the individual tractor may be divided into the following heads: Price, power developed in the belt, hauling test, economical and practical for work required to be done, accessibility, speed, manipulation, design and construction. Each of the former points should be taken into deep consideration when purchasing and the engine complying closest in the aggregate should be the best engine for farm use.

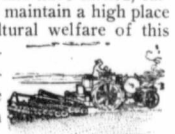


A Buffalo Pitts Steam Tractor Pulling a 27 Disc Emmerson Engine Gang in Saskathewan.

A Case 32 h.p. Steam Tractor Pulling a 12 Bottom 14 in. Cockshutt Engine Gang. Outfit of R. Pede, Dominion City, Man.

Most of the present-day farm motors, with reasonable care, will do favorable work. They have without a doubt been misrepresented, misused and abused the most of any farm machine. Cheap, yet expensive engines, were purchased and through rendering poor satisfaction put a damper for a while upon the general use of the better kind. However, the old maxim—"You can't keep a good man down," is true and, gasoline or kerosene tractors, whichever it may be, are going to greatly increase in numbers for general farm use within a very short time.

Wherever internal combustion engines are general they have shown that they are not only more practical than steam but also more practical than horses, especially for several of the heavy departments of crop growing and have earned, fulfilled, and will maintain a high place in the agricultural welfare of this our bounteous heritage, "The Canadian West."



TRACTION PLOWING
AS TOLD BY THE MEN WHO DO IT

Prefers Steam to Lump Coal.

In reply to your request for my experience concerning traction plowing, I can say that what I have done so far has been to my entire satisfaction.

I got my rig in time for the fall plowing, 1909. My engine is a 32 h.p. cross compound Reeves. My plow is a 12 bottom, 14 inch steam-lift Reeves.

I plowed 565 acres of stubble in 23 days and, considering the fact that I started up with a new rig, I am well satisfied with the amount of work done for short days.

I used five tanks of 13 barrels of water each day. When I drew water one mile, one tank rig did it, but for two and two and a half miles, it took two rigs. On the engine I had two men, engineer and steersman. The plow, being steam lift, is handled by the engineer.

The most satisfactory coal I used was the Hillcrest steam coal, of which I used on an average 2,500 pounds a day. When I could not procure this kind I used lump coal, which was much more expensive and required more than two tons a day. When using steam coal the engine could go continuously, but when using lump coal the grates had to be cleaned every two miles. When using steam coal we plowed from 30 to 35 acres a day.

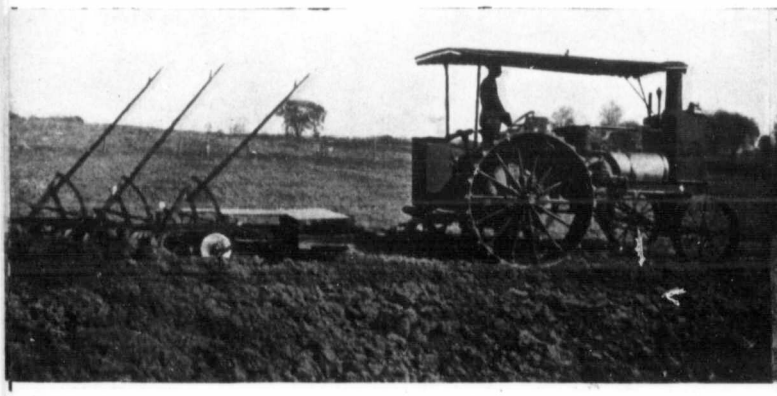
I also have breaker bottoms for the plow and expect to break better than a section next June. I expect to use the engine to help put in my crop of 1,700 acres of wheat besides 300 acres of oats, barley and speltz this year, and if I am successful in getting the engine hitch, which is manufactured by the Gas Traction Co., Winnipeg, I will pull five binders. Besides the binders I will operate with horse power. I will also use twenty head of work horses.

The work I have given the engine so far has not taxed it in the least.

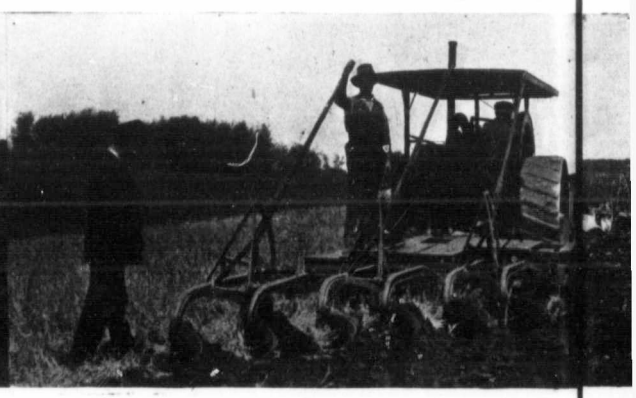
Of what I have seen of steam plowing and threshing, I consider plowing the harder on the engine, as every part is in use and exposed to more dust and grit, to say nothing of using about two tanks of water and from 1,299 to 1,500 pounds of coal a day more than for threshing, which is certainly harder on the engine.

My advice to any wishing power on a large farm is to invest in a steam outfit, and don't be tight when you hire your engineer if he does come high. Yours respectfully,

E. G. Hoppes,
Dundurn, Sask.



A Geiser Gas Tractor Pulling a 6 Bottom 14 in. John Deere Engine Gang.



An International 15 h.p. Gas Tractor Introducing Traction Cultivation into the Shoal Lake, Man., District, John Deere Plows Doing the Work.

A Speed for Plowing.

In regard to steam plowing, while I have run steam plows for three seasons, I don't claim to know very much about the business. Steam plowing is a business that few understand and can make a paying proposition of. I have heard men say things in regard to handling an outfit, and who claimed to be engineers and plowmen, that the average school boy would laugh at. We hear of them taking off the governor belt and travelling them a mile in fifteen to eighteen minutes with a big load of water and coal, and the plows behind all this.

There is but one speed for plowing that your engine will give good satisfaction at without cutting, heating and pounding, and the possible danger of your boiler's priming and doing damage to your cylinders, and that speed has to be found out in running the engine or by the engineer. A good engineer can prolong the life of an engine several years by finding that speed.

The quantity of coal used per day is determined by the quality and the fireman. Last year we averaged about 200 pounds per acre including moving and what was used in the cook car. We have a new 40 h.p. Avery under-mounted engine and new John Deere 12 bottom plows and they make a fine outfit together. We employed five men and four horses, and used from 60 to 100 barrels of water per day of 12 hours, and we plowed as high as 40 acres per day, but not on an average, for we had pretty wet plowing in the early part of the season.

Speaking of which is the harder on the engine, I believe, of course, that plowing is, but there are days when you are plowing that you think threshing is the hardest, but then you find days and the condition of the soil such that one day's plowing is harder than a month of threshing, but the average man will tell you that steam plowing is no snap for the engineer or engine.

We plowed about 1300 acres from June to August and were laid up several days for wet ground and water holes, but we had no loss from breakdowns.

Yours truly,
Walter Phillips,
Magrath, Alta.

Must Understand Engine Thoroughly.

In May, 1909, I purchased an International 20 h.p. gasoline traction engine with which I had very good success, although the season was pretty wet.

I plowed 110 acres of summer fallow, broke up 275 acres and plowed 70 acres of hay land that had been in hay for two years with very little trouble, taking about 3 gallons of gasoline per acre. I might say that it was naphtha which I used, and I think it took more than it would gasoline.

It is necessary for a man to understand his engine thoroughly if he wants to save gasoline. The valves all need to be working. One wants to learn by the sound of the engine just how it is working. I believe the ear is of more importance than the eye, but one wants to keep them both very much on the alert. Regarding the amount of gasoline used per acre, I might say, although three gallons per acre was what I paid for, this amount was not actually used. When opened, some of the barrels were almost half empty and there was some gasoline taken out of every one. I did not keep track of the gasoline any other way excepting by the barrel, so that three gallons per acre is not really accurate as I did not use nearly that much.

I operated with my engine a 5 furrow Cockshutt engine gang which gave very good satisfaction both in breaking and stubble, using rolling coulters for both purposes.

After harvest I went threshing with my 30 x 54 Buffalo Pitts separator, feeder and blower, threshing in 2934 bushels per day in 22 days with about 25 gallons of gasoline per day.

My separator worked very well, giving no trouble at all and when we got it loosened up, the engine could handle it fine.

I think gasoline engines are just all right and have done all I expected they would do and more.

Yours truly,
Alex. Ferguson,
Dominion City, Man.

Plowing No Harder than Threshing.

We have not as yet had much experience in traction cultivation. In 1909 we bought a 400 acre farm of which only 120 acres was broken. As we had so many more acres to break, and not having enough horses, we decided to purchase an engine gang plow for our 20 h.p.

J. I. Case traction engine. We therefore purchased a Cockshutt six bottom plow.

I was a little skittish at opening the throttle as a number of our wise neighbors had been telling us that we would soon have no engine left. However, I picked up courage and cut her loose, and away we went, I was watching my engine pretty closely and never thought of looking around to see what the plows were doing,, but we didn't go far when I heard the plowman calling, and on looking around, I saw the plows raised out of the ground and clogged so full of peavine that it took us about half an hour to clean them out .

We made another attempt, the plowman trying to keep the plows clean with the poker of the engine. But try as we might, it was no use.

We saw we could do nothing with the pea vine in our way, so made up our minds to mow the prairie and burn it, which we did, and after that we had no more trouble. However, if I had it to do over again, I think I would try rolling coulters to cut the vine.

As to the number of men employed. We had three, engineer, plowman, and tankman. The tankman also drew the wood, it being already cut. We used four tanks of seven barrel capacity per day, and as to the wood, I could hardly say how much we used, as it was just old stuff that was picked up around the farm.

We broke about 100 acres in about 12 days, and then stopped for harvest, and after harvest we went at the fall plowing with the steam outfit. We plowed 75 acres in six and a half days. We fired with straw and my opinion is that straw is away ahead of wood as far as steam plowing is ahead of horses. I made a rack and fastened it on the engine in such a way that it would swing clear of the plow levers turning at the ends. This I used for carrying my straw. I could put enough straw on it to carry me a mile.

Some seem to think that plowing is harder on their engines than threshing, but I might say that I haven't hurt my engine plowing yet. I watch it closely, and don't spare the grease. I used about 60 pounds of gear grease while plowing the 175 acres and needed it all, I can assure you. I could not give an exact amount of the cylinder oil used as we got it by the barrel and never kept count of what we took out. The only help we hired was the tankman who was paid $30.00 a month.

My opinion is that if a man has a half section or more he can make a steam rig pay for itself, in that he can get his work done much better and quicker than with horses.

Yours truly,
Alex. and Dave Bird,
Treherne, Man.

Dont Work too Long a Shift.

I have had three years' experience with steam breaking. The first year we started out with a triple made-over horse plow. We tied this behind a 25 h.p. Case engine with a lot of chains and drawbars. Sometimes we would run up against a rock and then there would be something doing, leaving a pile of scrap iron, broken chains, draw bars and a general mix up which would take half a day to straighten out. The first year nearly finished the plows and nearly finished the owners financially.

We then purchased a four bottom plow. Sometimes they were in the ground and sometimes they were out. They generally went in good and deep though, especially when we were near a soft place and then they would go down just leaving the levers out of the ground The engine would slip the drivers and having the plows fastened to it, we would have a time getting out. We would chain a tie to the drivers, and sometimes we would stay moving a lot of earth by pulling the ties under the engine.

This, I will say, is hard on the engine. If we had not had a good engine, I would be out of the breaking business. But it was always ready when we were, and never balky and is as good as ever, with the exception that the gear is worn. In February, 1909, I bought a Cockshutt engine plow which did not arrive until June first. I pulled the seven plows with ease, and figured on working ten hours per day. I had two men besides myself, a fireman and a tankman. The fireman attended to the plows at the end.

I could break 15 acres a day, using one and a half tons of coal which cost me, laid down here, $2.60 per ton. I paid my men $1.50 per day, and I ran the engine myself and had my own team. I figure my own wages $3.00 per day.

I figure my expenses ran about as follows:

2 men @ $1.50 per day ..	$ 3.00
Engineer @ $3.00 per day .	3.00
Team @ $1.50 per day ...	1.50
1½ tons coal @ $2.60 per ton	4.00
Oil @ $1.50 per day	1.50
Board for men @ $1.50 per day	1.50
Interest, $1.50 per day ..	1.50
Repairs $1.00 per day	1.00
Total.....	$17.00

15 acres @ $3.50 per acre—$55.00, minus $17.00—$38.50.

I used five tanks of water per day. I do not try to go fast; have got over that. Go steady and keep going is what counts. I tried going fast and putting in eighteen or twenty hours per day. Some will say you have to do this to make it pay. Twenty hours per day is all right if one is not going to work the next day, but I don't think there are very many men that can stand that and look after his engine as he should. The next day he will fall asleep in the afternoon, and if it is a hot day he is all in.

I always do my own steering and nearly always have a hand on the throttle, and be on the lookout at all times. If an engineer is a good man he will not wear his engine plowing any more than threshing with the exception that the gear will be worn more.

Yours truly,
Eugene Waite,
Midale, Sask.

Uses More Fuel When Plowing.

We have not had much experience in traction plowing, having only plowed and threshed one season, but think it a decided advantage over horses if a man has a lot of land to work.

We have a 22 h.p. Hart-Parr gasoline engine, which pulls six bottoms, John Deere engine gang.

Our first piece of work was breaking raw prairie, a piece of gumbo, which was very hard on the engine. We broke 12 acres of this land per day.

After that we had better plowing in clay loam soil with quite a few stones, which would often turn the plow points up, making it necessary for us to change shares frequently. In this soil we averaged 17 acres per day.

As we are thirty miles from the railway, I think that gasoline is ahead of steam for fuel, as steam engines using straw fuel are liable to scatter foul seeds over the land. Our season's work was 500 acres of raw prairie.

We operated the rig ourselves, doing our own blacksmithing, as we take our own blacksmith shop along with us.

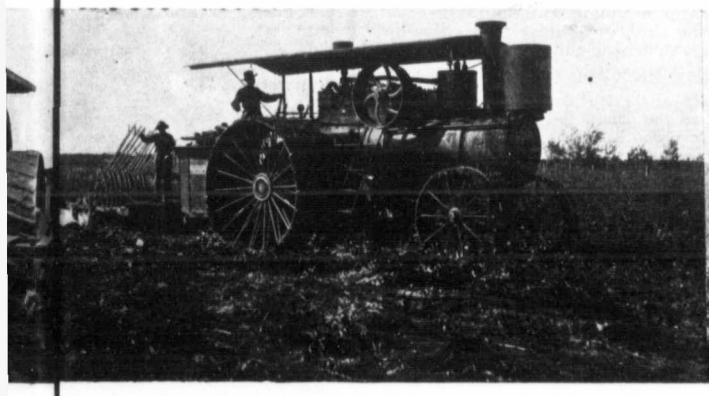
We broke for $3.50 per acre and board with the farmer, but intend taking a cook car along with us next season as so much time is lost is going to and from the house. Our expenses per day were as follows:

Kerosene, 45 gal. @ 18c..	$ 8.10
Gasoline for starting, 2 gal. @ 20c. per gal.	.40
Sundries	1.00
Gas engine oil 1¼ gal. at 70c.	.85
Machine oil, 1 gallon @ 25c.	.25
Our own time	6.00
Total—$16.62	

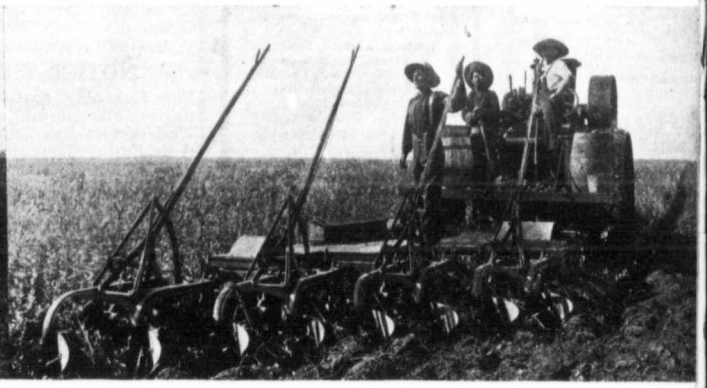
We commenced threshing September 1st, 1909. We found it easier on the engine than plowing. We have a 32-54 Advance separator, fully equipped. Our best day's run was 1500 bushels of wheat.

The quantity of kerosene consumed for plowing is far beyond that needed for threshing. What is needed in this part of the country is a separator that will handle flax successfully, as there are large quantities grown here and it is very tough grain to thresh. Our thresher did very clean work and we had a good run with only one breakdown. We pulled home on October 20th.

Yours truly,
Joyes & Martin,
Ratcliffe, Sask.



A Nichols and Shepard Plowing Engine pulling a 10 bottom 14 inch Cockshutt Engine Gang near Stonewall, Man.



A Sawyer and Massey Combination Plowing Engine pulling the 8 bottom 14 inch John Deere Engine gang Outfit of Jones Bros., Whitewater, Man.

Let These Farmers Tell You The Reasons Why They Bought A

BEST FOR STUBBLE — COCKSHUTT ENGINE GANG — IDEAL FOR BREAKING

Read These Names And Addresses

John E. Howey, Unity, Sask.
G. W. J. Barker, Russell, Man.
Henderson Bros., Scott, Sask.
C. F. Tollestrup, Raymond, Alta.
W. E. Newton, Lethbridge, Alta.
Green & Peterson, Craik, Sask.
M. Pickering, Wessington, Alta.
W. G. Groves, Brandon, Man.
Chas. H. Thode, Dundurn, Sask.
James Askin, Macdonald, Man.
Frank Francis, Delisle, Sask.
Fred. Salzer, Crossfield, Alta.
Adolph Roth, Roth, Alta.
S. Swanson, Lorngill, Sask.
H. W. Reinke, Warner, Alta.
W. R. Dobbie, Pincher Ck., Alta.
James Little, Lorghill, Sask.
Geo. Simpson & Wilson, Elm Creek, Man.
Hugo E. Ullerich, Hanley, Sask.
L. F. Rathburn, High River, Alta.
E. S. Bonter, Lanigan, Sask.
Paling Bros., Lashburn, Sask.
F. E. Robertson, Gleichen, Alta.
Conboy Bros., Asquith, Sask.
Paul E. Doege, Southcote, Sask.
C. H. Stratton, Red Willow, Alta.
Wm. Smith, Lumsden, Sask.
Jas. Russell, Craven, Sask.
G. L. & C. L. Miller, Starbuck, Man.
Orchard Bros., Borden, Sask.
Foss & Thiel, Rosthern, Sask.
Wm. Innes, Headingly, Man.
H. C. Bosh, High River, Alta.
E. L. Nelson, Dundurn, Sask.
C. B. Fast, Rosenort, Man.
Walter Irvine, Rouleau, Sask.
Henry Butters, Rocky View, Alta.
G. M. Annable, Moose Jaw, Sask.
Hy. Bohemier, La Salle, Man.
Nels. T. Cleven, Killam, Alta.
R. O. Ross, Lethbridge, Alta.
W. & J. O'Hara, Frobisher, Sask.
J. A. Vanmeer, Carman, Man.
J. G. Welsh, New Dayton, Alta.
Fred. G. Taylor, Oak Lake, Man.
G. W. Babcock, Bienfait, Sask.
A. W. Sunderman, Warner, Alta.
Isaac Thompson, Saltcoats, Sask
E. Graham, Foxwarren, Man.
Peter H. Wiebe, Aberdeen, Sask.
R. P. Atkins, New Dayton, Alta.

HUNDREDS MORE IF YOU WANT THEM

A PROVEN SUCCESS

If you intend buying the Engine Gang Plow that has proved itself the only positive success in Western Canada, this advertisement should settle the question for you for all time.

We are going to talk straight from the shoulder here, because there are some manufacturers claiming that their Engine Gang plows are equal to the "Cockshutt."

FACTS—NOT CLAIMS

We are not going to waste your time answering these claims here, because we have independent proof—evidence—facts which you must accept if you are determined not to be bothered with costly experiments.

It's an easy matter for any manufacturer to claim this, that and the other—but when it comes to **proving** these claims to YOU (the buyer), then it's a horse of quite a different color.

NOTICE THE UPRIGHT COLUMNS

Now look very carefully at the four columns in this advertisement and you will find the names and addresses of a **few** Western Canadian farmers who have bought and used Cockshutt Engine Gangs under all conditions.

We say only a **few** names, because if we had the space we could print hundreds upon hundreds of additional names and addresses of Cockshutt Engine Gang owners right here in Western Canada—over four times more than all the other Engine Gang firms put together could print. These few will do for the time being.

TAKE THE FARMER'S WORD FOR IT

A number of these farmers have tried other Engine Gang plows as well as ours, so if anyone is qualified to say which Engine Gang is the best, you will surely take their word before any manufacturer's.

Consult people who have tried them—demand names and addresses—see what other farmers have got to say, because an Engine Gang plow has to be tested in the **field**—not on paper.

INSIST ON WESTERN CANADIAN NAMES

And be careful to see that names and addresses are all in **Western Canada,** because there are some plows now being sold here, which are made to suit other countries **only,** but which are absolutely unfit to stand the test of our soils and conditions—as many Canadian farmers know to their regret and expense.

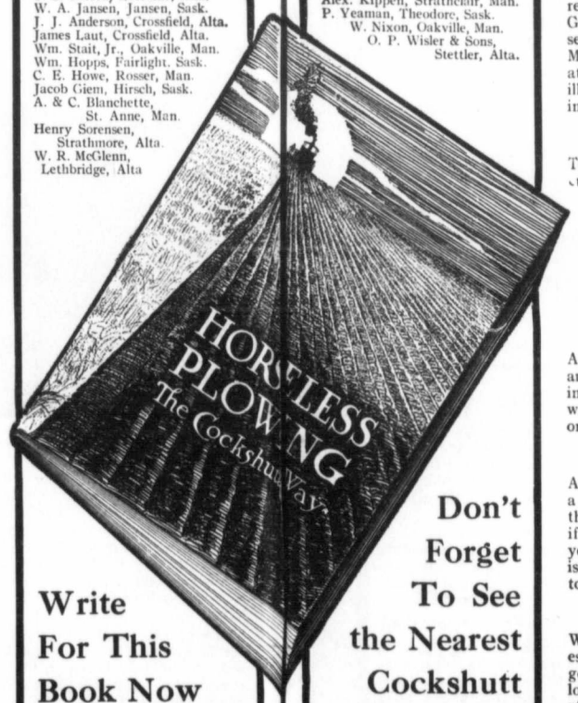
No doubt some of the men whose names we show here live right close to you—go and have a chat with them—ask them how the Cockshutt Engine Gang works. If you drop us a postcard we can probably refer you to one of our customers near your farm.

READ OUR CUSTOMERS' LETTERS

Many of the customers whose names we show in this advertisement have written us letters of their own accord, telling us what the Cockshutt Engine Gang has done for them and what they think about it. We would like you to see these letters very much.

Read These Names And Addresses

Frank Routhier, Altamont, Man.
A. F. McKeage, Loreburn, Sask.
A. B. Zimmerman, Oakville, Man.
Hauser Bros., Strome, Alta.
David Wiebe, Rosenfeld, Man.
T. C. Gorrell, Lorraine, Alta.
W. A. Jansen, Jansen, Sask.
J. J. Anderson, Crossfield, Alta.
James Laut, Crossfield, Alta.
Wm. Stait, Jr., Oakville, Man.
Wm. Hopps, Fairlight, Sask.
C. E. Howe, Rosser, Man.
Jacob Giem, Hirsch, Sask.
A. & C. Blanchette, St. Anne, Man.
Henry Sorensen, Strathmore, Alta.
W. R. McGlenn, Lethbridge, Alta



Write For This Book Now —To-day

Read These Names And Addresses

J. W. Givins, Arnaud, Man.
R. Pede, Dominion City, Man.
G. Yeaman, Theodore, Sask.
E. E. Bailey, Yorkton, Sask.
Frederic Marion, St. Jean, Man.
Geo. Frazer, Minnedosa, Man.
Alex. Kippen, Strathclair, Man.
P. Yeaman, Theodore, Sask.
W. Nixon, Oakville, Man.
O. P. Wisler & Sons, Stettler, Alta.

Don't Forget To See the Nearest Cockshutt Dealer.

SEND FOR THIS BOOK

They are all included in a handsome booklet, which is illustrated in the centre of this advertisement and which we will send free to any reader. In addition to the ordinary matter regarding our plows, the book contains the finest collection of plowing scenes (all our own plows) ever put together in booklet form.

CONTAINS SPLENDID PLOWING SCENES

In the book, you can see the only perfect plowing score at the recent Winnipeg Motor contest when the Cockshutt Engine Gang turned "half-a-mile furrow straight as an arrow." You can see the two Cockshutt Outfits that plowed over 4,000 acres for Mr. Robert Moir in one season, in addition to the Medal Winners at the Brandon and Winnipeg Motor Trials. There are two illustrations on the centre pages showing Cockshutt Outfits belonging to another customer, the equal of which we have never yet seen.

WHAT OUR CUSTOMERS SAY

The letters in the book will be sure to interest you. One of our customers will explain the superiority of our "One plow, one lever" system over gang bottoms. We make our beams **straight** and after you have read this book you'll admit what we have claimed, that **arched** beams are **not** suited for Traction Plowing. You will find a letter from one of our customers stating that "without question the Cockshutt Engine Gang is the best and most complete plow on the market to-day." There are many others along the same line.

"DON'T IMPROVE YOUR PLOW"

Another one in Manitoba says that "if you let your plow alone and not put any more improvements on it, you can guarantee it in anything but solid rock." "We have struck large stones," writes another customer in Alberta, "and rolled them out that one man could not load into a wagon and we never hurt the plow."

TWO IMPORTANT POINTS

As for the strength and durability of our plows there is scarcely a letter in the whole book which does not state something on that point. But why go into more details—the book is free and if you want hard, solid facts on the Engine Gang plow question you will find every page in this book bristling with them. There isn't a dull page between the covers—and the pages number up to thirty-six.

SEND FOR THE BOOK NOW - IT'S FREE

We therefore urge every business farmer to write our nearest office at once for a copy of this book before they are all gone. It will certainly guide you right, show you what to look for and what to avoid, besides giving you the experiences of so many successful farmers, many of whom live in your own district. Write for a copy now—**to day.**

Read These Names And Addresses

T. J. Pentland, Justice, Man.
D. B. Miller, Spring Coulee, Alta.
W. H. Watson, Alameda, Sask.
E. Snell, Balmoral, Man.
J. F. Crosby, Warren, Man.
O. T. Wilson & Sons, Camrose, Alta.
Alex. Collopy, Frobisher, Sask.
Ed. Brandsey, Claresholm, Alta.
Hopkins Bros., Maryfield, Sask.
A. Johnson, Fannystelle, Man.
John Durnin, Brandon, Man.
J. H. Pilkey, Lang, Sask.
J. T. Heninger, Jr., Magrath, Alta.
Ed. Evenson, Moose Jaw, Sask.
Thos. Wynn, Methven, Man.
H. H. Hall, Otterbourne, Man.
B. A. Rose, Yellow Grass, Sask.
S. G. Sims, Argyle, Man.
Phillip Demaere, MacLeod, Alta.
Aime Benard, Eustache, Man.
H. L. Thomson, Kimball, Alta.
G. F. Hanson, Lajord, Sask.
Harris & Salmon, Raymond, Alta.
Lester Boice, Govan, Sask.
J. Smidstad, Claresholm, Alta.
Ross Bros., Duval, Sask.
Laycock Bros., Foxwarren, Man.
J. G. Hilbery, Red Willow, Alta.
A. H. McLean, Kronau, Sask.
H. J. Flock, Spring Coulee, Alta.
F. B. Peters, Plum Coulee, Man.
J. Harradence, Langdon, Alta.
Jno. B. Ballard, Kronau, Sask.
J. P. Ross, Granum, Alta.
W. P. Perkins & D. Ruse, Bradwardine, Man.
A. Dow, Macdonald, Man.
Harry Rands, MacLeod, Alta.
Jas. Hewitson, Saskatoon, Sask.
Edward Smith, Richer, Man.
Cridland Bros., Summerview, Alta.
A. G. Lucht, Unity, Sask.
Lambert & Roy, Eli, Man.
Henry Bros., Claresholm, Alta.
W. J. Moore, Wilkie, Sask.
D. J. Bell, High River, Alta.
L. G. Wood, Zealandia, Sask.
David Blett, Clear Springs, Man.
J. C. Himm, Claresholm, Alta.
D. & J. D. Knapp, Juniata, Sask.
Mike Mohan, Craik, Sask.

HUNDREDS MORE IF YOU WANT THEM

The Cockshutt Engine Gang is made in 5, 6, 7, 8, 10 and 12 Furrow sizes. The frame is triangular in shape, made of heavy angle steel and possesses great strength and rigidity. Our beams are straight, which time has proven to be the strongest and most reliable. Arched beams very often become twisted or partly straightened under the strain of traction engines, this of course throws the plow out of alignment. Each plow works independently of the others, either in its own automatic adjustment to the conditions of the land or when controlled by its own lever. The book explains many great advantages of the independent plow principle over gang bottoms, but the fact that practically all others, manufacturers have followed **"Cockshutt's"** in this important feature, proves that it must be the practical way to meet Canadian conditions.

SPECIAL FEATURES OF THE COCKSHUTT ENGINE GANG

The top of each standard is fitted with a set screw for adjusting the "suck" of the share and levelling up the bottom. By using the set screw and loosening the bolts in the slotted holes in the standard, each bottom can be adjusted to as fine a point as desired. The gauge wheels can be raised or lowered to suit the different heights of the breaker and stubble standard. They can also be put back close to the shares for breaking, thus protecting them from stones, or can be transferred forward to make room for swivel rolling colters in stubble plowing. The hitch being direct from the centre brings the plows close up to the engine and thus utilizes all the power. One man standing on the roomy platform can operate all the plows quite easily. Write for the book to day–learn how this plow is made and what hundreds of our customers have to say about it.

125

COCKSHUTT PLOW COMPANY LIMITED

BRANDON REGINA SASKATOON CALGARY EDMONTON **WINNIPEG**

Two Men Handle Outfit

Our experience in steam plowing has not been very extensive Most of the plowing has been done on our own place. We have a lot of land that is very heavy and requires six horses to handle a two furrow plow. This is what first put me in the notion of traction plowing.

The first start we made was in 1905 with our threshing engine on summer fallow with a two furrow plow. We, however, went at it the following summer, plowing for barley and got on very good. We plowed forty acres in one day, pulling six two furrow plows. I might say just here that in barley seeding the traction plow shines. Where there is a large amount of barley to put in and if it is skinned in the fall, it can be left several days longer. We have the horses to follow with the packer, seeders and harrows, and what would take two or three weeks to do is done in a few days. Our barley land, about 200 acres, was all we plowed until after threshing when we only had time to plow 100 acres before it froze up, but that 100 acres just cost us $85.00 to plow six inches deep.

Well, we worked along with this outfit plowing for barley and summer fallow and all we could do in the fall after threshing, at a cost of from 90c. to $1.00 per acre. Last spring, as we were offered some breaking to do I made up my mind to get a larger engine and an engine gang.

We bought a 32 h.p. J. I. Case engine and a ten furrow Cockshutt plow and both have given satisfaction. We broke 500 acres, 300 of which we backset; besides which we plowed 600 acres of old land.

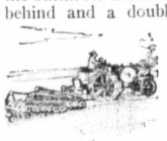
Our crew consists of three men and a team. Two men can handle the engine and plows without any trouble. We used about 100 pounds of coal per acre in ordinary plowing and two pounds of water. We get our coal by the car load at a cost of $7.50 per ton.

Yours truly,
W. A. Morris,
Portage la Prairie,
Man.

Does Not Find Discing Profitable.

I have a Reeves 32 C. C. engine and a Cockshutt 12 furrow engine gang. Last spring I started out to work as early as possible as the land was fit to work with an engine.

The first work I did was discing and harrowing. I used six eight-foot discs, four Cockshutt outthrow and two Bissel inthrow. I had the outthrow ahead and the inthrow behind and a double set of harrows behind the disc, making a swath of 32 feet, double disc and double harrow, at the rate of 80 acres per day at $1.50 per acre.



I only disced about 160 acres as I did not consider it very profitable on account of the dust on my engine. I then started to seed. I only used ten of the plows, a dry land packer behind the plows, a Massey-Harris 23 shoe drill and a three section harrow behind the drill. I plowed, packed, sowed and harrowed at the rate of 33 acres per day. I put in 290 acres of wheat in this way and did splendid work.

I had an engineer beside myself. We took turn about to fire. I also employed two teams for drawing water and coal. As to the amount of coal that we used, I cannot say to the exact pound. We used somewhere between 4000 to 4500 pounds and about 132 barrels of water. The coal cost us from $6.50 to $7.25 per ton.

We employ five men including the cook who helps to coal up the engine. Besides the first discing and seeding which I did I plowed and harrowed 80 acres for oats, broke 380 acres, summer fallowed 400 acres, triple disced and double harrowed 640 acres.

I am well pleased with my engine. It is an easy steamer and a great puller.

Yours respectfully,
Henry Moen,
Hanley, Sask.

Use 40 Gallons of Fuel Oil in Ten Hours.

I have a 22 h.p. Hart-Parr engine and a six furrow fourteen-inch Cockshutt stubble bottom plow, with rolling colters.

When plowing I use two men, one engineer and one steersman. We use a team once or twice a week when we haul six barrels of oil from town and a barrel of water runs us a day. I usually keep one old plug and a stone-boat with the outfit.

A Russell Steam Tractor doing a breaking stunt.

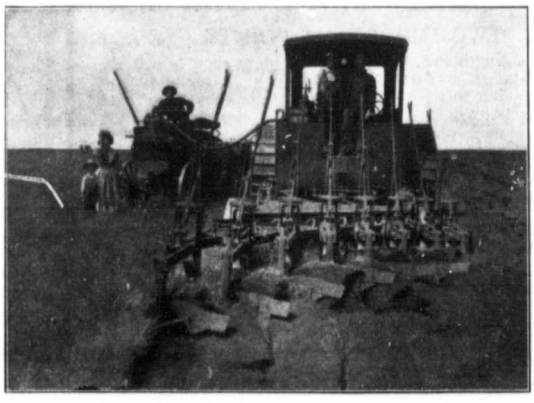
In ordinary work we use about 40 to 42 gallons of kerosene at a cost of 20c. per gallon for a ten hour day service.

We turned over some five or six hundred acres this season and consider it just as well done and a great deal less expensive than could be done with horses.

The advantage of traction plowing is the speed at which it is done in a country of this kind where the seasons are short. It is very essential that the work should be done quickly and at the same time well. It has been proven beyond a question that traction plowing done right is just as good as is done by horses. Such being admitted, then why not resort to traction plowing?

One thing about traction plowing is that in a short season with a large quantity of work it can be crowded to its limit both day and night. A traction engine never gets tired.

Yours truly,
J. E. White,
Yellow Grass,
Sask.



An Avery undermounted Steam Tractor pulling an 8 bottom 14 inch Cockshutt Engine Gang Outfit of W. D. Stroud and Son, Crossfield, Alta.

Can Turn Stones Very Easy.

We have a traction plowing outfit consisting of a 25 h.p. J. I. Case engine and a six-bottom John Deere engine gang.

On account of the very stony ground here our plows were used very roughly. So we went to work and made plows ourselves, four in number, and they work very well. We can turn up stones very easily.

We worked 40 days and broke 200 acres. We got from $6.50 to $9.50 per acre. We use wood for fuel and it takes about two cords per day. As to water, we use from 25 to 30 barrels per day. We employ four men and a team.

I do think plowing is harder on the engine than threshing in this country on account of the great number of stones.

We are thinking of buying a separator this fall and would like if anybody would advise us what kind and size to get for a 25 h.p. J.I. Case engine.

Yours truly,
Louis Ulstad,
Inwood, Man.

Traction Plowing Satisfactory.

My experience with traction plowing has been satisfactory. I have a 32 h.p. J. I. Case engine and a 10 bottom Cockshutt engine gang. I require for my outfit five men and four horses.

I use about two and a quarter tons of soft coal or two tons of steam coal per day. I find that the steam coal gives the best satisfaction. I broke 1275 acres last season and threshed 35 days.

I consider plowing far harder on an engine than threshing, but am well satisfied with my whole outfit for both jobs.

Yours truly,
A. W. Sunderman,
Warner, Alta.

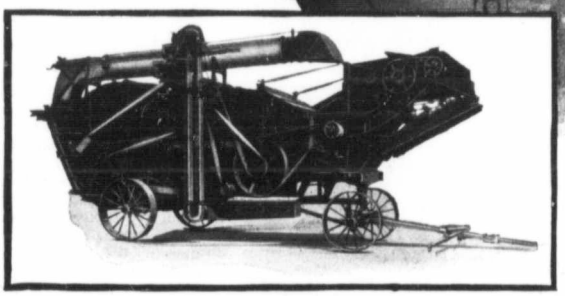
Uses Fernie Steam Coal

I worked for four years for one man who owned a steam outfit, and the fall of 1909 I purchased his engine and plows and bought a new separator. I threshed that fall and did well. But as to plowing, I think it is far too expensive. Coal here cost $7.00 per ton at the car. One team to haul the coal cost $4.50 and one team to haul water $4.50; $5.50 per day to engineer and it took five men to run the outfit.

I think anyone getting an outfit should understand machinery and have a good engineer and the engine should not be run when the ground is

Double Separation *beats* Single Separation *as a* PROFIT EARNER

The Reeves Compound Separator
With Mammoth Cylinder.



In this REEVES "Compound" Separator

the upper separating device, itself the most effective ever invented, is re-enforced by a second separating table which in turn is as effective as the whole separating mechanism of most machines.

Remember that point

when buying a threshing outfit. If there is any one thing more than another that will drive away a customer it is to see what he knows to be too large a proportion of his grain going into the straw.

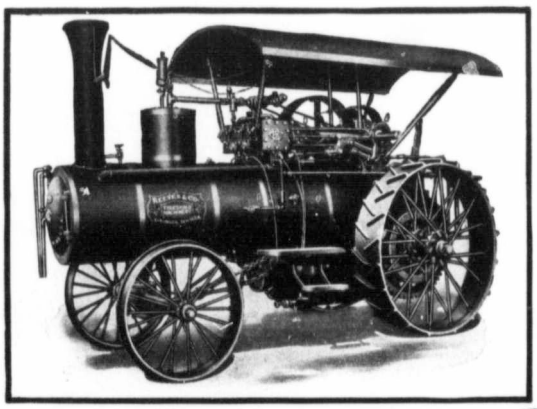
¶ You cannot fool a farmer. Most of them have seen a REEVES "Compound" Separator in operation and they know what "real" separation is. REEVES Double Separation tickles the farmer every time and brings you business. Lack of it is liable to cost you many good accounts.

¶ A thresherman is known by the work he delivers. Thresh with a REEVES Compound Separator and you will have the satisfaction of knowing that you have nothing to fear from your competitors on this point.

Another Pointer

Don't buy a SINGLE CYLINDER engine without reading the comparison between them and this REEVES DOUBLE CYLINDER ENGINE in the REEVES Engine Catalogue.

After that you won't want one.



REEVES & COMPANY

COLUMBUS·INDIANA·U·S·A·

Chicago Engr. Co.

CANADIAN BRANCH: REGINA, SASKATCHEWAN.

soft. It is hard on an engine getting out of bogs. I have had lots of experience in that line as the man I worked for tried to plow when it wasn't really fit.

My engine is a 32 h.p. Reeves and I have a 10 bottom Cockshutt plow. To run 12 hours and travel 20 miles, is required 2 tons of the Fernie steam coal. I think it is the best for steam plowing. In going this distance it took 9 tanks of water. The tank holds 11 barrels. I have seen some engines of the same size require 18 tanks of water and coal accordingly.

A plowing engine would last for years if just used for threshing. But after four years' plowing an engine has to be regeared, etc. Farming with horses is the best, to my mind.

Yours truly,
Charles C. Vaughn,
Fillmore, Sask.

Threshing Harder Than Plowing.

Last fall we bought a 20 h.p. International gasoline engine, an Aultman & Taylor separator and a five fourteen-inch bottom Cockshutt engine gang.

This was the first experience we have ever had with this kind of machinery and, considering our inexperience we got along fine.

We threshed for 15 days and then went plowing and plowed quite a lot of land. We used on an average 25 gallons of gasoline per day. We have sixteen head of horses and kept two plowing gangs going all the time, but the plowing that was done with the engine was much better and evener. Our ground is very heavy soil and on account of it being so dry last fall the plowing was very hard.

We think it is far harder on an engine to thresh than to plow.

Yours truly,
H. B. Zimmerman,
Oakville, Man.

Traction Plowing a Success.

I consider traction plowing a success, although there is sometimes some difficulty with regard to stony ground, and last season I had a lot of this to contend with.

I own a 32 h.p. Reeves cross compound engine, and a Cockshutt engine gang plow with 12 bottoms. However, I only used 10 bottoms and a 12 foot roller or packer, which left the ground smooth and besides preserved the moisture. I think, though, that a disc on the same principle would be better and I will use one next season when plowing.

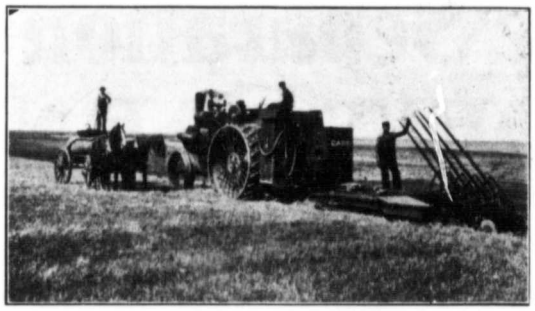
It requires three men on the outfit and one teamster with a four-horse team, making four men in all to keep the machine going. We consume 2 tons of coal per day and six tanks of water, or about 80 barrels of water, per day.

I consider it much harder on an engine to plow than to thresh.

Yours truly,
H. Woods,
Warner, Alta.

An Excellent Letter.

I have used steam power for four years and find it a profitable way of farming. In the year 1906 I bought a 32 h.p. cross compound Reeves engine. I pulled six gangs, twelve fourteen-inch bottoms, and broke 1760 acres.



A Case 32 H.P. Steam Tractor pulling a John Deere Engine Gang.

Galt Coal not Satisfactory.

I have a Reeves cross compound steam engine and a ten furrow Cockshutt engine gang. I have had rather bad luck since I got my outfit. In the first place the season was late when the outfit arrived and in the second place, the coal strike made it hard.

My crew consisted of five men and four horses. I was compelled to use Galt coal, which didn't give very good satisfaction. It required 250 pounds per acre or 2500 pounds per day.

Breaking is not what it is cracked up to be, as the prairies are very stony here and even if the stones are dug out there are so many large holes left, making the ground very rough for the engine to travel over. I used about 40 barrels of water per day.

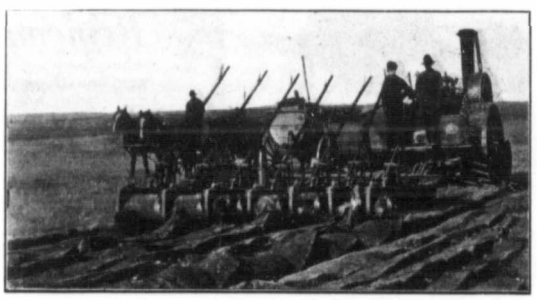
Plowing is much harder on an engine than threshing. Travelling over the rough ground soon knocks them out and the wear on the gear is much greater. Yours truly,

Fred Schadewald,
Lake Centre, Sask.

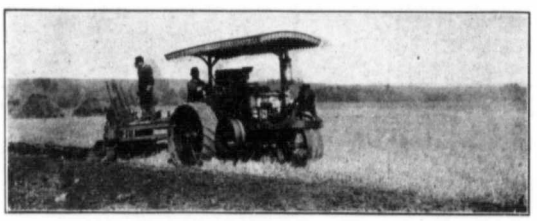
It took five men to run the outfit—engineer, fireman, plowman, tankman and coalman. It took 10 barrels, or one tank, of water for every two miles. Coal was scarce and of poor quality so that I had to use some wood. Fuel cost me about 65c. per acre.

I used four horses, one team for water and one team for fuel.

In 1907 I bought a 12 bottom Reeves plow. It took one man less to run this outfit, as it requires no plowman. The rest of the expenses, coal and water, amounted to about the same, but I could do more plowing in a day and with less trouble. When discing I pulled 7 discs and 28 feet of harrows, double discing and harrowing at the same time. When seeding I pulled three twelve foot drills and 36 feet of harrows.



A Sawyer-Massey Steam Tractor pulling a 7 bottom 14 inch Cockshutt Engine Gang, Outfit E. Evenson, Moose Jaw



A Russell Gas Tractor pulling a Sioux Falls Engine Gang.

In 1909 I bought a 40 h.p. Reeves cross compound engine. With this I pull 16 fourteen inch bottoms. This outfit requires five men but takes very little more water than the other engine, perhaps 15 barrels a day more. It cost 50c. per acre for coal for breaking.

In one season I broke with this engine 2100 acres. Last spring I plowed 500 acres of spring plowing, pulling 12 fourteen inch bottoms, a fourteen foot packer, two seven foot drills and two fourteen foot harrows. I might say that the packer weighed 4000 pounds. The ground was plowed, packed, drilled and harrowed twice with one application. With this outfit I also pull 12 eight foot discs, 6 inthrows and 6 out-throws, and 48 feet of harrows. I use four men and two teams to run the outfit for discing.

It costs far more to keep up an engine for farming purposes than for threshing. If a man, however, keeps his engine in running order and keeps it running, it is ahead of horse power. I do nearly all my farm work with steam. The greatest expense in keeping a traction engine in working order is the gear. I have never had a gear break, but have had them worn out. The first year I used gear grease altogether, but since then I used oil a good deal and found that the oil wore the gear faster than the grease. This year I intend to use nothing but gear grease.

In the four years I have been in Saskatchewan I have broken nearly 4000 acres. I have done all my discing with steam and nearly all of the seeding and harrowing. I have broken as high as 50 acres in a day with my 32 h.p. Reeves and over 60 acres with the 40 h.p. Reeves. In discing I aim to disc from 150 to 170 acres per day.

We start work at 4 o'clock in the morning. I bank the fire in the evening to hold some steam and as soon as I have oiled and greased the rig we are ready to start.

I always have two cars in the field with the outfit. One is used for dining purposes and the other is a sleeper with shop in one end. All the repairing is done at the car in the field, and is done by myself. It is a pretty bad break that I canot figure out and repair.

Yours respectfully,
Wm. Rowse,
Hanley, Sask.

Plowed 300 Acres in 7½ Days.

We have been plowing for the past two years with a J. I. Case 32 h. p. engine and a 10 bottom fourteen inch John Deere engine gang.

We employed four men, viz., engineer, steersman, water hauler, and cook and coal hauler combined. This was for single shift only. In double shifts, we used at night a second engineer, plowman, steersman and water hauler. We used but two teams on the double shift, unless we had to haul water over 1½ miles. Then it took two water teams on each shift. Shifts run from 12 o'clock at

noon till 12 o'clock at midnight.

We used about 3000 pounds of hard coal and 4000 pounds of soft coal for each 15 to 18 hours. The hard coal cost us $10.25 a ton and the soft from $4.00 to $7.50. The hard coal was the cheapest, all things considered. We used 5 barrels of water to the mile and averaged 32 miles in 24 hours. We broke from 40 to 45 acres per 24 hours and 25 to 28 acres per single shift.

We made two records on one half section, viz., plowed 300 acres in 7½ days and blew up the crown sheet. We used muddy water and neglected to clean the boiler at the proper time, which was the cause of the accident.

It is pretty hard on an engine to plow in the spring and early summer, as the footing is so insecure. But in late summer and fall I cannot see that it is any harder to plow than to thresh.

Yours respectfully,
J. H. Nichols,
Rouleau, Sask.

Gas Engine Must Go.

We own a 20 h.p. International Harvester gasoline traction engine. We bought our engine late last spring and have only plowed about 250 acres. We threshed 36 days last fall.

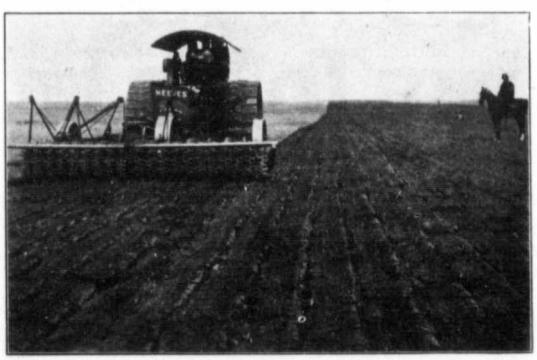
We are very proud of our outfit. Some say that the gasoline engine balks too much, but we found that as long as we kept everything in order, they must and will go.

We pulled a four fourteen-inch Cockshutt engine gang, with which we plowed 15 acres a day.

We had to pay 24c. per gallon for gasoline besides the freight, which is 2c. per gallon. It took about 75c. worth of gasoline to plow an acre. We have very heavy stony land here.

In threshing we pulled a J. I. Case 32 x 54 inch separator with feeder, high wagon loader and common stacker, and must say we were all surprised at the way the engine pulled it. We never used 20 gallons of gasoline a say for threshing. Our tank holds 20 gallons and often in dry weather the tank once filled would last a day and a half.

Yours truly,
J. E. Priebe & Co.,
Morse, Sask.



A Reeves 32 H.P. Steam Tractor pulling a Reeves steam lift plow and a Fleury Pulverizer near Lethbridge.

Made a Hitch of his Own.

I own a 22 h.p., 45 brake h.p., Hart Parr gasoline engine. I bought it last spring and double disced and harrowed 200 acres with it and plowed 125 acres of stubble.

I tied a long, strong pole behind the engine, about 20 ft. long, and attached three disc harrows right behind the engine and two behind the others overlapping, and each disc had about 250 lbs. weight on it. I used dirt for this, putting about 125 pounds in a bag and two bags on each disc. Behind the discs I had on 16 ft. harrows. That load was an easy one on the engine.

I was using about 4 gallons of kerosene an hour, which cost me 18c. a gallon. I used about five gallons of gasoline per day, as one cannot start an engine on kerosene. The gasoline cost 23c. a gallon.

For stubble, I had a heavy Cockshutt 10 14-inch bottoms plow frame with skids, and I was pulling 7 plows about four inches deep with ease. I was using about the same quantity of kerosene as when discing. I plowed on an average two acres an hour and was alone with the outfit to do it very often, and had to stop and get off the engine at the end of the furrows to raise the plows.

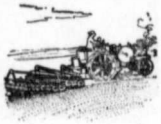
For breaking I used two 20-inch John Deere brush breakers as I had a lot of scrub some places and broke four to six acres a day with it. We had to stop often on account of the oak stumps or big rocks.

I enclose a picture of the outfit breaking.

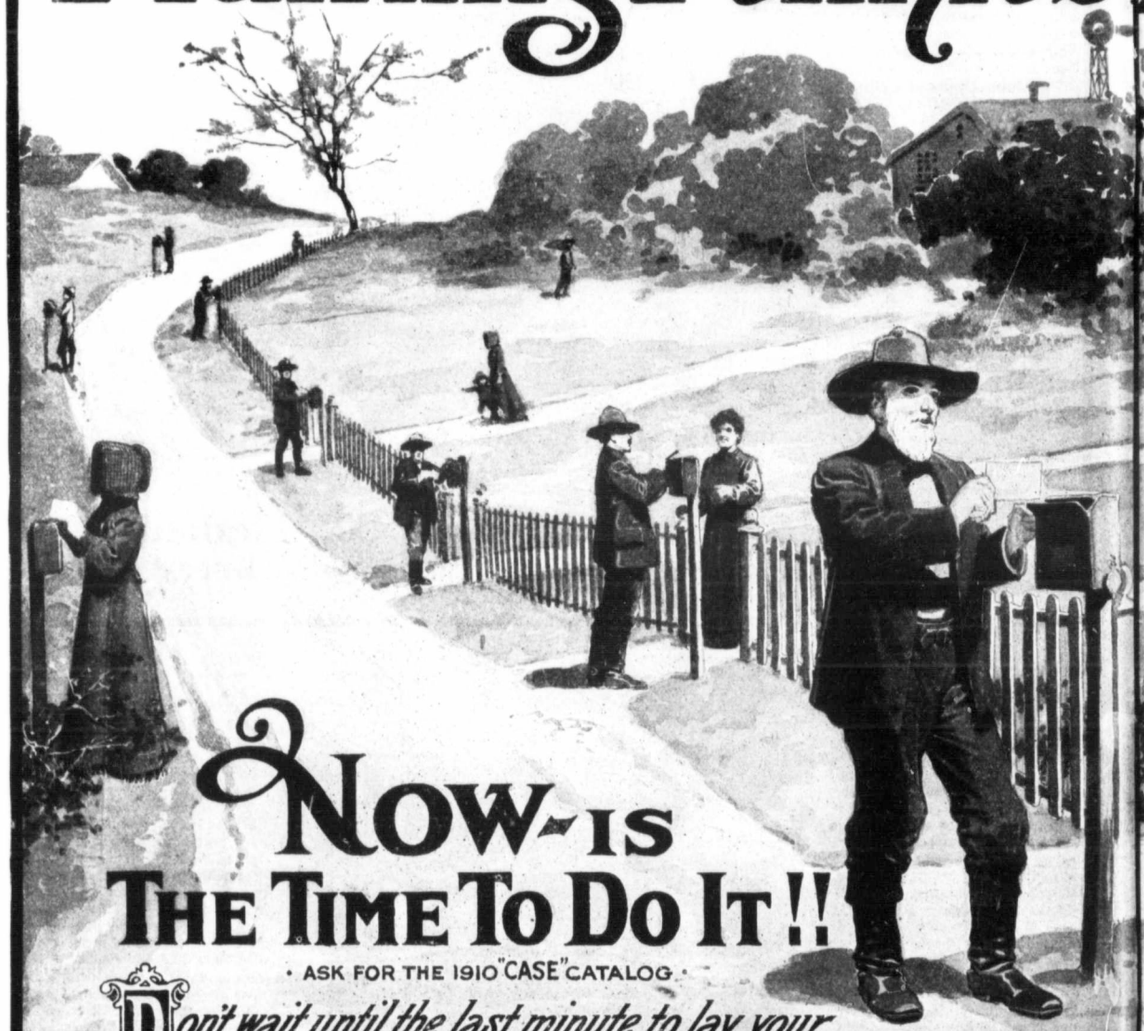
Yours truly, Jos. Pantel,
Somerset, Man.

Uses 8 Barrels of Water every Two Miles.

Regarding traction plowing the following are the details of the work done by our outfit: 32 h.p. Case Engine. Three



Planting Pennies



Now-is The Time To Do It!!

ASK FOR THE 1910 "CASE" CATALOG

Don't wait until the last minute to lay your foundation for a successful threshing season. If you have not written to us - Do it today.

J.I. Case Threshing Machine Co.

INCORPORATED

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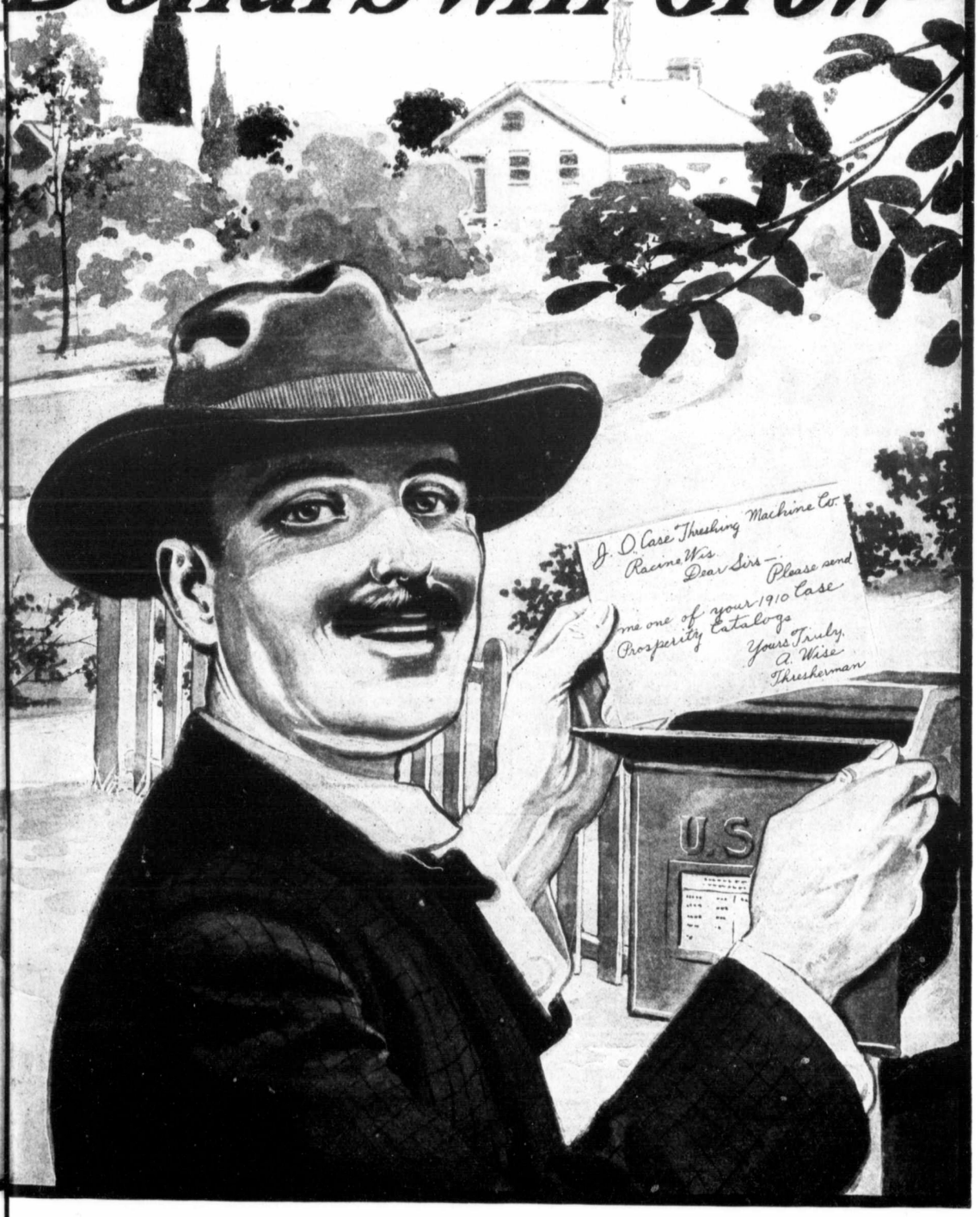
TORONTO, WINNIPEG, REGINA, CALGARY

Chicago Engr. Co.

Dollars will Grow.



discs. We used an engine gang, 18 sections Emerson disc engineer, fireman, plowman and tank man, and one team, and burned flax straw. We used eight barrels of water every two miles.

If the engine is constructed for plowing and kept up and the gear attended to we do not think plowing harder on it than threshing.

Our engine handled her load with all ease, notwithstanding the hardness of the soil and the bad water we had to contend with. We plowed thirty acres in ten hours last fall. We will add another section in the spring when we expect to plow forty acres easier than we did the thirty. We enclose photo.

We have a tender large enough to carry sufficient straw for three miles, and water tank carries enough water for that distance.

Yours truly,
G. Renwick,
Milestone, Sask.

Averaged 20 Acres Per Day.

My brother and myself bought a 45 h.p. Hart Parr plowing engine in Southern Alberta last May. It was delivered to us May 31st. We also bought a Cockshutt engine gang with seven bottoms; we took one off as it was rather dry at the time we started plowing.

We employed one man and team; there was one on the plows and the other drew the fuel, which was fourteen miles; he also did all the blacksmithing.

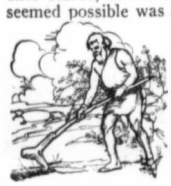
We used 60 gallons of engine kerosene, 10 gallons of engine gasoline, 1½ gallons gear oil, and 1½ gallons of gas engine oil per day. We plowed on the average of 20 acres per day, five inches deep, which was worth $4.50 an acre here. We plowed in all 800 acres, which we did in forty days.

Our engine was practically in as good shape when we got through as new. It cost us nothing for repairs and gave us no trouble whatever. We have not tried it threshing yet.

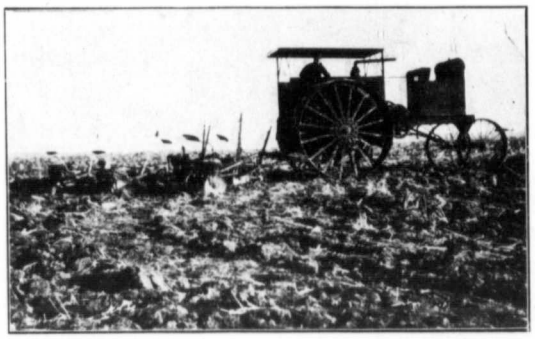
Yours,
Wm. P. Perkins,
Bradwardine, Man.

Plows for $3.00 per Acre.

I came to Canada in 1908 and bought a section of land near Strathmore. In March, 1909, I moved my family here and after getting ourselves located on the land, I began casting about for the best method of getting the larger part of it plowed ready for crop. Horses were high in price and good ones scarce, so the only thing that seemed possible was an engine and gang plow.



I therefore bought a 25 h.p. Case simple engine and a seven bottom Cockshutt engine gang plow. With this outfit I went to work. I plowed up about 450 acres of my own place and about 500 acres for others, making in all something over 900 acres. I could have plowed much more but for the misfortune of breaking the rear axle of my engine, which delayed me in all about three weeks. Then the coal strike hung us up another ten days right in the best part of the season.



A Flour City Tractor, negotiating some tough stuff Outfit of J. H Pillers Coaldale, Alta.

My average plowing per day was 16 acres, and my coal cost me 50c. per acre. The best single day's work was 24 acres.

I would not hold out the idea that traction plowing can be done for a song. In the first place, your outfit costs too much money. Coal and labor are both too high. An ordinary good rig will cost $4000 and by the time you plow 4000 acres, you haven't much left of your engine and plows. However, I consider it the best method of breaking up this tough prairie sod.

We made a short threshing round, but on account of the snow coming so early and very little grain being stacked, made flax threshing very unsatisfactory, and we pulled home. I consider plowing very much harder on an engine than threshing. I know it was play for my engine to pull my 44 x 66 Case separator in dry grain. This may be partly due to a Gould Balance Valve which I put on in the end of August, which I believe increased the power at least 20 per cent. This valve was advertised in your paper last summer and I decided to try it. It came so late that I could hardly give it a fair trial in plowing, but the latter part of August, when the ground was very dry, it made all of one plow's difference in the power of my engine.

In summing up my experience for the past season's plowing, it is something like this:

	Per acre.
Wear and tear on my engine and plows....	$1.00
Hired help	.50
Coal	.50
Use of 6 horses for hauling coal and water and board for 4 men and 6 horses....	1.00
Total.	$3.00

It has cost me a total of $3.00 per acre for every acre I have plowed this year.

Hoping these facts and figures may be of benefit to someone, I remain,

Respectfully yours,
J. A. McKenzie,
Strathmore, Alta.

A Robt Bell Steam Tractor pulling a 10 bottom 14 inch John Deere Engine Gang and a Fulton subsurface packer at Gainesboro Sask. Outfit of Ed. Bourke.

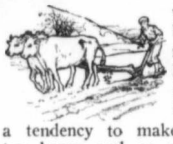
Uses No Horses.

In reply to your inquiry regarding traction plowing, would say I have a 20 h.p. International engine and Cockshutt plows. I use 5 14-inch, in stubble 4-inch breaking. We just have one man to operate engine and plows. We work on the mile long and consider it not necessary to put on an extra man. We use no horses in connection with this rig, but quite a number outside of it on our farm.

I use about 18 gallons of gasoline for plowing and 24 to 30 for threshing, and use about two barrels of water per day, sometimes a little more if windy weather.

I think threshing harder on our engine than plowing, as it is run at a higher rate of speed, and this engine has not enough power for this work.

We did not do very much breaking this last season but did considerable summer fallowing and a lot of discing, and would say that this engine is better on traction work than belt work. It not being large enough for our work it might have a tendency to make us load it too heavy and so make quite a difference in the total. We handled four sets of discs 16-16 feet and it worked all right.



Yours truly,
Frank Janrow,
Govan, Sask.

Earns $75.00 per Day.

I have just plowed with steam one season. I have a J. I. Case engine and a seven-furrow Cockshutt plow. The engine is an old one, not built for plowing, but it did first class work. We had only one break and that just laid us off for three-quarters of a day.

We used 1½ tons of steam coal per day and plowed on an average of 25 acres. We used about four barrels of water per acre. My crew consisted of an engineer, steersman, water hauler and myself to cook, sharpen shears and to take a turn on the engine, as I am an engineer myself. I had my coal mostly all out before I started plowing.

I think if a man has land of his own to farm and can run his own rig that it pays to plow with steam. Why some people fail in steam plowing is because the outfit isn't run right, or they may not know anything about it themselves and depend all on hired help. I think if a man keeps his engine in good shape and handles it easy over rough places that plowing isn't very much harder on an engine than threshing, but it must be watched more closely and kept in good repair.

I consider my expenses and earnings about as follows:

Board and oil per day	$5.00
Steam coal 1½ tons @ $4.50 per ton	6.75
Engineer	3.50
Wheelman	4.00
Waterman and team ..	4.00
Myself	3.50
Total	$26.75

Earnings—25 acres at $3.00 per acre=$75.00.

Yours truly,
Wm. H. Miller,
Brant, Alta.

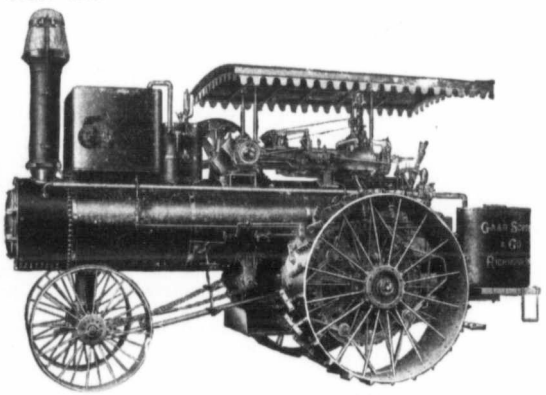
Needs Five Men.

We have a J. I. Case 32 h.p. engine and a Cockshutt 14-inch 10 bottom plow We got the outfit in 1907 and broke that year about 750 acres and would have done a great deal more if the weather had been favorable. In 1908 we broke 500 acres and in 1909 broke 200 acres. It was very wet all through the breaking season in 1909 in this district. I consider 25 to 30 acres per day good work and one wants to be on land where you can keep moving all

THE TURF-TURNING

IF YOU are looking for an all-round, general-purpose engine, to do plowing, freighting, threshing or any work that a traction engine might be expected to do, from furnishing strong belt power to heavy-duty traction power, you needn't look any further than the Gaar-Scott 22 and 25 h.p. Double-Cylinder Heavy-Gear Engines.

We can recommend them for any work in any place, without a single reservation. We not only recommend them for what they will do, but for the economy with which they do it, both in fuel and water, and in attendance. Add to these qualities the greatest possible durability, and what more could you ask? They develop actual work horse-power in excess of three times their rating. The 25 h.p. engine has been officially tested, both in the United States and Canada, and showed on the brake 76 h.p. throughout a two hours' test.



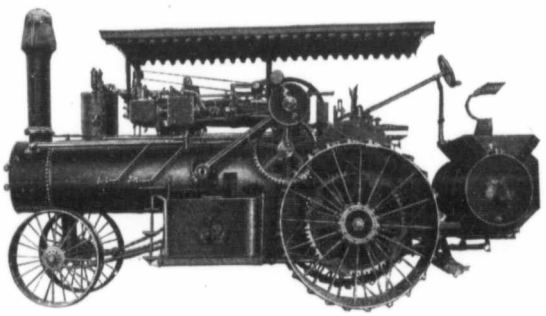
The main crank shaft is forged from a single piece of steel turned to 3.5-8 in. diameter, and its pull is evenly distributed between two heavy self-oiling boxes. Both the crank shaft and countershaft have full steel pinions, and are so strong, so well balanced, and have such large bearings, that they can't spring, twist nor vibrate.

The extra-strength traction gears are 5 in. and 6 in. face, and provided with oilers. Each steel bevel pinion in the different gears has an oiler, and master gears are interchangeable.

The eccentric drive wheel spindles add years of service to the gearing, because they insure perfect adjustment and even contact and avoid uneven strain on the cogs. That is the reason they outlast any other gearing, of whatever material, pattern or mounting.

EVERY part of the Gaar-Scott "Big Forty" double-tandem compound-cylinder engine is designed and built for big plowing. It is "on the job" every minute, because it is not lacking in steady pulling power nor in emergency power. It never fails in the task of applying the power because there is no weak spot in the transmission the shafting, journals, pinions and gears.

This engine will get more pull out of a given number of pounds of coal and water than any other engine of its horse-power rating. Shop tests and field practice show it to be the biggest "Forty" that ever turned the turf. Every ounce of steam is converted into usable power by means of its four (two tandem-compound) highest-type cylinders, and its matchless massive gearing.



Another thing that adds to its economy, is its wear-resisting construction and consequent freedom from repair delays, and the convenient arrangement of, and access to, all of its operating parts. All the time saved in attending and managing a plowing engine, oiling, taking and carrying water and fuel, gives just that much more working time and so many more acres plowed.

This "Big Forty" has a water carrying capacity of 21 barrels, and an immense coal bunker.

The gearing is double-driven, rear-mounted, semi-steel, with full steel shaft and pinions.

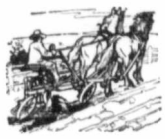
The drive wheels are 76 in. in diameter, 30 in. face plate-steel rims, and arranged for 10 in. extension.

In fact, every part of this engine is just as good as the biggest and best equipped boiler and engine factory, backed by the longest experience in this kind of manufacturing, can make them.

Write to-day (not to-morrow) for our 75th Anniversary Catalogue and Plowing Circular.

GAAR-SCOTT & CO., WINNIPEG, Man. REGINA, Sask. CALGARY, Alta.

"TIGER" TRACTORS



the time to do that.

It takes 1½ to 2 tons of coal and from 65 to 75 barrels of water per day to run the outfit. We need five men—engineer, steersman, plowman, waterman and coalman, one team on water tank and one on coal wagon.

I consider plowing hard work on an engine in the general condition of land. If you have gumbo to contend with you want all the steam you can produce. We run a 42 inch cylinder, 70-inch body, Avery threshing machine and consider threshing a great deal easier than plowing.

Yours truly,
Lachlan MacLean,
Fillmore, Sask.

Ran Day and Night.

I have not had much experience as yet in traction plowing, as I only purchased my rig last fall and after threshing did some fall plowing.

My engine is a 25 h.p. Case, and I drew a Cockshutt 7 bottom gang, also a five section drag harrow behind the plows. We ran the outfit day and night, had two crews of four men each; one shift going on at 12 o'clock at night and one at 12 o'clock at noon. Each crew was comprised of engineer, steersman, tankman and plowman. We only used two teams of horses, one for each shift. The tankman coming out at noon brings out 2½ tons of steam coal which is sufficient for the 24 hours' run. We only have to haul the water about a mile, so you will see that it is not hard work for the tank team. We never use more than about 45 barrels of water during a run of 12 hours.

We plowed and harrowed twice 270 acres in nine days of 24 hours. This is the extent of our experience in traction plowing thus far. We hope to be able to write you a better letter next year as we have about 1500 acres to plow in 1910.

Yours truly,
A. H. Maclean,
Kronau, Sask.

A Good Engineer Necessary.

Our experience with the steam plow in the field has been limited, but having spent thirty days in actual work with the outfit, we have had a valuable experience, as now we know what breaking the virgin prairie means in its fullest sense.

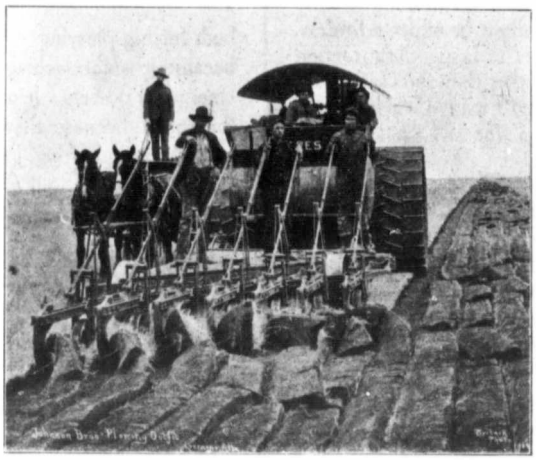
We have a 25 h.p. J. I. Case engine and pull a John Deere engine gang of eight fourteen-inch bottoms and a roller. I might say that the roller is a splendid part of the whole, leaving the ground smooth for after work.

I am not an engineer, but my experience very plainly proves to me that you do not have a paying institution with a poor engineer. Every engineer who can run an engine threshing cannot run successfully the same engine breaking. Then the first thing to do is to secure an engineer of wide experience and practical every-day knowledge at steam plowing. In other words, the engineer is the "whole thing."

Our crew consists of engineer, steersman, plowman, waterman, cook for cook car, and coal and general utility man. Two teams do all the work ordinarily. Coal in Alberta is cheap, and we haul it direct from the mine at a cost of $3.00 per ton. Six tanks of water will run the engine for an ordinary day of twelve hours. An average of 20 acres per day is good, but we have broken up to 30 acres per day. We don't travel fast, but steady and waste no time at the ends.

Steam plows are all right for experienced men, but otherwise they are not.

Yours respectfully,
E. J. Middleton,
Lethbridge, Alta.



A Reeves 32 H.P. cross compound Steam Tractor pulling a 7 bottom Cockshutt Engine Gang at Lorraine Alta.

Plowing Easier Than Threshing

We have a 20 h.p. simple Case traction engine and an eight-furrow John Deere engine gang. We plowed 200 acres summer fallow and 200 acres of stubble last fall. As we have about 1600 acres to cultivate, the steam outfit certainly looks good to us.

Our land is level and free from stone, and this, along with being situated in the best part of Southern Manitoba, is perhaps particularly favorable for traction plowing. We had no trouble handling the eight furrow plow five inches deep and, in fact, it is easier than threshing.

Two of us operate the engine and plow and one man and team draws the water and coal. We use about 1½ barrels of water and 80 pounds of Yohoganna steam coal per acre.

Wishing The Canadian Thresherman and Farmer every success,

Yours truly,
Jones Bros.,
Whitewater, Man.

Uses 4500 Pounds of Souris Coal per Day.

We bought a 25 h.p. Case steam engine last spring and were green at the business. We used it for seeding 150 acres, doing a first class job, and found it very much cheaper than horses. We intend seeding as well as plowing, so long as it proves as great a success as it did last spring. We also drew packers behind the seeder, which gave all the seed an even start. In sowing we used one-half bushel less grain to the acre than some did with horses and got as heavy a crop, which matured as early as the grain sowed over two weeks earlier.

We then started plowing with a ten furrow, fourteen-inch Cockshutt gang. We drew eight plows and a packer, but some of the time we only pulled seven plows. We never plowed more than four inches deep and plowed some very rough land, in fact some places where it was scarcely fit to put horses. We loosened stones over five feet across that were buried out of sight, tore some out over 2½ feet in diameter, went over knolls that would upset an engine that was at all top heavy, and went up sharp hills. In these places we never got stuck with seven plows. These are places where an engineer learns to handle his engine to the best advantage.

We burned straw most of the time as coal was hard to get at the first of the season. We had no trouble in keeping up steam, even with very poor stuff. We make about 16 acres per day on it quite easily. Later on we burned coal. It took 4500 pounds of Souris per day and 3250 pounds of Edmonton per day and 4500 pounds of Galt per day. We found that the best coal was the cheapest in the long run.

We plowed in all 400 acres, seeded 150 acres and threshed 40 days and I know that the engine worked nearly as hard on the 40-inch cylinder while threshing as it did plowing but, of course, not so steadily. All breakages on engine for the season would not exceed $1.00. These were mostly bolts.

I think that in places where the ground is comparatively level, where water and fuel is handy and the climate is rather dry, that steam plowing is the most economical and most reliable means of cultivation.

As we engaged our men for the summer by the month, our expenses were as follows:

Engineer	$ 4.00
Fireman	1.25
Strawman	1.25
Waterman	1.25
Two teams	4.00
Oil and grease	.50
Shares sharpened	1.20
Total	$13.45

This brings our expenses somewhat below $1.00 per acre.

Yours truly,
John L. Henderson,
Adanac, Sask.

Experience Necessary.

I have a 45 brake h.p. Hart-Parr tractor, which is all right. We did not get our engine until August and then it was very dry for breaking. We have an eight-furrow Cockshutt plow and at this time broke about 50 acres.

We kept no record of the amount of oil used, but I feel sure that

Wm. Lackies outfit near Lethbridge. A Case 25 H.P. Steam Traptor pulling a John Deere 12 bottom 14 inch Engine Gang.

we used a good deal more than was necessary because we did not know enough about the management of the machine, never using a gas engine before. But we got some experience, and as we use the machine more we may get the price of our experience back.

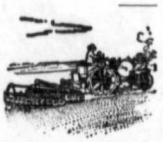
We needed only two men for plowing, whereas had we been using steam we would have had to have four men and two teams. We consumed about a barrel per day of coal oil and some gasoline for starting the engine. We had to have a man and team one day every week to haul the oil from the town.

We have a 32-inch separator and threshed about 28 days. We did not, however, keep a close record of the work done, but some days we did remarkably well. Every old thresher will understand that with new machinery and green men the profits are not large.

With what experience I have had, I can say that threshing is much easier on an engine than plowing.

I have never used a steam engine for plowing, but have used steam to quite an extent for threshing; but I like the gas engine and small thresher much better.

Yours truly,
J. H. Guest.
Weyburn, Sask.



Horses Unnecessary.

I own a 20 h.p. International Harvester Co. gasoline tractor and a five twelve-inch bottom Emerson engine gang.

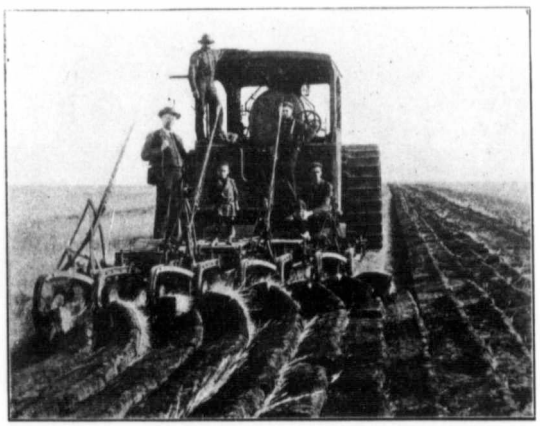
When spring plowing, the engine had no difficulty in pulling this plow together with a three section drag harrow and a light pulverizer five feet wide. This left the land in perfect condition for the disc drill, the land having been plowed, twice harrowed and packed.

In twenty-two working days the outfit averaged a trifle over 13 acres per day, at a total cost of 81c. per acre. An engineer and a plowman operated the outfit at a cost of $40.00 and $30.00 per month, respectively, and board.

We consumed one gallon of gasoline per hour, but as water was plentiful no estimate was made on it, though it would not exceed two barrels per day. Horses are almost unnecessary for spring work in this district. We never keep any special horses for this work. When it is necessary to haul water, one of the teams working on the drill would be utilized.

Traction plowing is most certainly harder on an engine than threshing. The dust is a constant annoyance. I consider the lighter the engine, consistent with strength and durability, the more convenient it is for the average farmer.

Yours truly,
E. B. R. Hall,
Solsgirth, Man.



An Avery undermounted Engine pulling an 8 bottom 14 inch John Deere Engine Gang Outfit of Geo. Ohin of Manoka, Alta.

125 Pounds of Coal per Acre.

My engine is a 25 h.p. Case, and my plow is a seven-bottom Cockshutt, and I can draw the seven plows without any trouble. I have been running a steam plow for three years and have so far found it a success.

I employ two men besides myself. One draws the water and the other does the firing and attends to the plows. The farmers around draw my coal. I only have one team on my outfit. It takes about 125 pounds of Crow's Nest steam coal per acre to keep the outfit going.

I find plowing harder on some parts of the engine than threshing, although I have had very good luck since I commenced plowing.

I do all kinds of plowing, backsetting, etc., with my engine and can do the best of work.

Yours truly,
Joseph Falkingham,
Kenaston, Sask.

94 Acres in 3 Days.

We have a 20 h.p. Case engine and pull a 10-furrow John Deere plow and can break

from 25 to 30 acres per day. Our best run last season was 94 acres in three days.

We figure it costs us about $1.25 per acre to break ground. We broke and plowed about 1200 acres last summer.

We use about 3000 pounds of coal per day and about 50 barrels of water. We employ five men and two teams for the outfit. Two men are on the engine, one tends the plow and does the blacksmithing, one hauls the water and one the coal.

We consider it a little harder on an engine to plow than thresh as the strain is more uneven and the engine gets far more dust, causing greater wear.

Yours truly,
Fairbairn Bros.,
J. L. Fairbairn,
Clavet, Sask.

Constant Vigilance Necessary.

I own and operate a 25 h.p. Case engine and an eight-furrow 14-in. Cockshutt engine gang. Our crew consists of four men—engineer, fireman and tankman, and also an all round blacksmith and general repair man. This does not include the cook. We usually have our coal hauled to the ground during the winter or early spring before the frost is out of the ground, as the roads are in much better condition then than later on when the frost is out and spring rains soften the ground. Labor is also cheap and horses not in use for farm work. We find it necessary to use four horses on the water tank on account of hilly road to water supply. We have two tanks, one being in the field while the other is being filled. 65 barrels of water will run the engine for 10 hours if the boiler is clean and conditions favorable. Sometimes 75 or 80 barrels are consumed.

Coal costs about $4.50 per ton, and we use about 3500 or 4000 pounds in ten hours. The amount varies according to the quality of the coal.

I consider plowing much harder on the engine than threshing. In fact, there is no comparison, in my mind. The driving gear wears very fast on account of dust, grit and dirt accumulating unless kept perfectly oiled at all times. Also the unequal strain to which the engine and boiler are subjected to while plowing on rocky or uneven ground, makes constant vigilance on the part of the operator necessary.

In my opinion, the best men that can be had to run a steam outfit are the cheapest men, and I agree with my brother plowmen who say that a man who owns a plowing outfit should thoroughly understand every detail of it himself. He should be an engineer and blacksmith, also something of a machinist. I think the blacksmithing should be done at least on the same quarter section where the rig is working, as much valuable time is lost travelling long distances with repair work, and plow shares, to say nothing of the time spent waiting at the shop when the blacksmith is rushed with work. Sometimes five or ten minutes work at home will do the repairing, when as many hours will be spent in town getting a job done.

I have estimated that it costs me $1.50 per acre for sod plowing and $1.25 per acre for stubble. We usually burn straw while plowing stubble, and I find it a very economical fuel, as it saves the first cost of coal and the hauling is about even. For threshing I like straw better for it is always on hand.

I consider traction plowing cheaper than horse plowing when taking into consideration the present high price of horses and scarcity of labor in the busy season.

Yours sincerely,
D. J. Bey,
High River, Alta.

Steam Plowing a Labor and Time Saver.

In August, 1909, my brother and I bought a 25 h.p. Case engine and a 36 x 58 Case separator. We threshed 37 days that fall and had a very successful fall, having been able to cover all expenses and have a little surplus on hand.

The following spring we purchased a 15 disc Emerson engine gang, the first one sold in these parts. We backset 763 acres for spring crop and afterwards plowed 100 acres of summer fallow.

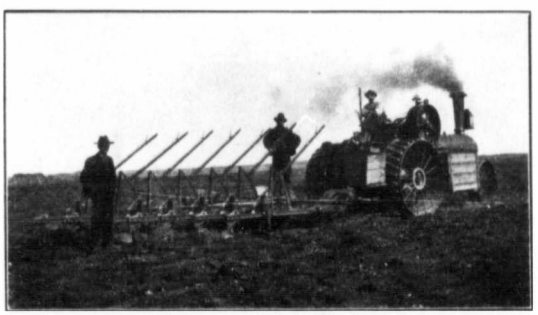
We had an engineer who did the firing, a steersman, a plowman, and tankman who also drew the straw, as we did all our firing with flax straw. After finishing up our summer fallowing we totalled up our expenses and found our plowing cost us 63⅗c. per acre. We plowed an average of 25 acres per 12 hour day and might as well say we were well satisfied with the speed of plowing as well as with the job done. We found the engine quite capable of hauling the 15-disc plow, except when the ground was soft and slippery.

During the fall of 1909 we commenced threshing and threshed 65 days. We also did considerable plowing at night, having had an extra engineer, steersman, plowman and tankman, who were on the job where we were threshing and as soon as we dropped the belt at night they pulled off with the engine and hitched to the plow. At 5 o'clock in the morning our day engineer and fireman brought the engine back and hitched to the separator again ready for the day's threshing.

A Hart Parr 22 h.p. Gas Tractor pulling two drills. Outfit of A. H. Powell, Caron, Sask.

Owing to the dryness of the ground last fall it was difficult to make much time and do a good job, but we managed to plow in the neighborhood of 400 acres.

With regard to the difficulties met with in steam plowing, would say that they are almost entirely due to the inefficiency and inexperience of the crew who are handling the outfit. If a capable crew are on the outfit under the directorship of the owner, I see no reason why steam plowing cannot be a success as well as a great labor and time saver.



A Case 25 H.P. Steam Tractor pulling a 7 bottom 14 inch Cockshutt Engine Gang, Outfit F. F. W. Hunter, Stonewall, Man.

Thanking you for the space we have occupied in your paper and wishing you every success, I am,

Yours very truly,
John Cook,
Milestone, Sask.

How about It?

My experience in traction plowing is very limited, last season being my first. I believe traction plowing a practical proposition for working a large piece of land, as three men with an outfit can do a lot of work.

My engine is a J. I. Case 25 h.p. and pulled a six gang John Deere plow with my engine. I averaged 12 acres per day breaking. The land in my section of the country is very heavy and six plows is all my engine could handle.

My crew for this work consisted of three, as follows: one man and team for hauling water, and two men on the engine. I used the ordinary steam coal, and my engine consumed on an average of about 2,500 pounds per day. We used close to 100 barrels of water per day.

I consider traction plowing much harder on an engine than threshing. There is constantly dirt flying into the gears and this cuts them out much faster than threshing. I believe there should be some way figured out whereby these gears could run in dust-proof casings, thus eliminating a large per cent. of the cutting out.

Yours truly,
W. C. Edwards,
Langdon, Alta.

Plowing Harder Than Threshing.

Last spring my brothers and I purchased a J. I. Case 25 h.p. engine and a seven-bottom fourteen-inch Cockshutt engine gang, which we consider makes a very good rig.

We broke 25 acres per day on the ground and did not burn more than 2500 pounds of Western steam coal, which cost us $6.50 per ton. Our expenses were as follows:

Plowing 1,016 acres in 60 days at $3.00 per acre.

I waterman and team, $3.00 per day.

I coal man and team, $3.00 per day.

In 60 days we consumed 65 tons of coal and used, per day, 50 barrels of water.

I consider plowing a little harder on an engine than threshing,

Yours truly,
Blanchette, Bros.,
St. Anne de Chenes,
Man.

Engine Plow Beats Horse Gangs.

I have not done much traction plowing as yet. I have no plow of my own, but I had a neighbor's ten-furrow John Deere engine gang for a week last fall.

The plow did excellent work, far better than could have been done with horse gangs, as the plows were heavier. My engine is a 25 h.p. Case. I just had the small water tender, so placed two barrels on the platform of the plow and box to carry coal.

We used about one ton of coal per day and between five and

six tanks of water per day. We averaged over 20 acres per day. Two of us ran the engine and plow and one man and team hauled the water. I had the coal loaded on the wagons before I started to plow.

Traction plowing is harder on the engine than threshing because the pull is always the same, while in threshing there is some give to the separator.

My engine had plenty of power for the ten plows in the soil here. I plowed but five inches deep. I had my engine on the elevator grader for about three weeks, ditching and grading and it answered the purpose splendidly.

I would advise anyone going into steam plowing or road-work to get all the attachments for the engine, as they save time and time is money. I believe that steam is the coming power for large farms.

Yours truly, A. Campbell,
Boissevain, Man.

Don't Overload Engine.

We purchased a J. I. Case 25 h.p. engine and a No. 62 separator with which we thresh every fall. During the summer months we plowed with a six-bottom fourteen-inch Cockshutt plow, which we bought last year.

We started plowing in July. My brother ran the engine and I looked after the plows and fired the engine. We ran the outfit ourselves, with the exception of the tank man and team. It took about two cords of wood a day and four tanks of water. Our tank is an 8 barrel tank.

I consider plowing is much harder on an engine than threshing. It is far harder to keep the engine in shape, as everything has to be kept snug. The main thing is to keep the boiler clean. It should be cleaned out at least three times a week. Plenty of good oil should be used in the cylinder, and one should have enough oil going into the steam chest, so that the reverse lever will not be clicking. An engine should not on any account be overloaded, as it does not pay. It is far better to run an engine with just enough plows attached so that it will run with ease.

We pulled six plows with our engine, although I am sure we could have pulled eight. We use plenty of heavy black oil about the gearing to keep the sand and grit washed out of the gears. I do not think an engine should be run fast. There is no time gained in that; it will rack the bearings. About four miles an hour on good level ground is quick enough.

Hoping this will be of some benefit to someone in the steam plowing business.

Yours truly,
Ellis Bros.,
Altamont, Man.

Phillips and Heathers Avery undermounted Engine pulling a 12 bottom 14 inch John Deere Engine Gang at Magrath, Alta.

Plowing Twice as Hard as Threshing.

I have a Hart-Parr traction 22 h.p. engine, and a Cockshutt engine gang with 6 fourteen-inch stubble bottoms.

I did not plow much with my outfit as I only got it in September and I threshed till the season was pretty well over. I only plowed six or seven days and it was so cold at the time that I could not give the engine a fair trial.

I was plowing on a mile score. We used to make a round every hour, making two miles per hour, including turning. Our gang consisted of two men. The only time we required horses was in the morning, to take out the oil and a can of water. We used about 8 pails of water per day. For fuel we used gasoline which cost us about $12.00 per day. You must remember that we were new at the work and used far more oil than an experienced hand would.

I think an engine will last twice as long threshing as it will plowing. It is just play for my engine to run a 33 x 35 Geiser separator. Our thresher crew consisted of an engineer, separator man, six teamsters and teams and three pitchers. We threshed about 1300 bushels of wheat and 3000 bushels of oats a day, and used about a barrel of oil. Yours truly, A. E. McEwen, Yellow Grass.

Rumely Outfits are Money Makers

Rumely Engines are Savers of Fuel, Labor and Time

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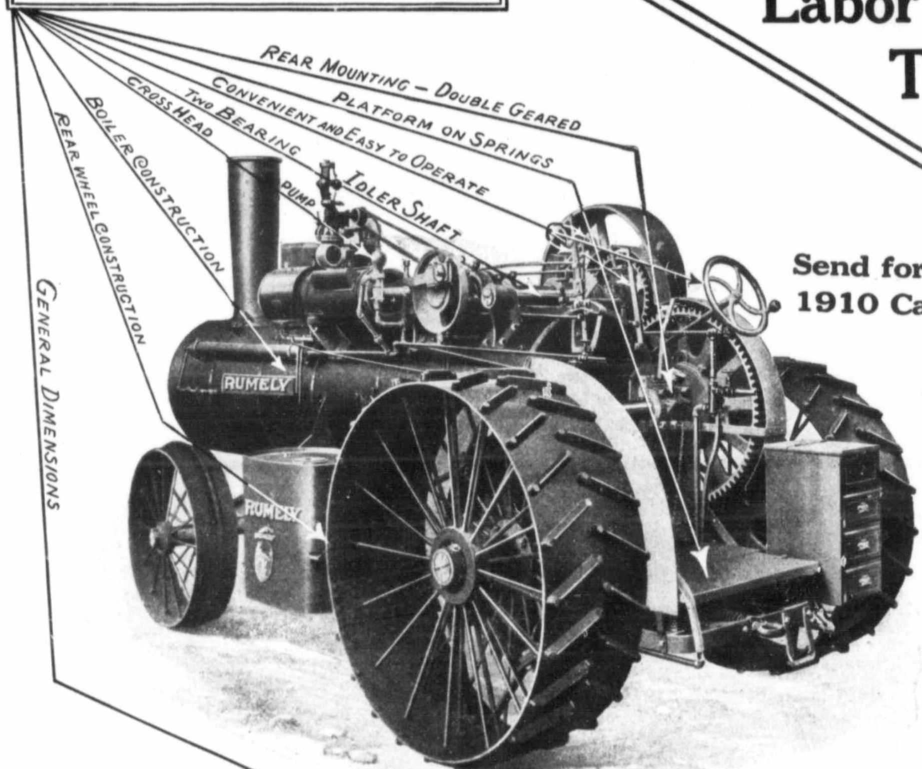

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Dimensions and Specifications Rumely Engines

			FIREBOX				BOILER							ENGINE												
							FLUES			SHELL		DOME		CYLINDER		BAND WHEEL			REAR WHEELS		FRONT WHEELS				EXTREME HEIGHT OF ENGINE Inches	
																									With Cab	No Cab
12	Single	Coal Burning Threshing Engine	23	26	36	151	40	2	72	28	88	16	18	7¾	10½	38	8½	225	64	14	46	6	87	174	...	90
16	Single	Coal Burning Threshing Engine	24	26	48	197	48	2	78	30	94	16	18	8½	10½	41	10½	225	64	18	40	12	96	190	118	114
20	Single	Coal Burning Threshing Engine	26	26	48	219	54	2	78	32	94	18	18	10	10½	41	10½	225	64	20	40	12	98	198	118	117
25	Single	Coal Burning Threshing Engine	28	28	48	231	58	2	78	34	94	18	18	10¾	11	41	10½	225	64	24	40	12	100	207	118	117
16	Double	Coal Burning Threshing Engine	24	26	48	206	48	2	84	30	100	16	18	6½-6½	10½	41	10½	225	64	18	40	12	96	202	118	114
20	Double	Coal Burning Threshing Engine	26	26	48	221	54	2	84	32	100	18	18	6½-6½	12	41	10½	225	64	20	40	12	98	206	...	117
25	Double	Coal Burning Threshing Engine	28	28	48	248	58	2	84	34	100	18	18	7 - 7	12	41	10½	225	64	24	40	12	106	213	...	122
20	Single	Universal Boiler Threshing Engine	30	33	48	299	69	2	84	36	100	18	18	10	10½	41	10½	225	64	20	46	12	106	204	...	124
25	Single	Universal Boiler Threshing Engine	32	35	48	327	76	2	84	38	100	18	18	10¾	11	41	10½	225	64	24	46	12	111	207	...	125
20	Double	Universal Boiler Threshing Engine	30	33	48	716	69	2	90	36	106	18	18	6½-6½	12	41	10½	225	64	20	46	12	106	210	...	126
25	Double	Universal Boiler Threshing Engine	32	35	48	343	76	2	90	38	106	18	18	7 - 7	12	41	10½	225	64	24	46	12	108	210	...	125

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"This outfit (Rumely Ideal Separator and 25 h. p. engine) has certainly made money for us and we are pleased that we decided, after looking all other ones over, to buy a Rumely rig."
BATTEEN BROS., Northville, S. D.

Rumely Ideal Separators Are Grain Savers and Money Makers

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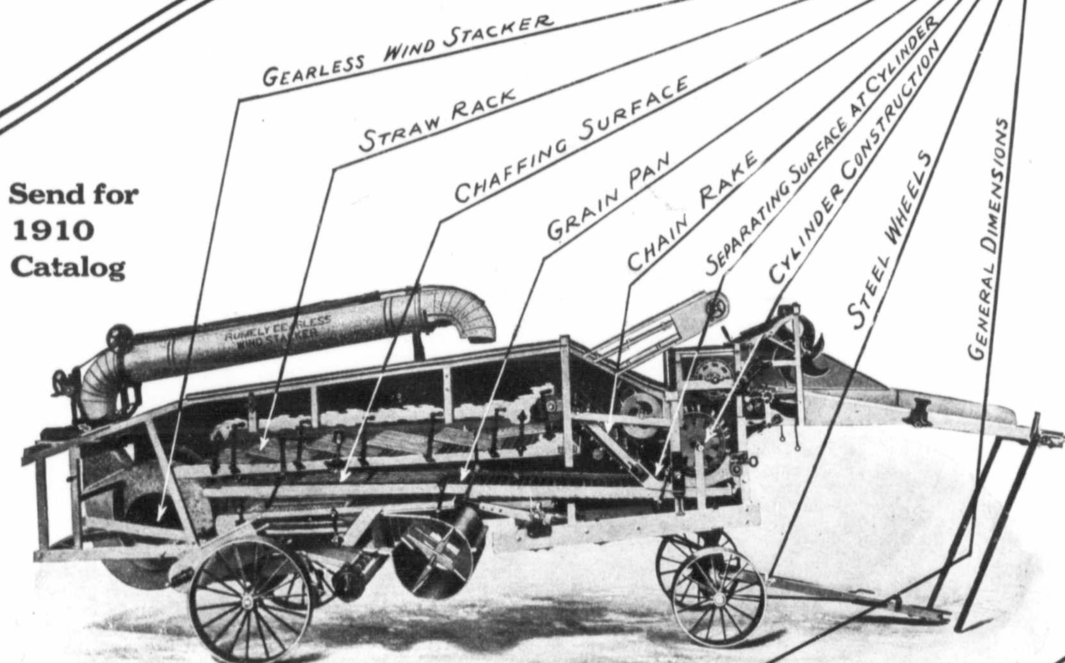


Dimensions and Specifications Rumely Ideal Separator

SIZE		CYLINDER									CONCAVES and CYLINDER			REAR									TRUCKS			
Cylinder	Rear				Number of Teeth			Driving Pulley						Straw Rack Length Ft. In.			Chaffer in Grain Pan		Chaffer in Shoe		Adjustable Sieve		Front Wheels		Rear Wheels	
28	44	28½	27¼	15	115	130	2¼	10½	10	850	5.25	1.93	7.93	12 10½	46.72	16½	7¼	25.31	42⅜	12.35	40⅜	13.52	34	6	44	6
30	48	29½	27¼	15	120	145	2¼	10½	10	850	5.63	2.8	8.66	12 10½	50.34	16½	7¼	27.33	42⅜	13.41	40⅜	14.01	34	6	44	6
32	52	32⅛	27¼	15	130	150	2¼	10½	10	850	6	2.22	9.38	12 10½	54.89	16½	7¼	29.82	42⅜	14.56	40⅜	15.93	34	8	44	8
34	56	33⅛	27¼	15	135	155	2¼	10½	10	850	6.37	2.35	10.11	12 10½	59.18	16½	7¼	32.17	42⅜	15.74	40⅜	17.20	34	8	44	8
36	60	36	27¼	15	145	165	2¼	10½	10	850	6.75	2.5	10.83	12 10½	63.86	16½	7¼	34.98	42⅜	17.01	40⅜	18.63	34	10	44	10
40	64	39½	27¼	15	160	185	2¼	10½	10	850	7.5	2.77	11.55	12 10½	67.88	16½	7¼	37.15	42⅜	18.17	40⅜	19.87	34	10	44	10

Dimensions and Specifications Rumely Ideal Junior Separator

24	40	24¾	22	12	80	111	2⅛	7½	9	1100	4.42	1.16	4.83	6 6	21.45	...	7⅝	24.27	32	8.44	36	9.3	30	6	30	6

Furnished in seven different widths of cylinders and separating parts.

Rumely Ideal Separators are Built to Save Grain— NOT to Save Freight

"I am running two outfits this year—a—— and a Rumely. Both are the same size and threshing in the same locality and same kind of grain and with the Rumely I can book from $15 to $20 more a day with only $4 more expense, two extra men to pitch bundles."
ROB EVANS, Lake Beriton, Minn.

M. Rumely Co.,

Soil Cultivation in the West

By E. HUGHES

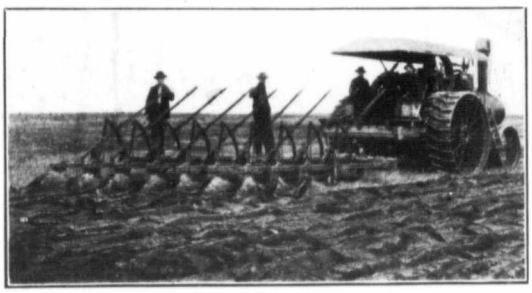
From the valley of the Red River to the foot of the Rocky Mountains stretches an area of country which, thirty years ago, was as little known, to the world at large, as the remote parts of China are to-day. To the world at large it was a barren, inhospitable waste, the greater part designated on our maps treeless, arid desert. It is true some travellers brought back stories that seemed to point to some variations from the general classification generally accepted. These stories came from enthusiasts and were accepted with so much salt that the whole mass was unfit for human assimilation. By degrees spots were discovered where the general designation of desert was palpably inappropriate; but when such places were looked up on the map, they appeared as mere specs in the wide expanse generalized. Though few of those who came to spy out the land had ever set foot in the commonwealth of Missouri, it took a lot of showing to make them believe there was a country here fit to live in.

It took a long time to show people that there were different kinds of soil and different climates in this great area. As climates and soils varied, so have the pursuits of the settlers. Towards the Rocky Mountains, where winters were mild and cattle could get a living outside for most of the year, stock-raising or ranching was followed almost entirely.

Wheat raising belonged to Manitoba, the Red River valley, where the soil is a heavy, black clay loam but, going west, one encounters all admixtures from the heaviest clay to gravels, even to drifting sand. As a rule, as elsewhere, the more clayey soils last the longest under bad farming methods and they need more motive power in cultivation.

For general rules, the land should be broken as shallow as possible when the grass has made a good start, thus dividing root and crown so that the sod will die as quickly as possible. A month to six weeks later backsetting, or plowing the same land about double the depth after breaking, commences. Broken land is the better for being rolled or packed after breaking so that the least possible moisture may be lost and the sod rotted with all possible speed. Discing should follow backsetting and harrowing be done in the fall. This should make a model seed bed for following spring.

The consensus of opinion among the best authorities favors the breaking and backsetting system for nearly all soils. A plan followed in Dakota and practised by Dakotans who come to this country, is to plow deep in breaking the sod, disc well, harrow and sow a crop of flax the first year. The second year the stubble is disced, harrowed and seeded without plowing. The third year the land is plowed four inches deep, and not until the fifth year is the original top of the sod brought up to the air again. This system is condemned by some authorities but it has the advantage of getting a crop the first year and the second crop without much work.



A Rumley Steam Tractor pulling a 9 bottom 14 inch Cockshutt Engine Gang. Outfit of Jacob Giem, Hirsch Sask.

However in some localities with a good top soil that is shallow it would not do, as the seed would be laid in subsoil and would not grow.

With a friable, sharp loam of good depth success has been attained by simply breaking rather deep, say four inches, and putting on discs and harrows till the sod is thoroughly pulverized. The advocates of this system claim that breaking and backsetting such land involves loss of too much soil moisture, but by discing, harrowing and packing at once this moisture is held. It is, however, impracticable with a heavy, strong sod.

When a crop has been drilled in, frequent harrowings, especially after rain, hold moisture and kill sprouting weeds. This should continue till growing crop is covering the ground well.

Strange as it may seem, much the same general principles of cultivation apply in the cases of very diverse qualities of soil. The reason is that good tilth, conservation of moisture and weed killing are as necessary in one soil as another and rainfall is light over all the country. The same degree of good tilth, or other requisites are not attained in a stiff, clay soil with the same power or in the same time as with a friable soil that pulverizes easily.

In the handling of stubble land much advance has been made in the last few years. Discing after the crop is cut is a good plan, for the process buries weed seeds, which start growing at once. These are killed by frost before they ripen a second crop and fall or spring plowing turns over a clean slice. Some good farmers have a disc following the binder continuously with splendid results. When fall plowing, or in plowing stubble in the spring, a gang plow with a light disc harrow attached does very good work in fining down lumps that would otherwise dry out quickly.

In calculating the power necessary to perform any of the different portions of the work on the lands of the Canadian north-west provinces, it is pretty certain that some land will take as much power as would be needed anywhere. In other places but a minimum is sufficient. Four 1,400 pound horses will be kept warm with a 14 in. breaker in some soils, while in others two lighter horses will cover the same ground in a day.

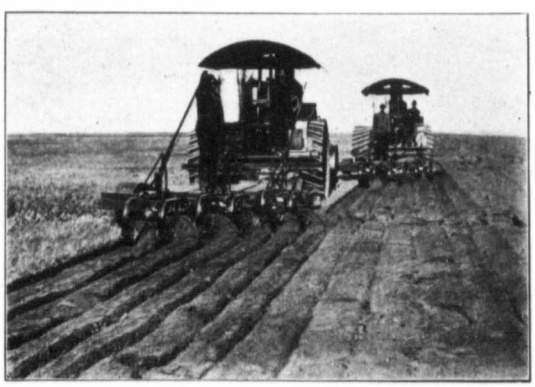
Though the above rules of cultivation hold good generally, anyone going into the south part of Alberta, which has been termed semi-arid till of late years, should observe the system of neighbors and procure a copy of the reports of the dry farming conventions. Much of Southern Alberta is irrigated and extensive systems have been instituted for distributing water, but in the same localities fall wheat was raised by dry farming methods and captured first prize at the great exhibition at Billings, Montana, in the fall of 1909. Yields there reach 40 bushels per acre without water. It is only within very recent years that this section of the country has demonstrated its ability to grow cereals at all and, already, the land commands the highest price of any irrigated land in the country, as purely farming land.

Much injury has been done by the overweening ambition to have a large crop. There is more money in 100 acres of crop perfectly tilled than in 200 on the get-in-all-you-can plan. The man who is wiser than his neighbors will keep stock from the start and feed more grain than he sells; thus making it possible to have his yields of grain as large ten or twenty years hence as now.

The old tales of inexhaustible fertility are the veriest bosh ever invented. There never was such land anywhere, but generally where there has been a series of owners, clinging to that insane idea, the mortgagor has had to rustle to realize the amount of his claim.

When a dry year came to the early settlers and crops were short, fallowing was resorted to with much improvement. Then it became popular. Land was cheap and some men found there was less rush in work by fallowing land one year and growing grain the next, keeping half the land unproductive. Such a thing is too costly to-day and it would only defer the evil day of exhausted land. Fallowing is good for weed killing and, with frequent harrowing much moisture is saved; land should not be plowed twice in a season if it can be avoided. Humus and intrates are wasted by such work.

When land becomes weedy, a good discing of the stubble in the fall, plowing in spring, cultivating and harrowing to kill weeds till 1st June will be fine preparation for a crop of barley. This can be cut and the land plowed again before weeds have gone to seed. With a cultivator and harrows weeds can be killed again and the land will be found clean again. If rape be sown broadcast about 1st September it will smother weeds, and either provide fall pasturage for stock or make plant food for next year's crop. Rape costs about $1.00 per acre for seed and is well worth sowing any time from 1st May till 1st Sept. if land is going to otherwise be idle for seven



Hart Parr Outfit of A. A. Johnston of Lethbridge Alta. John Deere Engine Gangs are doing the work

THE GAS TRACTION ENGINE
KING OF ALL GENERAL-PURPOSE FARM TRACTORS

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OUR FOUR CYLINDER GASOLINE TRACTION ENGINE

Does just the work you want done, and does it better and cheaper than you can get it done any other way. That is a big general statement but we can prove it right down to details.

THIS ENGINE IS NOT AN EXPERIMENT.

Thorough testing for 8 years has developed it to a point of perfection which combines power, lightness, economic use of gasoline, immense strength and endurance.

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a remarkable series of letters written by prominent farmers about the Gas Traction Engine—telling of their success with it in the field, breaking, plowing, threshing etc., sawing wood, road grading and general all-purpose farm work.

LIGHTEN YOUR LABORS

and increase your profits. Use the Gasoline Traction Engine wherever power, time-saving and lasting qualities are desired. Write to us and we will send you exact, convincing statements showing what economies and profits you can secure by use of our engine.

IT HAS POWER.

Will pull 6 to 8 breaking plows and from 8 to 10 stubble plows. One user writes: "We pull 12 stubble plows anywhere, and I know we could pull 16 or 18 if we had them."

IT DOES MORE WORK.

We estimate 25 acres as a day's work for stubble plowing, yet we have affidavits from farmers, who have broken over 40 acres of virgin prairie sod in one day with a Gas Traction Engine.

IT IS ECONOMICAL

Our claim is that it costs approximately 44 cents per acre to plow, yet we have affidavits from farmers whose cost was under 30 cents and as low as 24 cents per acre.

IT THRESHES MORE.

We say the Gas Traction Engine gives an average of 1400 bushels of wheat per day in threshing, where the wheat averages only 15 bushels to the acre.

Our estimated costs of harvesting are based on cutting 60 to 80 acres per day, but most users double that average.

THESE STATEMENTS MUST INTEREST YOU.

Compare the figures with your own costs, etc. You will find, as we claim, the Gas Traction Engine stands in a class by itself for work done and for economy of both time and money.

OUR FREE BOOK

"The Passing of the Horse" tells exactly how our Self-steering Gas Traction Engines are made—shows why they are strongest though light—explains the construction of each detail. Send for it.

TO THE WESTERN FARMER. Our book about the past history of agriculture, and its development up to the present, with its comparative statements of work done and cost of various farm motive powers is as interesting as a romance. It is yours for the asking.

THE GAS TRACTION BINDER HITCH which permits the easy handling of a Separator and road Graders in multiple with Traction Engines is a wonderful invention, manufactured only by us. **Every power outfit should have this hitch.**

FREE ***Cut this Out***

Send this coupon and we will send you a fine illustrated book "The Passing of The Horse."

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or eight weeks.

In the Province of Saskatchewan today is to be seen the most gigantic and remorseless carnival of soil robbery of modern times. The next generation will curse the farmers of to-day for the abject idiocies being perpetrated in the name of farming. It seems that every nation and every age must have its day of profligate waste that is only checked when dire want stares the people in the face. In Saskatchewan a warning voice is hooted and jeered. The waning yields of all America's wheat fields has no terrors for the "big-field" and "wheat-wheat-wheat" craze.

The bad state of the beef market and the atrocious handling of cattle by the railways in transit and at terminal points has done much to aggravate matters; but beef prices must improve for the agitation against these abuses has aroused an agitation that will enforce radical changes for the better. Pork and mutton are high, the former far passing all records. This year the best wheat, oats, barley and flax will be sold for more money in the stockyards than at the elevator and the land benefited thereby.

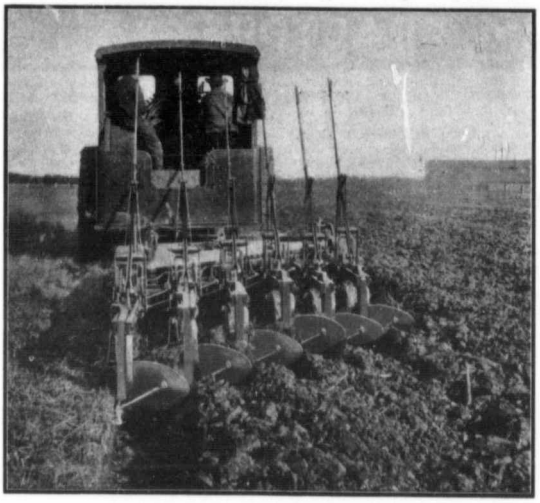
Denmark buys grain in the markets where ours is sold and Denmark is a country of very small farms, yet Danish butter passes our doors and reaches markets beyond, where it outclasses ours. Can it be possible that there is not something radically wrong?

TRACTION CULTIVATION

This subject is engrossing the attention of the progressive farmer to-day; for the great strides in effective implements and motive power compel the admiration of all who can comprehend their magnitude, and the influence they will have on agriculture.

Four short years ago the whole business was a gamble and regarded as a fad by many. The engines were cumbersome and shook themselves towards the scrap heap while drawing half a load. The hitches were home-made makeshifts, many of them marvels of ingenuity but impossible of general application. The implements followed in skirmishing order and the officer in command was compelled to "halt" and "dress" them with great frequency to keep them all facing "front".

To-day engines are lighter, stronger, more durable, faster and more economical. They turn more quickly and are far handier. The plows are in a frame that is a marvel of rigidity on the forward movement and the individual is under marvellous control of the operator.



An Avery undermounted Steam Tractor and a Cockshutt Engine Gang on Stubble.

The following statement of cost of breaking two thousand acres of land, cropping with flax, threshing and hauling to elevator, she shows what can be done under good management and favorable conditions. Possibly not every one could do as well, serve as a guide as to possibilities in this direction:

Cost of Breaking.		
Labor	$1,443.00	
Oil	1,298.00	
Board	333.00	
Sharpening plows	233.00	
		$ 3,307.00
Cost of Seeding.		
Seed	$1,750.00	
Oil	182.00	
Labor	130.00	
Board	30.00	
		$ 2,092.00
Cost of Cutting.		
Labor	$ 528.00	
Oil	229.00	
Board	144.00	
		$ 901.00
Cost of Threshing.		
Labor and Team Work	$2,545.00	
Oil	367.00	
Board	473.00	
Horse Feed	110.00	
		$ 3,495.00
Cost of Hauling.		
Labor	$ 284.00	
Oil	146.00	
		$ 430.00
Lubricating Oils for the entire work	360.00	
Incidentals	500.00	
Total	$11,085.00	

The same outfit broke one thousand acres more the same season. The cost of this work is not included in the statement. The total yield was 32,000 bu. of flax, which brought $48,000 at the elevator. Kerosene cost 13c. per gallon and gasoline 17c. These prices are below the price of oil and gasoline in this country but the oil is a low grade on which some engines, it is claimed, do excellent work.

With such facilities for doing cultivation and all work in handling a crop at such a price, surely no excuse remains for insufficient tillage or sloppy work in raising flax or wheat.

Co-operation in an outfit, as for threshing, would be most advantageous in the way of getting work done economically; and the horse, which is not superseded, by any means, yet, will be less frequently called upon, minus hide and hair, to bleach his devoted slats on our gently undulating landscape. His lot has often been a hard one, when big crop returns enabled his owner to replace him without financial jolt when he died. Relieved of the worst of the work, his usefulness will be rather enhanced. In grateful remembrance of his more unfortunate brothers, who have passed into oblivion by the sacrificial route, may his present master make his lot a little easier and give the respect past devotion has richly earned.

This co-operation scheme has been successfully carried out in Texas and elsewhere. Experienced engineers are employed, first-class blacksmith's camp with the outfit to repair machinery and sharpen shares; and every department is handled on the most up-to-date business methods.

Concrete Fence Posts

By K. J. T. EKBLAW

It has been estimated that the number of fence posts used each year is well above five hundred millions. This means that in ten years five billion new posts will be required to replace those now in service. Assuming that each post costs the low price of fifteen cents, the farmers of the country are going to spend seventy-five million dollars the next ten years for wooden posts, which in a few years will be practically worthless. In fact, the greater part of the number of posts used cost more than fifteen cents each,

so the aggregate cost will be well over a hundred million dollars. Most of these posts are cut young trees, which if left to attain their full growth, would be a source of supply tending to alleviate the lumber famine which obviously will soon be upon us.

With these considerations in mind, the economy of concrete fence posts is evident; their first cost may be slightly higher than that of wood posts, and in most cases this is true; however, the life of a well-made concrete post is practically endless, so that a young farmer who puts in concrete posts on his farm, makes an investment which yields dividends of approximately ten per cent. each year, and which requires practically no maintenance charge.

The requirements for a satisfactory post are low cost, reasonable strength and durability. The cost of concrete posts varies greatly under different conditions, considering labor, kind and accessibility of material, and size of posts as the determining factors. When a farmer makes his own posts during slack times and on rainy days, the labor item is very small. When there is a gravel bed or stone crushing plant easily accessible, the cost of material is greatly reduced. The size of posts enters to a certain extent in the figuring of cost, as a square post will require approximately twice as much material as a triangular one of the same length, width and thickness.

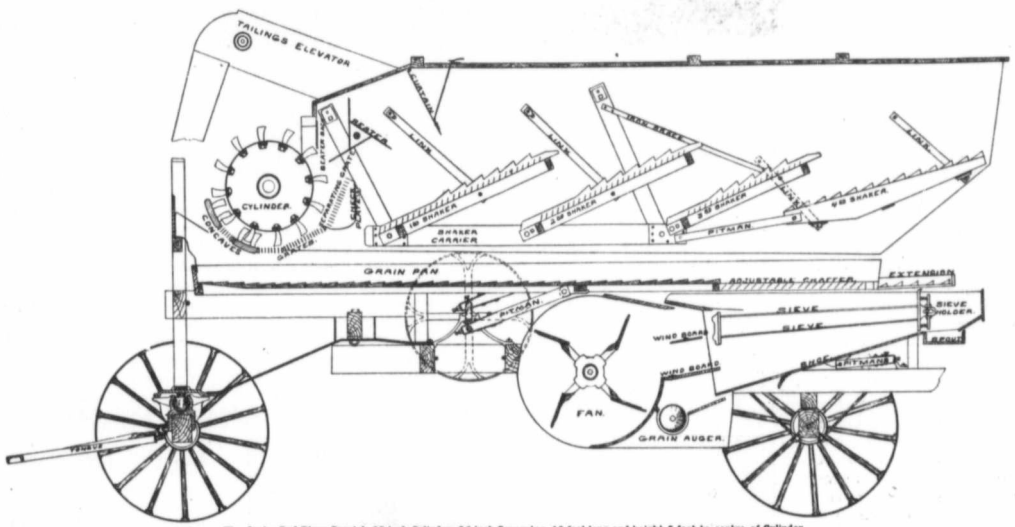
Selection of first class material is absolutely essential in the manufacture of concrete posts. Poor material and careless workmanship are responsible for the objection to concrete work in numerous localities. If good materials are selected in the first place, and are properly mixed and placed, the resulting concrete will prove satisfactory in every case. In the matter of cement, only Portland cement should be used, for it has been proved to be eminently superior to other kinds in every sort of concrete construction; it is mixed in chemically correct proportions, and gives a uniformly strong mixture, which is not true of natural cement. Since the maximum strength and lightness are desirable in concrete posts it is economical to use only

Continued on page 68

Something New in Threshing Machinery

A Thresher for the hills. A Thresher for small power---gasoline or steam. A Thresher for the individual farmer. A small Thresher which is not a toy. A Thresher which will do a big day's work. A Thresher which will do the very best of work. If you live in the hills where the roads are bad. If you have a gasoline engine either traction or portable. If you have a small steam engine. If you want a small machine which can easily and safely be hauled over a rough country, which requires small power and yet which will thresh 1000 bushels of wheat per day, this is the Thresher for you.

It is a small machine which will thresh as much and save and clean the grain better than many large Threshers.



The Junior Red River Special, 22 inch Cylinder, 36 inch Separater, 13 feet long and height 5 feet to centre of Cylinder.

It has "The Man Behind the Gun" and saves the "Farmer's Thresh" Bill. The only small thresher which will do the work of a large one. Can be furnished with wind stacker and self feeder or side gear for horse power. It will do very much more work than other so called small threshers. It is no plaything but a Thresher for Business. Write for special circular.

Nichols & Shepard Company

Battle Creek, Michigan.

BRANCHES: Fargo, N. Dak.; Minneapolis, Minn.; Madison, Wis.; Lincoln, Nebr.; Regina, Sask.; Des Moines, Iowa.; Peoria, Illinois; Nashville, Tenn.; Winnipeg, Manitoba; Kansas City, Missouri; Indianapolis, Indiana; Geo. H. Gallagher Co., Spokane, Wash.; Keating Imp. and Mach. Co., Dallas, Texas; Consolidated Wagon & Machine Co., Salt Lake, Utah.

Traction Engines

By W. F. McGREGOR, M. E.
Presented at the Third Annual Convention of American Society of Agricultural Engineers.

The early history of the traction engine goes back to the very earliest history of the steam engine itself. We find that James Watt's attention was called to the possibility of a steam driven carriage in 1759. He included the locomotive engine in his patent of 1784 and the same year his assistant, Murdock, made a working model of a locomotive. As early as 1769, a Frenchman, Cugnot, made a three-wheeled, two-cylinder steam carriage which carried four passengers and attained a speed of 2¼ miles per hour. However, it capsized one day in the streets of Paris, which incident led to the imprisonment of the inventor and stopped further trials.

The first record we have of a steam-driven vehicle in America is the patent issued to Nathan Reed in 1790. About the beginning of the nineteenth century, Oliver Evans completed a flat bottomed boat to be used around the Philadelphia docks and mounting it upon wheels propelled it by its own steam engine to the river. This is the first record we have of the building of a traction engine in America. However, Evans was evidently impressed with its possibilities, for he asserted that carriages propelled by steam would soon be in common use, and offered a wager of three hundred dollars that he could build a "steam wagon" that would travel faster than any horse that could be matched against it. This perhaps speaks more for Mr. Evans' sporting blood than for his mechanical judgment, for although his statement has been proved correct during the present automobile age, it would doubtless have troubled the gentleman considerably to have produced one in his day.

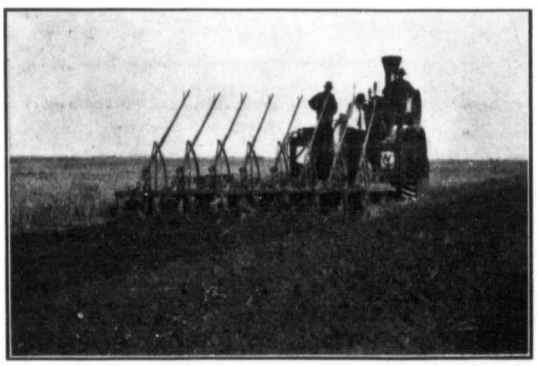
About 1830, when the common roads had been considerably improved in England and when railroads were being opened in several places, the idea of the introduction of steam carriages on common highways became popular with inventors. During the following three or four years several steam carriages were built and put in operation in and around London. Some of these made regular trips carrying passengers, and reached speeds as high as ten miles an hour. At one time the successful introduction of road locomotives seemed to be almost an accomplished fact in England. Finally, however, further development was discouraged by opposing legislation and perhaps also by the fact that steam railroads were making rapid progress, for up to this time the designers and builders of traction engines had in mind the passenger traffic. In America the roughness of the roads was an additional obstacle of importance.

But few traction engines were built during the period from 1840 to 1875, altho the patents issued during this time include several devices which are generally supposed to have been first proposed at a much later date. Among these is the "caterpillar" wheel (1856); the four-wheel drive (1857); the traction wheel with spikes which may be withdrawn (about 1859); and the double-undermounted engine (1868).

About 1876, when portable engines were used to quite an extent for power for threshing machines, it became apparent that it was only logical that these engines should propel themselves and also perhaps pull the threshing machine from place to place. The manufacture of traction engines was then begun in earnest and in 1880 we find about ten firms engaged in their manufacture, about eighty per cent. of which are still in the business.

A Goold, Shapely and Muir Gas Tractor pulling a 5 bottom 14-inch Cockshutt Engine Gang in Manitoba Gumbo.

Originally, no sharp distinction was drawn between the traction engine and the self-propelled passenger vehicle. The idea of the latter was again taken up in the later eighties, but since then development along this line, resulting in the present automobile, has been entirely aside from the development of what is now known as the traction engine.



A Moline Engine Gang doing some nice work in stubble.

It is not the writer's intention to dwell upon the history, and this has been touched upon merely that we may better appreciate the present stage of development and possibly obtain some idea along which lines of improvement may be expected. We shall perhaps arrive at this most directly by considering for a moment the engine we would have if all of the desirable features were combined in one; if we met all conditions in the best possible way; if we had, in short, an ideal traction engine. These features might be something as follows:

1st. In the ideal traction engine the fuel cost must be low, and the fuel should be easily obtainable at any time in the local market.

2nd. The ideal traction engine must be simple and reliable—that is, it must be always capable of delivering the required power.

3rd. The ideal traction engine must be durable, for maintenance and depreciation must be counted in the cost of power delivered.

4th. The ideal traction engine would be safe against the danger of injury to life and property from explosion or fire.

5th. The ideal traction engine would be able to drive over anything in the way of roads or ground that it would meeet. It would be able to negotiate steep hills, sand, soft ground, sloughs, wet clay, mud, snow, ice., and also travel on pavements without injuring them. It would have wheels that could not slip on any surface and the engine would always be able to furnish whatever power was required to turn them.

6th. The ideal traction engine would be well balanced and would run steadily; that is, it would be able to maintain a constant speed whether running empty or under full load. This is necessary because the separators and some other machinery which it is required to drive can only do good work when run at an unvarying speed.

7th. The ideal traction engine would require only such attention from the operator as would be required to make it conform to the requirements. It would be easily steered and would turn as short as desired.

8th. The ideal traction engine for all localities should not require a great amount of water, for although this is usually plentiful, there are localities where it costs considerable to furnish it, and this cost must be counted in the cost of power delivered.

9th. In the ideal traction engine the cost of lubricants and miscellaneous supplies would be low.

10th. The ideal traction engine would be noiseless in operation.

11th. The ideal traction engine would be simple in construction so that anyone could easily learn to operate it.

12th. The ideal traction engine would be constructed so that the operator could easily manipulate it, and be protected from dust and weather.

When several manufacturers build a machine for a certain purpose year after year, they are obliged, to a great extent, to follow the demands of the purchasers and operators, who are naturally most intimately affected by the state of perfection of the machine. It is, in short, in the end simply a matter of the "survival of the fittest". We have many examples in farm machinery, in which the accepted type has become well established. It may then be fairly assumed that the most popular type—the one which, other things being equal, sells in the greatest numbers—is the nearest to the perfect or ideal.

There is still considerable variation in the design of traction engines built by the different manufacturers, but in the case of the steam traction we may now begin to see some tendency toward a common type. The internal-combustion tractions, on the other hand, being of more recent origin, naturally show greater variation in design and construction.

To-day most of the leading builders of both steam and gasoline engines mount the engine on four wheels, the rear two of which are the drive or traction wheels, while the front ones are used to steer the engine. In a few cases a single front wheel is used. The weight is usually distributed so that from two-thirds to three-quarters of it is carried by the traction wheels. A certain amount of weight is neces-

sary on the front wheels so that the engine may be steered when pulling, for the gearing then tends to lift the front wheels from the ground. Four wheel drive engines have been often proposed and sometimes built, one firm having manufactured them successfully for a number of years.

The differential gear, which allows both wheels to drive all the time independently of the direction of travel or the straightness of the path, is universally used. In practically all of the large engines, the differential gear is located on the countershaft with two sets of gears transmitting the power from the countershaft to the traction wheels. Friction clutches are in most cases provided to facilitate disconnecting the engine from the traction gearing when desirable for belt power.

Among steam engines, the locomotive type of boiler has become quite general and of the large manufacturers there are now only three building the return-flue and of these only one builds it exclusively. Upright boilers and water-tube boilers have been and are used, but not generally. It is common to mount the engine above the boiler, there being only a few firms who have been or are building under-mounted engines and the number of these built is small in comparison with the total number of traction engines. Both single and two cylinder steam engines are built, a number of the leading firms building both types. Of the sixteen representative firms which may be considered the leading manufacturers, six build the single cylinder exclusively and one builds the two cylinder exclusively. The "live" axle, that is, the system of mounting whereby the traction wheels are placed upon an axle that turns, is gaining ground, and we now find more manufacturers using it, at least for their larger engines, than ever before.

In valve-gears, the Stephenson link was the favorite at one time, but at present we find only two or three of the leading firms using it. The simpler valve-gears are now more popular, the shifting eccentric and radial types both being well represented. Some form of the radial type is used on over fifty per cent. of the engines manufactured.

The throttling governor is generally used, and very close speed regulation has been obtained with it. The ideal speed regulation for driving a separator or other belted machine is to have a slight increase in speed with full load in order to make up for the slippage of the belts. Throttling governors are now made which will give ideal results in this respect, the speed increasing gradually with increase of load until at full load it is about two per cent. faster than at no load. The automatic cut-off governor has been used on agricultural engines more or less in Europe, but very rarely in this country. The throttling governor dries and superheats the steam and, used in connection with a valve-gear which admits of "hooking up" to vary the point of cut-off according to the load requirements, gives good results in economy of steam consumption. These points are mentioned, as showing in a general way the tendency towards certain forms of construction by the leading manufacturers of traction engines, nearly half of whom have now been in the business above thirty years.

The following table gives some data of current practice in steam traction engines by leading manufacturers in the United States:

TABLE I

STEAM TRACTION ENGINE PRACTICE IN THE UNITED STATES

Showing ratio of stroke to bore, normal engine speed, piston speed and rate of travel of 108 engines of the different sizes built by fifteen leading manufacturers.

Make of Engines.	Average for different sizes of each make.	Ratio of stroke to bore.	Normal Engine speed R.P.H.	Piston speed feet per minute.	Rate of travel miles per hour.
No. 1	6	1.352	257.0	462.0	2.205
No. 2	9	1.190	244.4	402.6	2.313
No. 3	6	1.231	223.3	390.5	....
No. 4	12	1.410	236.6	412.4	2.152
No. 5	7	1.213	251.4	405.9	....
No. 6	12	1.403	247.0	456.3	....
No. 7	2	1.250	220.0	366.0	2.100
No. 8	9	1.373	256.4	474.3	....
No. 9	6	1.363	227.5	441.7	....
No. 10	6	1.285	232.5	406.2	2.170
No. 11	10	1.288	247.5	461.5	....
No. 12	7	1.236	240.7	412.4	....
No. 13	6	1.117	246.7	431.0	2.498
No. 14	5	1.108	240.0	416.0	....
No. 15	5	1.718	238.0	414.2	....
Total	118				
Minnimum		1.00	200	246	1.67
Maximum		2.18	300	557	2.63
Average		1.313	240.6	423.5	2.239

The figures in the columns of the table are obtained by averaging the various sizes of engines built by each of the fifteen manufacturers. The minimum and maximum given at the bottom of each column, however, in each case show the extreme of any one size, while the averages below are the averages of all sizes and all makes represented, and consequently are not necessarily the same as any figure in the column above. These figures are given, not only as illustrating the general practice along certain lines, but also because some of these figures are interesting in connection with the points brought up later on.

There are a few traction engines which differ quite widely from the accepted type, but these have, as a rule, been built for some particular class of work and are not usually conceded to be suitable for general work in various localities. Among these are the Best and Holt engines which are built on the Pacific coast, primarily for hauling combined harvesters, but are also used to some extent for plowing, working the soil and for hauling logs, ore, etc. These engines are quite large, some being rated as high as 110 horse-power. When required, the boilers furnish steam for an auxiliary engine to drive the header and traveling thresher. Although built for similar purposes, these two makes differ considerably in construction, as one has an upright boiler while the other has a horizontal boiler; one has a single engine while the other has a double engine; and one is chain driven while the other is gear driven. Both ordinarily use crude oil for fuel. Both use a single front wheel, have traction wheels of large diameter (seven to nine feet), and have wide tires, widths of four or five feet being common. One of these manufacturers has built special engines with the traction wheel-tires thirteen and even sixteen feet wide.

Another example of an engine built for a special purpose is the Lombard, made in New England. This engine is of the double-under-mounted type with locomotive boiler. In place of the usual traction wheels it has the so called "caterpillar wheels", and in place of the front wheels it has runners. It is used to haul logs on snow or ice roads in the woods and the exhaust of the engine is thrown down on to the road where it freezes and renews the ice, making it unnecessary to sprinkle the road as is done when hauling by horses. The caterpillar wheels consist of an endless steel belt running on two sprocket wheels. The part of this belt or chain in contact with the ground is kept in practically a straight line by rollers on the inside. This arrangement, as already noted, was proposed quite early in the history of the traction engine, and is supposed to have great traction power. Several engines with caterpillar wheels have been built in England and a few in this country.

Walking wheels also have been proposed at various times. These have feet hinged so that they remain flat on the ground while in contact with it.

A discussion of the traction engine at the present time is not possible without some reference to the relative merits of the steam and internal combustion engines, but it is not the purpose of this paper to attempt to show which of the two is more nearly ideal. In such a comparison, all the factors which go to make up the ideal engine as outlined must be taken into account and this is difficult, for the experience of one operator varies widely from that of another. In fact, the personal element of the operator enters so largely into the question that in many cases it is the deciding factor in determining the reliability, the durability, the cost of attendance, the cost of maintenance, and it usually determines to a more or less extent its ability to travel over bad ground or difficult places, its safety and the amount of lubricants required.

The fuel cost is always an important item, except when it is straw

that is otherwise of no value, and it is sometimes the deciding element. It is well known among engineers that the internal combustion engine is capable of, and in fact, gives a higher efficiency than the steam engine, but this is ordinarily of little interest to the purchaser. What is of vital importance to him is the actual cost of the fuel per unit of power delivered at the belt or at the draw-bar. It should not be difficult to obtain this, but one obstacle in the way of so doing is the lack of a uniform unit of power, or rather the lack of uniformity in the popular conception of the unit of power among users. Public motor contests, such as those held at Winnipeg and Brandon last summer should be encouraged, as they are of considerable importance not only in the interests of science, but to both the users and the manufacturers of the engines represented, in that they give some authentic figures to use as a working basis.

In obtaining fuel costs and in selecting an engine for a given purpose, the intending purchaser of a traction engine is confronted by a very confusing problem on account of the differences in the methods of rating by the various manufacturers. Steam traction engines have been rated at from a half to a quarter of their actual horse-power, while internal combustion engines have been rated at figures more closely approximating their actual horse-power. Most manufacturers publish only the rated or nominal horse-power, altho several now publish both rated and brake horse-power, and a few publish only the brake horse-power. Actual horse-power, as determined by the Prony brake test, is becoming better known, but ordinarily the purchaser has no means of applying this test; consequently a uniform system of rating, based on the cylinder dimensions, pressure and piston speed is very desirable. It would not be a difficult thing to arrive at and it seems that the necessity for it is becoming more apparent each season. If it falls within the scope of work of the American Society of Agricultural Engineers to propose some system of uniform rating or to work towards the adoption of uniformity in this matter, it would, in the writer's opinion, be conferring a great benefit on the man who purchases or operates the traction engine—the traction engine which embodies more engineering than any other piece of farm machinery.

The Association of Licensed Automobile Manufacturers have adopted a horse-power formula as a ready reference guide by which the power of different motors may be computed with reasonable accuracy in a short period of time. It has been possible to reduce this formula to the simplest condition, because American practice in automobile motor construction is quite uniform. This formula is simply

$$H\ P = \frac{D^2 \times N}{2.6}$$

where D equals bore of cylinder in inches
and N equals the number of cylinders.

This is based on the assumption of a piston speed of 1,000 feet per minute, of a mean-effective pressure of say about ninety lbs. per sq. in. and a mechanical efficiency of about seventy-five per cent, all of which approximate American practice in this line, with sufficient accuracy to serve the purpose for which the formula was intended.

As the practice is not so uniform among the builders of traction engines, either steam or internal combustion, it is not possible to use such a simple formula. However, we may find comparatively simple formula which can be applied by most of the buyers or operators of these engines, which will give reasonably accurate results.

We will take the usual formula for indicated horse-power as determined by the indicator,

$$H\ P = \frac{P\ L\ A\ N}{33000}$$

where P equals mean effective pressure,
L equal lengths of stroke in feet
A equal area of piston in sq. ft.
N equal number of power strokes per minute.

The "number of power strokes per minute" is twice the number of revolutions in the steam engine, and one-half the number of revolutions per minute in the four-cycle internal-combustion engine. The area of the piston-rod of the steam engine is neglected in these calculations, but this does not materially affect the results. Practically all steam traction engines have the point of cut-off such that the mean-effective-pressure may be as much as one-half the boiler pressure. Now, we ordinarily have the boiler pressure expressed in pounds per square inch, the cylinder bore and stroke in inches and speed in revolutions per minute, so for simplicity we can write our formula in these terms and combine all of the constants. For indicated horse-power it then becomes practically as follows:

$$I\ H\ P = \frac{2\ P\ L\ D^2\ N}{1{,}000{,}000}$$

in which P equals boiler pressure,
L equals length of stroke in inches,
D equals diameter of cylinder in inches,
N equals number of revolutions per minute.

In these engines the mechanical efficiency should be (and is under proper conditions) about ninety per cent., so we may write our formula for brake horse-power as follows:

(A) $$B\ H\ P = \frac{18\ P\ L\ D^2\ N}{10{,}000{,}000}$$

TABLE II

HORSE POWER OF STEAM ENGINES

Twenty-five examples computed by formula compared with horse-power by other methods.

Rated H.P.	Cyl. Bore (inches)	Stroke (inches)	No. of Cylinder	Steam Pressure (lbs. per sq. in.)	Rev. per min.	Brake H.P. Claimed.	Brake H.P. in public test.		Brake H.P. by formula.
1	..	6	8	1	125	300	20.6	.....	19.4
2	10	7	9	1	120	240	.....	.....	22.9
3	10	7¼	10	1	150	225	.....	.....	31.9
4	12	8	8	1	125	250	28	.....	28.8
5	..	8	10	1	125	250	.....	.....	36.
6	13	8	10	1	130	252	.....	.....	37.7
7	14	7½	10	1	175	220	42	.....	39.
8	14	6	10	2	150	260	42	.....	50.5
9	15	7¾	10	1	150	225	.....	.....	36.5
10	16	8½	10¼	1	135	240	48	.....	43.2
11	18	8	11	1	135	250	.....	.....	42.8
12	18	8½	12	1	150	260	54	.....	60.9
13	19	6 & 7	10	2	125	230	45	.....	44.
14	20	8¾	10	1	125	250	.....	.....	43.
15	20	10	10	1	130	250	60	62.9	58.5
16	22	9	11	1	150	220	.....	.....	52.9
17	25	9½	12	1	150	230	60	.....	63.8
18	25	7	11	2	160	257	76	76	79.8
19	30	11	12	1	135	240	116	.....	84.7
20	30	7	10	2	145	300	90	73.6	76.7
21	32	7 5-8	14	2	125	230	.....	.....	84.2
22	32	12	12	1	160	230	110 .	97.5	114.5
23	35	7 7-8	11	2	150	225	.....	.....	82.6
24	35	7¾	12	2	135	250	.....	.....	87.6
25	36	7¾	14	2	165	235	120	105.5	117.4

For one cylinder B.H.P. equals $\frac{18\ P.L.D^2\ H.}{10{,}000{,}000}$

Continued on page 66

APR.

The Canadian Thresherman and Farmer

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SECRETARY

F. C. BRAY
TREASURER

"Everything begins and ends with the soil."

1910

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Advertising copy in order to secure good position should be in our hands not later than the 15th of the month preceding date of issue.

Advertising rates furnished on application.

THIS, the second Traction Cultivation number of The Canadian Thresherman and Farmer in 1910, should demonstrate to both reader and advertiser alike that we know something about the game and that we are in it for keeps.

Despite the fact that there are more plowing engines sold in 1910 in Western Canada than in the two previous years, the price of horses is higher and there is more demand for them than ever before. This would indicate but one thing and that is that Western Canada is going to turn over some land this year and turning over this land, it will produce a crop that will be bigger by far than anything in the records of Western Canadian Agricultural history.

* * * * * * *

The Motor Contest for 1910 to be held at Winnipeg promises to be by far the biggest yet. It will be a more exhaustive test, will be longer, and will be from all indications participated in by a much larger number of contestants than either 1909 or 1908.

These Motor Contests are of inestimable value to the farmer in that they demonstrate to him just what the traction engine will do. Another feature of the 1910 Contest, which will in all probability be carried out is a comparison between the traction engine and the horse. The Exhibition Association propose to have plows at work upon the same ground as the traction engine. Careful note will be taken of the amount of work they do, the cost of doing it, etc., and this will be compared with the work that the traction engines do in order to arrive at a comparative statement between the horse and the traction engine.

This is a thing in which the farmer is vitally interested. It is always a question with him before he purchases a traction engine as to whether or not it will be a paying proposition, whether or not he can discard his horse outfit and substitute the traction engine at a saving to himself. The test at Winnipeg will not demonstrate this conclusively, but it will provide a basis from which the farmer can calculate.

Every manufacturer who has a traction engine suitable for traction cultivation purposes whether it be steam, gasoline or kerosene, should enter this contest. The manufacturer who builds steam traction engines goes to the farmer and through the medium of his salesman and catalogue, etc., tries to prove to him that the steam engine is the whole thing in traction cultivation work, and that the oil engine is not the thing best suited to his needs. The oil engine manufacturer does practically the same thing. Consequently, it is up to every manufacturer to come into this contest, not so much with the idea of winning a medal because when we get right down to brass tacks, medals are not the real things, but with the idea of furnishing the farmer with reliable data to back up the manufacturer's argument.

The tests are carried on thoroughly and impartially, each and every manufacturer having a fair show. He should get into the spirit of the game, playing it to win if possible, but accepting his defeat with the best of grace and go home with the firm resolve that he will either build a better engine or will come back another year prepared to win.

The Exhibition Association have stayed by the game and are staying by it in a way that calls for commendation. It is not a money making proposition in so far as they are concerned, but they realize that it is of interest to the farmer and they are in the Exhibition business to give him the best value for his money that they possibly can. The farmers should do their part towards providing a big show by attending in a body and watching the game. With the plans that are under way and which will be made known later there is absolutely no reason why we cannot have the biggest motor contest in Winnipeg in 1910 that has ever been held in the world and there is absolutely no reason why we cannot secure data from the results of this contest that will be worth thousands of dollars to the farmers of Western Canada. Just pass the word along, talk about the motor contest to your neighbor, get him interested and induce him to come down to Winnipeg and see for himself just what the traction engine can do for him.

Engines will be on the field in a wide range of sizes suitable to every farmer's needs, from the man who owns a quarter section up to the man who owns three and four sections, and everything possible will be done to make the results as beneficial to the farmers as it is within the power of the judges to make them.

We shall have considerable to say about this motor contest during the next two or three months, but as a last word we would like to say to the farmers that if each and every one of them will put this motor contest on some little shelf of his memory until such time as he can come to Winnipeg and see the contest that no small amount of good will result.

* * * * * * *

We had the opportunity a short time ago of viewing the plans for the University of Saskatchewan and after going over them carefully we must say that the province is to be congratulated on preparing for such a broad-gauged educational institution. When the plans are carried out, which will probably take a number of years, the province of Saskatchewan will have a University that will be equal to anything on the American continent. It will provide educational facilities for its young men and young women that will enable them to fit themselves for any vocation that they may desire, whether it be agriculture, the arts and sciences, law, medicine, etc., etc., etc. It is a grand move and should receive the hearty support not only of the people of the province of Saskatchewan, but every province in Western Canada. It costs money, it costs time and it will cost an infinite amount of labor, but everything that is expended will return to Western Canada in the shape of future generations of young men and women that are fitted to go out on the avenues of life and to take their places side by side with the best minds of the world.

This is not mere talk, it is a fact and the future position of the province of Saskatchewan will prove it conclusively.

ABOUT OURSELVES

IN these columns from month to month we shall attempt to give to our Readers a brief digest of what we consider the strongest features of the issue in question, notices of New Departments, etc., etc. In short it will be a handy place to turn to when you wish to know what you may expect from future numbers of "THE CANADIAN THRESHERMAN AND FARMER.

OUR readers will note that this issue of The Canadian Thresherman and Farmer is devoted to Traction Cultivation, as was our issue for March.

The increasing popularity of tilling the soil by the use of mechanical power has led us to do this, as we believe that this topic is of sufficient importance for us to devote a portion of two issues to it. We have gathered together a large amount of material on Traction Cultivation in these two issues and if our readers will go into them carefully we believe that they will be a great deal wiser as regards the proposition of Traction Cultivation than what they were before.

* * * * *

SOME CASH PRIZES.

In all the traction cultivation letters that we receive very few of our correspondents have ever had much to say about the matter of hitches. A great many of the photographs show that the farmers are pulling harrows, both disc and drag, drills, pulverizers, etc. behind their engines, but none of them go into details as to just how they attach the various implements.

We should like to hear from traction engine owners regarding this and will offer the following prizes for what we consider the best ideas along this line.

The first prize will consist of $5.00 in cash for the first best idea; $3.00 in cash for the second best idea and $2.00 in cash for the third best idea.

Illustrate with a rough pencil sketch where you can, but if you can't do this, give us as good a description as possible. We should like to hear from a number of traction engine owners along this line, as we believe that there has been sufficient experience among traction plowmen to permit of our receiving a goodly number of replies.

* * * * *

On another page of this issue will be found a double page advertisement that is worth money to all of our readres. In addition to our Guessing Contest we are giving away some very nice premiums for just a little bit of work on your part. We are giving away a valuable watch, guaranteed for one year, and an excellent time keeper for obtaining four subscriptions to out magazine. For obtaining two subscriptions you secure a first class jack-knife, or an "Awl for All' which is one of the handiest little tools that we have ever come across.

In that advertisement will be found a number of subscription blanks. All that you have to do is to speak to your neighbor where you see him and if he is not already a subscriber, it will be a very easy matter for you to get his subscription. If every one of our readers would send us in two new subscribers, it would treble our present subscription list. The bigger the subscription list, the etter the paper you get, so that you are really working for your own interest in the matter.

Just keep this in mind and bring it up before your neighbor the next time you see him. In addition to your securing these prizes for your work, we will give you a guess in our Big Two Thousand Prize Guessing Contest for every subscription that you send us. The person whose subscription you secure is also entitled to a guess. As we have stated before many times in this magazine, we are going to give away $4572.50 worth of prizes and the guesses which you register for sending in these new subsrciptions should without a doubt, bring you some of these valuable prizes.

Won't you do a little work for us along this line? Just a word from you as to what you think of The Canadian Thresherman and Farmer passed along to your neighbor will do us a lot of good and at the same time will put you in the way of winning some very valuable prizes.

The Importance of Farm Machinery in General, and the Gang Plow in Particular.

First Prize Essay of the Canadian Thresherman and Farmer Contest at Manitoba Agricultural College

By A. J. McMillan

The contrast between the crude farmer of a century ago and the progressive agriculturist of to-day is due to improved education along agricultural lines and to the introduction and improvement of complex machinery for the cultivation of the soil and the economic handling of farm products.

The success of agricultural pursuits depends primarily upon the accomplishment of the largest possible results, both in quantity and quality of work, at a minimum cost.

To prove that this point is reached mainly through the influence of farm machinery one has only to refer to the farmers of the North American Continent who to-day are the largest users of farm machinery and through its use have made this the greatest agricultural country in the world.

In the first two hundred years after the pilgrims settled on the American shore the abundant natural resources of the country failed to bring any great increase in the products of agriculture, but the introduction of the most ancient implement in history formed the connecting link between soil and man and with its evolution the agricultural world has arisen from the drudgery of the hand power machinery of the seventeenth century to the engineering of the horse and steam power implements whereby with his own intelligence the farmer has at his command the most complicated machinery of the day. As late as 1845 the people of the United States did not raise enough wheat for their bread. With the advent of the steel plow, the self-binding harvester and the steam threshing machine there was a marked change in the producing power of America. The food supply increased from 4.33 bushels of wheat per capita in 1845 to 5.5 bushels in 1859, to 7.45 bushels in 1869 and became as high as 10 bushels in 1889. In the same epoch the farm laborers decreased from 80 per cent. in 1850 to 33 per cent. in 1900. The farmers of to-day employing less than one-third of the labor of the country, produce enough food to support, not only the other 67 per cent. of population, but they also exported, in the year 1908, agricultural products to the value of $960,000,000.

Much of this achievement is, no doubt, attributable to the fertile soil of the great valleys and plains of the United States, much to the progressive spirit and intelligence of the farmers of America, but much more is due to the persons who have developed the modern farm implements and machines which enabled the farmers to sell their products in the open market of the world in competition with the poorly paid laborers of Russia and India.

Implements and machines will be still more important in the future, because it is mainly through them that the farmer can reduce the cost of production. To illustrate this it is only necessary to state that in 1830 it required over three hours labor to raise one bushel of wheat while in 1906 it required ten minutes, making a saving in the cost of labor in one bushel of wheat equal to the difference between 17¾ cents and 3½ cents.

In 1850 the labor represented in a bushel of corn was 4½ hours while in 1904 this labor had been reduced to 40 minutes. In 1860 the labor in one ton of hay in bales represented 35½ hours while in 1904 this was reduced to 9½ hours or from a cost of $3 in labor to $1.12. The agricultural implements in the United States saved in human labor in 1899 the vast sum of $681,471,827.

American farmers buy annually $100,000,000 worth of implements and the total value of the implements and machinery on the farms in this country is $761,261,550. In no other country is such extensive use made of farm machinery and the scarcity of farm laborers will tend to increase its use rather than otherwise.

The introduction of the reaper marked the beginning of a revolution on the farm. With a machine to harvest the grain rapidly and to increase thereby the acreage which each farmer could grow, there was economy in the use of other machinery and a demand was thus created for modern farm tools.

This was followed by a remarkable change in commerce, transportation, manufacture and the development of the great natural resources of the country.

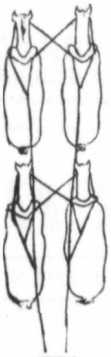
The most important of all farm implements and perhaps the most important implement, drawn by horse, steam or gasoline, known to mankind, is the plow. Its gradual evolution is coincident with the history of the race. The crooked stick, the plow of centuries merely scratched the ground. Inventors improved it by adding a sheet-iron ploughshare and moldboard. Afterward came the cast-iron plow, which was followed by the chilled plow, the soft centre steel moldboard and the all steel plow.

The walking plow was followed by the sulky riding-plow, the gang-plow and the disc-plow. With a gang plow and five horses a man can plow from five to seven acres per day, completely turning and thoroughly pulverizing the soil, whatsoever its nature. Plows are now introduced with 10 to 20 14-inch plows in a gang, the motive power of which is a steam traction engine and with which two men can plow from 40 to 60 acres per day.

A 110 horse-power machine plows, sows and harrows at the same time a strip 30 feet wide at the rate of three or four miles an hour turning over the soil at the rate of 80 to 100 acres a day or under favorable conditions 10 to 12

acres an hour. It thus performs work which ordinarily requires 40 or 50 teams and men.

No article of this kind could emphasize the importance of machinery on the farm without considering



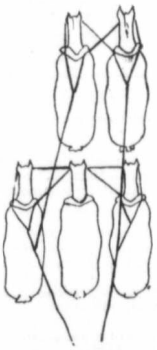
CUT I

some one implement which is absolutely necessary, one that is practicable to the average farmer both in economy and ease of manipulation, and showing the place which this machine uniquely fills, and it alone. One must also illustrate clearly that although its construction has reached almost perfection, there are still numerous possibilities stored up in that combination of beams, wheels and levers which can never be realized unless this machine is properly handled. That is—the importance of any machine depends largely upon its performance. Therefore if any suggestions can be offered which will in any way lead to improving the work of an implement, through improved handling, its importance to the farmer is increased.

No farm implement can fill the place of the plow. Due to the large acreage under cultivation and the scarcity of farm labor, the walking plow is decidedly impractical for regular use on the western farm, consequently, under present conditions which demand the breaking of land by quarter sections rather than acres, some gang plow must be chosen.

The two-furrow gang is by all means the most commonly used, is most practicable and contains more possibilities within it than any other form of plow, and yet is most ill-used and improperly handled of all farm machines.

For these reasons the writer will endeavor to discuss the operating of this implement, in order that its importance to the farmer may be fully realized, and thus may receive its due consideration.



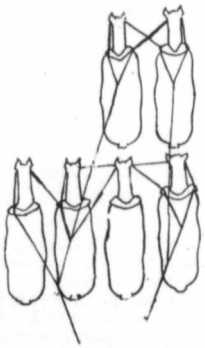
CUT II

Before using a new gang plow all attachments should be put on according to directions, nuts tightened and all bearing surfaces oiled. If four horses are to be used the hitch should be arranged tandem (see cut 1) both for convenience and good work as the wheels may then run directly in line with the frame, and the swinging of a horse does not affect the plow as when used abreast, and side draft is also eliminated.

If a five-horse team is necessary the addition of a long double-tree to the four-horse hitch (see cut 2) makes a splendid equalizer and the writer's experience has been that no contrivance for a plowing evener can give results equal to this style of hitch. Should six horse-power be required, a still longer doubletree enables the original four-horse hitch to be used (see cut 3) and is very satisfactory for heavy work such as backsetting or deep breaking in heavy soil.

In conjunction with the position and hitch of the horses comes the arrangement and adjustment of the lines. If a free lead team is available it is unnecessary for the operator to have all four lines in his hand as this leaves him no hand free for the operation of the levers which is so essential to successful plowing on rough or uneven land.

The lines of the leaders should be tied in the buckle of the lines on the wheelers (see cut 4) so that, when all horses are walking freely, the lines of the leaders are equally as tight as those of the wheelers.



CUT III

This is a particular piece of work and a ploughman may often have to work half a day before his lines are properly adjusted, but when exactly right this arrangement is an important factor in good, straight plowing. For five horses the same is applicable when all lines are on the outside horses (see cut 5) but for six horses it is necessary to have the lines on the second land horse and furrow horse in the rear and command the outside wheeler with a snatch line snapped to the buckle on the line of the second horse (see cut 6).

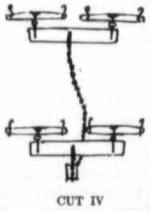
The adjustment of the plow depends entirely upon the class of work to be done, and to make points more clear to the readers, the set and working of the plow will be discussed separately for plowing stubble and for breaking open prairie, together with a solution of some of the problems met with in the every-day course of plowing.

STUBBLE PLOWING

The shares and coulters demand most careful adjustment and for heavy soil, the rolling coulter should be set out about ½ inch from the landslide, back about 2 inches from the point of the share and low enough to cut almost the full depth of the furrow. They may be set farther forward and higher in looser land without the same tendency to raise the plow out of the ground.

If a fourteen-inch plow is used, set the furrow wheel fourteen and one-half inches from the point of the share and the rear wheel tight to the square edge of the furrow.

Adjust the furrow wheel with the pole casting, and the rear wheel with connecting rod so that both run perfectly straight, and set the frame on the rear axle arm so that when the plow is working, the back of the landslide is carried about ½ inch from the bottom of the furrow



CUT IV

which gives suction and thus lightens the draft. The operator should always ride to obtain the best results as he is then in constant touch with the levers and can keep the plow in the ground when a hard spot is encountered.

As the shares become worn, raise the draft but do not let them become thick as tests with the dynomometer have proven that the draft is increased by one half with dull shares.

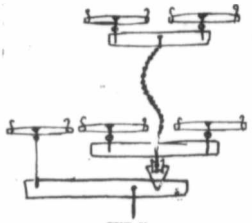
Should the furrows fail to match upon starting, the cause may be due to three reasons:—

1. The plows may not be running at the same depth.

2. They may not be running at the same width.

3. Either beam or share may be slightly out of position causing one furrow to be thrown rather than turned.

The first may be remedied by changing the levers as nearly as possible to the proper position, which is usually two notches up on the left-hand lever for every one on the right hand. Should this fail to level it, the trouble may be found by removing the soil until the bottom of both furrows is seen and a slight



CUT V

adjustment of the levers, provided the shares are both cutting level, will immediately overcome the difficulty.

The second may be remedied by having the width between the two plows just ½ inch less than the distance between the front share point and the front furrow wheel, or if not exact, a slight widening of the coulter on the narrow furrow or a narrowing of the coulter on the widest furrow will bring the desired result.

The last can seldom be remedied without taking the plow apart but before doing so the trouble may be partially ascertained by placing a straight-edge along each landslide and extending these a few feet out. If the edges are not parallel, the beam, or more probably the brace between the beams, is bent, causing an improper slope of the moldboard.

This brace will require straightening to the length that in position it holds the plows the proper distance apart.

The point and heel of the share may not be level, thus leaving a V-shaped bottom to the furrow, which requires a reshaping of the shares to the same level, and with all parts replaced properly, no trouble in turning a straight even furrow should be encountered.

BREAKING

Nowhere will a gang plow respond by good work to the effort and perseverance of the operator as in breaking on open prairie. Here any minor carelessness in adjustment shows up most strongly, while the state of perfection which may be reached by judicious management is equally obvious and is most creditable both to machine and operator.

The breaker bottoms are of course essential, and are distinguished mainly by a long narrow moldboard with a very gradual slope, so that the furrow is slowly inverted and not thrown over as with the stubble plow. The coulters should be set to run flush with the landslide, low enough to cut the full depth of the furrow, and forward to cut within 1 inch of the point of the share.

In the set of the coulter for breaking lies the great secret of saving horse power as the tearing of tough sod is making the horses do the work intended for the coulter and is absolutely unnecessary.

The horses should be hitched as closely as possible to the plow and the fore furrow wheel should run quite tightly to the square edge of the furrow as there is less danger of it running out than in stubble.

The writer has noticed considerable difficulty in adjusting a plow to shallow breaking when such is desired, especially if it is to be backset later.

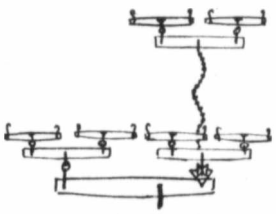
If the plow runs too deeply even after pressure is removed from both levers the first point to be noticed is the shares.

They may be either too long or have too much dip on the point, which may be improved by turning the point well up, though much more satisfactory results are obtained by taking shorter shares turning the points almost straight out and keeping them sharp. Should this fail to remove the difficulty, the clip on the spindle at the front of the plow, which is merely the continuation of the axle of the furrow-wheel, should be raised as far up as possible and fastened.

This gives a larger range over which to move the right-hand lever and will invariably give the desired effect.

After a ploughman has his plow perfectly adjusted, he must look forward to the work he is to do and endeavor to carry his knowledge of the machine into practice on the field.

In conclusion the writer will endeavor to give a chronological account of the method of procedure



CUT VI

in ploughing a land in breaking, beginning with the first furrow and so on until the last is turned.

After having plenty of stakes placed in line across the field, bring the lead and pole team in line with them, and with tight lines drive so that the pole is kept in line with them across the field.

Run the front furrow slightly less than half as deep, and the hind plow a shade shallower, than the field is to be plowed, for the first time across the field.

When returning do not change the levers and drive with the fore furrow wheel close to the edge of the furrow already turned, and this will place one thin furrow directly on top of the other, thus making the four furrows occupy the width

of three, place them almost level and thus prevent growth of grass on the crown.

Gradually regulate the plow to the desired depth and drive always so that the fore furrow wheel will run tight to the square edge of the furrow, and be very careful to come out and go in squarely at the ends.

Should the plowing not be straight as the work goes on, the operator should begin to pace off the remaining sod and ascertain the wide and narrow places, which he can gradually remove by cutting only one furow in narrow portions and crowding the plow to its fullest capacity in the wide places.

If this is properly done, the land will come out uniformly to between 90 and 100 inches, and this is almost the exact width of a fourteen-inch gang to in two rounds or four widths across the field.

In nearing the finish, adjust the head clevis so that one of the horses can walk in the other furrow, which greatly aids in keeping the work straight, and when the last round begins, the sod for a 14-inch gang should be from 36 to 40 inches.

Before going down the field again, raise the rear plow one or two notches to make the last furrow less prominent, and after reaching the end, the strip left will be found between 8 and 12 inches wide.

This should be about 10 inches for a 14-inch plow and is turned with the front plow after raising it an inch or two.

Lower the hinder plow about 3 inches which will steady the whole implement and take a "sole-furrow" or final furrow about half as high as the rest of the plowing.

This gives a finished appearance to the work and assures that all roots in the bottom of the furrow are cut and covered.

Gross Fats of Fine Perfumes.

It may surprise you that such gross things as pork and beef fat enter largely into the manufacture of choice perfumes, and in the great celars of the factory are piled up large flasks of fat especially prepared for its delicate work of extracting the essence of flowers. It is a curious fact that the flowers are in no way contaminated by this somewhat doubtful companionship, but transmit to the fat all the virtues they themselves possess.

In another room are seen great cauldrons in which the fat is melted and mixed in such proportions as to counteract the fluidity of the one by the extreme firmness of the other.

Besides maceration, there are two other methods of extracting perfume, namely, enfleurage and distillation. The jasmine, tuberose, and violet are so extremely delicate that they scarcely give out any essence or altar by distillation, and have to be subjected to maceration or enfleurage. The latter method, which is most interesting, consists of placing the petals between plates of glass framed with wood about three inches deep. These glass trays are spread over with cold fat about half an inch thick and sprinkled with freshly-gathered flowers, the blossoms being renewed every morning, since great care must be taken to prevent evaporation of the aroma. After a time the pomade is scraped off the glass, melted at a very low temperature, and strained. It takes about three pounds of jasmine blossom to perfume one pound of fat. In very exceptional cases the petals are placed between layers of lime dipped in olive oil, the perfume being afterwards pressed out by a mild application of the old-fashioned hand press.

Some Hints on Poultry

The most profitable part of poultry raising for women is the production of eggs for sale. For the average woman who has her home to look after, the money end of the poultry business centers in the nest. Now the amount of profit depends on the management.

The study of feeds and feeding methods is a very prominent branch of the business, and one that is absolutely necessary in order to get the greatest possible profits.

For heavy egg production a mixture of foods is necessary. Chickens need lime food. Where oyster shells can be secured, this form of lime seems to serve the purpose about the best. It is a good plan to break the shells up fine and keep a quantity before the laying hens all of the time.

Next to oyster shells, lime mortar and broken limestone will answer the purpose.

There is not so much success in the kind of food as there is in the way in which it is given. Feeding utensils should be cleaned often.

Provide clean drinking vessels and cleah water for the poultry.

Ground bone is valuable to feed during the molting period as it supplies feather-building material.

A good winter feed is unthreshed millet.

Generally it does not pay to keep a hen after she is two years old.

A pullet hatched in April or May should begin to lay in November or December, and keep on until hot weather commences, laying about from 100 to 125 eggs.

A really good hen, well fed and housed, the second season will lay from 150 to 250 eggs, but after that her egg yield will not be profitable. There are, of course, exceptions to this rule.

I keep some hens over the second winter for breeders and others for mothers.

Some hens will not mother chickens but the poultry woman will learn her matronly hens in a season. Keep the young poultry as they are almost entirely free from disease; sell your old poultry except the few for breeding.

There are two ways of keeping track of their ages. One is the web punch that makes a small round hole in the thin web of the foot between the toes. The other method is by means of metal leg bands.

The punch is the surest and the easiest. You can make one punch hole this year, two next year, and the third year goes without. System is very necessary in the poultry business.

Herbert Shearer.

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 mature that ths gas engine owner may easily adapt them to his daily engine work

LESSON V.

The average person naturally understands nothing about electricity, and the only accessory about a gasoline engine in which he has no confidence is this particular part.

A wire, when charged with an electrical curent contains a property adverse to the natural state of the wire when not electrified. When a wire has an electrical current flowing through it, magnetic lines of force surround it to a distance consistent to the strength of the current. If the wire is wound in a circular form, in layers, forming a coil, the magnetic lines of force are increased in strength, and if wound around a bar of soft iron an additional increase is gained.

If a bar of soft iron is wound with several turns of insulated (covered) copper wire, and a curent of electricity passed through the wire, either from a dynamo or battery, the bar becomes saturated with a property called magnetism, and is capable of attracting particles of steel as long as the electricity flows through the wire, and ceases immediately when the wires are disengaged and the current flow stopped. When the bar of iron is magnetized, one end will attract steel while the other end will repel it.

Induction or jump spark coils and any electrically operated mechanism such as dynamos, etc., are based on the principles or phenomena of electro magnetism as above stated.

A permanent magnet is a piece of special steel, stored or saturated with magnetism for an indefinite time. It will perform the duties of an electro magnet in many instances. Permanent magnets are utilized for the construction of magnetos, and the magnetism contained in the metal lasts generally from 5 to 10 years, according to the grade and work the magneto performs.

In order to first saturate the steel with magnetism, it is necessary to lay it on a direct current dynamo or motor, or rub it on what was originally called a load stone (another permanent magnet). When the magnetism becomes weak the same method of charging is again repeated.

Electric current requires some standard of measurement, therefore it is expressed in volts and amperes. A volt is the unit of pressure or strain, and is similar to the pressure of steam in a boiler, or air in a tank expressed in pounds.

An ampere is the unit rate of flow or amount backing up the volt, and compares with the amount drained from the above referred to boiler or air tank. If a tank or boiler had 100 pounds pressure and discharged the whole contents at once the rate of flow would correspond to the flow from a battery on short circuit, and to discharge at a low rate for a length of time, would correspond to the drain from a battery through a coil or otherwise.

The drop in pressure during this operation corresponds to the drop in volts when using a battery.

The necessary electric current to fire the charge in an oil engine is got from a battery, a magneto or a dynamo. Inside the cylinder, the current is either broken to get the spark, or is made to jump a small gap, called the spark gap, for the same purpose. Having done its duty in giving the spark, the current is "grounded" on the metal of the engine and, by a path provided, carried back to the place it came from.

There are two ways of firing the discharge by electricity,—make-and-break and jump-spark.

Assume a strong current of electricity running along a wire. Assume the wire broken in one place, with the broken ends touching. Separate the broken ends. As the ends come apart there is a spark, and the current is broken and stops. Bring the broken ends together again, and the current is made again. Bring the ends apart once more, and get a fresh spark. That is the make and break method at work.

Now hold the broken ends close together, but not touching. The force of the current makes it jump the interval or gap, and as it jumps, we get a spark, and this continues until we interrupt the current or circuit. That is the jump-spark.

All wires must be carefully insulated by being covered with some non-conducting material, like silk or rubber. This insulation is needed to prevent the current from escaping in any direction other than that in which it is meant to travel. If the insulation gets worn in any part along the wire, so that part is bared, and the bared part touches, or is near enough to, the engine metal, short circuiting happens. That is to say, the current escapes at the exposed part and hurries back to the place it came from without doing its work. Short circuiting, besides preventing ignition, is bad for batteries.

To get a spark by the make-and-break method, a dry cell battery is used. This battery consists of four or six cells. The cells are canister-shaped vessels of sheet zinc, covered outside with heavy paper for purposes of insulation. The vessels are filled with a paste made of powdered carbon and black oxide of manganese, moistened by some "exciting fluid," like sal-ammoniac, dissolved in water. A carbon pole stands up in the middle of each cell. A brass thumb screw,

called a terminal, is fastened at the top of the carbon pole. Another brass screw or terminal is fixed at the top of the zinc wall of the cell. The carbon pole is the positive pole, and the zinc the negative pole. The screw terminals are called the positive and the negative terminals, respectively. If the terminals are connected by a wire, the electric current is started, running from positive to negative.

Another necessary part of the make-and-break equipment is the spark coil. This is a quantity of insulated wire wound around a soft iron core. Its purpose is to intensify the spark.

The make-and-break block is a piece of steel which passes through the wall of the cylinder into the part where the explosion takes place. It is heavily wrapped around with mica or other insulating material, to prevent possibility of touching the metal of the cylinder. Inside the cylinder a hammer of steel rests on the end of the make-and-break block. A cam on the cam shaft, connected with this hammer, makes the hammer rise from the block to break the circuit to get the spark at the right moment.

Now, this is how the make-and-break system works. Let us assume a battery of four primary cells connected in series; that is to say, the positive or carbon pole of the first cell is connected by a short wire to the negative or zinc of the next cell. The positive pole of this second cell is connected in the same way to the negative or zinc of the third cell and so on. From the zinc or negative of the first cell a wire is led to the metal frame of the car. From the positive or carbon pole of the fourth cell, a wire is led to a switch. From the switch another wire is led to the spark coil, and an insulated wire from the spark coil is fastened to the end of the make-and-break block outside the cylinder. The circuit is now complete, the switch being closed. The electric current starts from the battery and travels first to the switch, next to the spark coil, where it gathers force, then on to the make-and-break block, through this block into the cylinder, then from the inside end of the make-and-break block to the hammer, and thence to the walls of the cylinder. It is grounded here, and runs to the wire which connects the zinc of the first cell with the metal frame of the car. In this way the current gets back to the battery. An electrical current will not run unless provision is made for its sure return to the place it starts from.

A complete electrical circuit having been provided described above, the spark is got by lifting the hammer inside the cylinder at the right moment for the power stroke, as already explained; namely, with the aid of a cam on the cam shaft.

We use what is called a primary current to get a spark by the make-and-break method. This current is measured in an amperes for our purpose, and amperes are measured with an instrument that looks like a watch, and is called an ammeter. A new battery should give a current of about 20 amperes. It weakens gradually with use, and when it gets below five amperes it is time to get a new set of cells. To use the ammeter, connect the positive and negative terminals of a cell to the terminals of the ammeter. The amperage will be indicated on the face of the instrument. Do not keep the ammeter terminals touching those of the battery longer than is necessary to get a reading, as the use of the ammeter is hard on the battery. The cells should be tested individually, and those which are below the required amperage should be put aside and replaced as soon as possible. In the meantime, the battery can be used with less than the full number of cells. It is usual for engines using dry cell batteries for firing purposes to carry two sets of cells, each set forming a complete battery. These batteries can be used separately or in combination, the cells being connectin series of multiple. As already explained, a series connetion is got by connecting the positive of one cell to the negative of the next, and so on. By the multiple method, all positive poles are connected on one wire, and all negative on another. The current is carried from the positive terminal to the engine, and back to the battery by the negative.

The need of thorough insulation of all electrical apparatus has already been mentioned. Most troubles in an ignition system can be traced to some flaw in the insulation, causing the current to turn away from its intended path. The man in charge of an engine should overhaul his electrical outfit regularly, seeing that wires are well covered, and that all exposed parts are kept clean and bright, and particularly that no carbon or soot, is allowed to gather on parts inside the engine.

Besides the dry-cell battery, there are three other ways of getting the electric current in the make-and-break system. These are by (1) Storage Battery; (2) Low-tension Magneto; (3) Dynamo.

A storage battery consists of a number of cells containing "grids" or perforated plates of metal and filled with a mixture of water and sulphuric acid. This battery must be charged before it can be used.

A magneto is a series of horse-shoe magnets set up to form an arch. Inside this arch, in the lower part, an armature turns on a spindle. This armature is a shuttle wound lengthways with insulated wire. The armature is turned from the shaft. As it turns rapidly a current of electricity is started. No spark coil is needed with the magneto; but cars equipped with magnetos usually carry batteries as well. The battery is used at starting, and when the engine is going, the battery is switched off and the magneto switched on.

When a small dynamo is used to get the current, the dynamo is driven from the shaft, like the magneto. It is also necessary that the engine should be running before the dynamo is put to work.

We need a primary and secondary circuit to get a jump spark in the engine cylinder. The primary circuit or current is that which starts from the battery. follows a certain path and comes back to the battery. The secondary circuit is that which is "induced" in an induction coil by the interruption of the primary current. The secondary current runs from the induction coil through a spark plug to the inside of the cylinder. Inside the

Continued on page 65

Gas Engine Experience Departmemt

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 expepience. 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.

A Combination Outfit.

I own a 12 h.p. portable engine, bought of Goold, Shapley & Muir, of Brantford, Ont. It was bought eight years ago last spring to run a brick yard press, for doing my threshing, running a chopper and a saw for cutting wood. It has splendid power for doing all that kind of work, and has given me good satisfaction. But the place it shines most is in threshing. No worry about fire, and no trouble about the wind damaging the drive belt. I run it with a short belt and can thresh all windy days that sheaves can be handled.

I have separator attached to engine so that the whole outfit can be moved by putting two teams on separator and one on the engine. Then when pulling into setting place it takes such a short time to place. It is all ready to put on drive belt, and braces on engine are attached; the latter being done the engine works better and can run at a higher speed if needed, the braces keeping it steady.

I have engine and separator attached so that if I want to separate them I have only to draw a bolt and each are free. I ran them separately every other year but this, and I find the new plan far the best.

You will likely be surprised when I tell you that this small engine runs a 32-inch big cylinder 54 inch shoe with blower and high bagger, and is capable of threshing 1,000 bushels of wheat in 10 working hours and from 2,000 to 2,500 bushels of oats in the same time. Now to do this it uses between 1 and 1¼ gallons of gasoline per horse power at 26 cents a gallon. That is what I paid for gasoline here at Grenfell. I find that the gasoline engine is not only inexpensive, but is durable.

Now, as far as having trouble with the engine is concerned, I want to say that an inexperienced hand will have lots of it and lose time, till he understands his engine. Those that are thinking of buying one would be fully repaid if they were to learn all about gasoline engines before they purchased one. I have had my own troubles, but, being an inexperienced hand, I blamed the engine when it was all my own fault. I understand my engine now and this year it has given me the least trouble of the eight years that I have had it.

Yours truly,
A. Switzer,
Maple Grove Farm
Grenfell, Sask.

A Success.

A neighbor and I bought a second hand outfit last fall about the time threshing started. The separator had not been used for some six or seven years previously and needed a lot of fixing up before we could start and when we did start it seemed impossible to keep the bolts and nuts tight for some time. The separator is a Colombia, built by the Bell City Co., size 32 inches all through and was bought some fifteen years ago. All the machine was driven from the fan, which is underneath the cylinder.

When we started our outfit consisted of three men, two boys and two teams and an extra horse for the boys to buck straw with. One man would load up, the engineer would pitch off the loads and one man feed and cut bands. Then we got things running in better shape and by the time we got to threshing oats we were going better, the machine having been repaired more or less all the way through.

The day we finished we had two men driving the teams and loading, the machine being in the field, but they could not keep it going. We could thresh 100 bushels of oats per hour easily.

Our engine is a 7 h.p. Northey, weighing some 3,000 pounds, mounted on steel trucks. The fly wheels are very heavy, giving the separator a fairly even speed. The ignitor is a hot tube which was not always satisfactory especially on cold gusty days, the temperature through the tube changing, and, therefore, changing the time of the explosions. We also had a little trouble with the gasoline pump, a little piece of foreign substance getting into the valve. This might have been avoided by straining the gasoline. For a cooler we used a tin tank with considerable exposed surface which held about a barrel of water, which needed replenishing with from four to six pails per day.

The engine had power to spare, it being no trouble to drive the separator. This was our first attempt at threshing with gasoline and having decided to buy at the last moment we did not have things fixed anywhere near up to date. But we have had an opportunity of fixing both separator and engine this winter, knowing just what was needed.

We threshed between five and six thousand bushels and feel satisfied with our experiment.

Hoping for a most successful sesson next year when things are in better shape and wishing The Canadian Thresherman and Farmer a successful career, I am,

Yours truly,
H. P. Springall,
Grenfell, Sask.

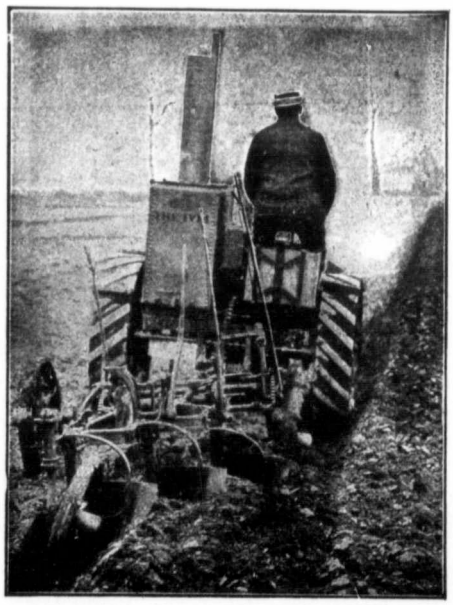
A Good Experience.

My outfit is comprised of an 8 h.p. "Ohio" portable gasoline engine and a Sawyer Massey Eclipse separator with bagger. We purchased this in the fall of 1907 and it has given us great satisfaction. The engine has run the separator with ease at a consumption of about 3 gallons of gasoline per day. The price of gasoline in this locality is from 22 to 28 cents per gallon. The consumption of water for cooling purposes was not more than one-half gallon per day.

In 1907 and 1909 I and my two sons did all our own threshing on 480 acres of land without any outside help. The engine never gave us the slightest trouble and the whole expense incurred was cell batteries and one or two ignitor points.

In 1908 we threshed for three of our neighbors, threshing from 700 to 800 bushels of wheat and about 1,000 bushels of oats per day, which is not bad work for so small an outfit. Last year our own threshing, considerably over 2,000 bushels cost us only $16.00 in gasoline. In 1908 we attached an Auto Sparker in place of the batteries and found this worked more satisfactory and the new power has never failed us.

We built a special shelter for the outfit and for three winters fixed down an 8 inch Maple Leaf Mill, crushing some thousands of bushels of oats and barley, giving us occupation in the winter months and proving a boon to our neighborhood. We crush



from 10 to 12 bags per hour, charging 7 cents for oats and 8 cents for barley.

When the weather is below zero we warm up the air suction pipe on engine, starting from the batteries and switching on to the auto sparker immediately.

The gasoline or motor tractor is undoubtedly the future power for the farmer and although we are thoroughly satisfied with the 8 h.p. engine we have we hope at an early date to replace this with a tractor of small size to pull 3 to 4 plow bottoms. We don't hold with too large an engine on, say, a whole section of land. The operator cannot make such finished work in our opinion and a good make of engine of say 16 h.p. would be strong enough to operate these beside driving a good sized separator with high bagger and stacker.

Yours truly,
Wm. Toone,
Maryfield, Sask.

A Drilling Experience.

I have a 3½ New Way, air cooled gasoline engine. I use this engine for drilling wells and have used it for three years and like it fine. I also use it for chopping and sawing wood and have cut 18 cords of wood in 7 hours and have drilled a 4 inch hole 560 feet deep with hydraulic machine, which means pumping out drillings at the same time. For this I use about 2 gallons of gasoline per day, which cost me 35 cents per gallon.

My engine has given me very little trouble and I think I can now make it go whether it wants to or not. But I am not an expert with gas engines and would thank you for your hand-book, which I think would help me very much.

Yours truly,
J. W. Tripp,
Melita, Man.

Uses Engine for Many Purposes.

I have a 6 h.p. Master Workman gasoline engine built by the Temple Pump Co., Chicago, and I have it mounted on trucks to move about on the farm. It has never been off the farm since I got it four years ago last fall.

I have different uses for this engine. I have a 6,000 bushel grain elevator on the farm, with a small creamery (for our own use) attached, where the engine runs the cream separator, churn and grinder. We also take it to the wood pile, saw our wood, and in the winter take it to the small nine inch throat cutter with blower on.

As to the amount of gasoline used, this varies acording to the condition of the engine; or in other words, how it is adjusted and how it is run. When engine is properly adjusted and everything right, it takes much less than when the engine is not right.

With a 6 h.p. engine cylinder like mine, we just run one cylinder on light work, such as cleaning grain, running cream separator, churn, etc. These are all run off line shaft. Then for other work such as sawing wood, cutting feed, grinding feed, etc., we hitch right on to the different machines, therefore get direct power.

The gasoline engine is a fine power for the farmer, but like some men, kicks sometimes for very little and this about the time one is in a hurry. I think every farmer should have one on his farm, kick or no kick. I would not think of farming without this time saver. Of course there is trouble sometimes, but what is it that does not give trouble in this world and I am very much afraid if some of us do not change our ways we will meet a great deal more trouble than a kicking gasoline engine before we get far out of this world.

Gasoline is about 25 cents a gallon here.

Yours truly,
Wm. Story,
Darlingford, Man.

Wants Small Separator.

My engine is a 4 h.p., hopper cooled, International Harvester Famous mounted on skids. I believe it one of the first hopper cooled ones sent out by that firm, but I have had satisfaction with it, as it starts up in all weather, 80 degrees in the shade or 40 degrees below zero, with two turns of the fly wheel. I have an 8-inch crusher made by the Ontario Wind Engine and Pump Co., 12-inch feed cutter with 20-inch reversible carrier made by Fleury & Co., and a 26-inch circular saw made by the International Harvester Co.

I would not be without this outfit as it saves me a hired man and his board. It saves me at least half my feed, which is considerable when feeding 25 head of cattle and 15 horses. It increases the yield of my 12 head of milch cows by 15 to 25 per cent. and I can go out with a team hitched to the engine, in winter, with saw, crusher or cutting box mounted on a single bob behind.

I paid 25½ cents per gallon for my last barrel of gasoline and I have crushed 72 bags of oats with 2 gallons and received $6.00 for it.

I wonder if the time will come when a practical separator of a size small enough for a 4 h.p. will be put on the market and whether it would thresh fast enough to be worth while.

Yours truly,
C. Hubert Sanders,
Rapid City, Man.

Uses Engine for Pumping.

In regard to my experience with gasoline engines. I have only had my engine about five months, so I have not had very much experience yet. I bought a 2-horse power Fairbanks Morse engine and use it on portable elevator, which I bought last year for loading cars, and it works satisfactorily.

I also use the engine for pumping water. My well is 280 feet from barn. I have a two inch galvanized pipe from well to barn and a 50 barrel tank in barn.

I have not any photos of the engine at work, but will get some as soon as I can and forward you same. I am thinking of purchasing a large plow engine in the spring for general farm work.

I am enclosing subscription for The Canadian Thresherman and Farmer and would be glad of your book "Plain Gas Engine Sense."

Your sincerely,
John Thos. Stilborn,
Pheasant Forks, Sask.

Somewhat Different.

I have a 5-h.p. Stickney portable engine and use it for grinding grain, cutting feed with a straw cutter, No. 4 Fleury. I use an eight-inch plate grinder and can grind 125 bags in 9 hours, using about 5 gallons of gasoline, which costs from 24 to 27 cents per gallon according to the season.

The engine uses from 4 to 5½ gallons of gasoline in 10 hours according to how high the governors are; or in other words how hard it is working.

I like my engine fine, and have run it a year and had no bother with it yet. I also saw wood, 20 cords or more in a short winter's day.

Running a gasoline engine on a farm at this kind of work is a

different proposition to running one in an elevator or shop, for your engine is on the move more or less all the time and it is generally cold weather; but with a few pails of hot water I can start my engine in 20 minutes after I get to where we are going to work.

Yours truly,
A. T. Spurrill,
Ninga, Man.

The Only Trouble Was In Starting.

I have been operating a gasoline engine for my father for three threshing seasons and if my experience would be of any value to others I will be only too glad to have it published.

Our engine is a 15-h.p. portable International Harvester. I have been running with it a Belle City separator, 32-inch cylinder and rear, and have just about the right amount of power.

I can thresh about 750 bushels of good wheat or 1200 bushels of oats in a ten hour day.

I have never used a traction engine, but think that it would be better than a portable, as it is rather awkward moving from place to place, besides the necessity of taking horses along.

The engine gave very good satisfaction last year. It works better each year, as I get better acquainted with it. It uses about 1½ gallons of gasoline per hour at a cost of 34 cents per gallon. I have used coal oil for fuel when I ran out of gasoline. I seemed to have just as much power, but had a great deal more smoke.

The starting was really my only trouble with the engine. This was more noticeable on cold mornings, but by holding the exhaust valve open till two men got up good speed, then letting on all the compression and sparking it on dead center, it nearly always started and my troubles were then over for the day. If a person could always have a real good spark it would do away with a great deal of trouble in starting. I had to get four new sets of dry cells and then they were only used to start the engine, as I have an auto sparker, which gives very good satisfaction.

Yours truly,
D. Fred W. Willock,
Pincher Creek, Alta.

Threshes 500 Bushels Per Day.

In the fall of 1908 I purchased an International Gasoline engine, 15-h.p., with a Belle City separator 32 x 40 with straw stacker. I feed by hand, as I consider the hand feed much superior to the self feeder on a small gasoline outfit.

This outfit has proved very satisfactory to me, as I have not lost a day in the two falls through the outfit failing to run. I own a section and a quarter of land and would advise any farmer with more than half a section to own a little rig and thresh when he is ready. My rig is quite simple to operate and is a grain saver, as when a man is just threshing his own crop, does not need to crowd the grain through.

Last fall I used three stook teams with a man in the field, and could thresh about 500 bushels of wheat a day and about 1100 bushels of oats and do a first class job. I threshed 7,000 bushels of wheat, 4,000 bushels of oats and 1,000 bushels of barley last fall for myself, and the cost was not more than $100 more than it would have cost me to have stacked it and I was through while most of the steam outfits were still stook threshing.

I used to run from seven in the morning till eight at night with one hour off for dinner and used about fifteen gallons of gasoline per day. The gasoline cost me 23 cents per gallon last year, while the year before I paid 28 cents. The engine is a portable and besides threshing I do my own crushing with it.

Yours truly,
Walter Young,
Minto, Man.

Well Pleased.

I have a 25-h.p. Fairbanks Morse gasoline engine, which I use to drive a 28 x 42 Waterloo Separator, with all attachments, which it seems to handle quite easily.

I used five stook teams with two pitchers in the field and threshed about 1000 bushels of wheat in ten hours, and was only threshing oats one full day in which we made three moves covering a mile in the moves, and we threshed 2,500 bushels in nine hours.

I used about 30 gallons of gasoline every ten hours, but the expert told me that my ignition points were worn too short and that was the reason I used more than the 25 which was all the engine was supposed to use.

The gasoline cost me 29 cents a gallon and I was allowed $1.00 for the empty barrels when I returned them.

My engine gave me good satisfaction. I did not have a strainer to strain the gasoline before it went into the tank on engine and it seemed to clog in the pipes.

I have done some grinding of grain with the engine. I have a twelve-inch crusher and can crush about 35 bags of oats in an hour, using about 4½ gallons of gasoline.

Yours respectfully,
John A. Young,
Mountain Peak,
Kisbey, Sask.

Mrs. Martin J. Wessels, of Spokane, Wash., is said to be the only artist whose work is devoted exclusively to pictures of grain.

Lady Elizabeth Butler, well known as the painter of the stirring battle scene "The Roll-Call," purchased by Queen Victoria; "Inkerman," which brought $15,000; "Scotland Forever," showing a wild charge of the Scots Greys, and many other military subjects, has published a book, "From Sketch-Book and Diary," illustrated by herself, which takes her reader to Ireland, to the east, to South Africa and to Italy.

New Implements that Are Good.

THE CORRUGATED ROLLER.

Much of our crop land will need rolling in the very near future. There is no type of roller more generally suited for this kind of work than the corrugated roller. It is practically a new type and is not so well known as it should be. For crushing clods and pulverizing a plowed field, it hardly has an equal. It does not tend to push clods down into the loose earth without crushing them like the smooth faced roller.

Again, it leaves the ground surface rough or corrugated, which prevents the ground from blowing to any great extent. The smooth faced roller leaves the surface in a good condition to blow. The smooth surface is also favorable to the greatest amount of evaporation. The corrugated roller is a very good implement for breaking crusts or packed surfaces. This implement is usually made of cast iron and, on account of its great weight, is expensive.

The Farm Mechanics Department of the Colorado Agricultural College made a corrugated roller last year out of cement, which answered the purpose just as well as a cast iron one, and showed no signs of wear at the end of the season. The cement roller costs less than one-third that of the cast-iron one of the same weight.

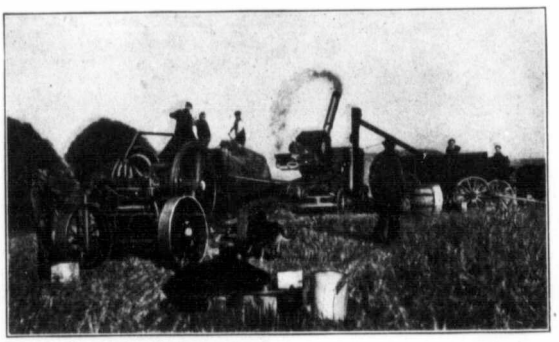
THE TWO-WAY PLOW.

This type of plow has recently been thoroughly tried out on the Colorado Agricultural College farm; the results have been very satisfactory. The two-way plow has not been generally used, in fact, there are only a few companies manufacturing it at present.

By using this type of plow all the plowed land is kept in one body. A right hand plow is used in going across the field in one direction, the plow is turned squarely around at the end, and a left hand plow is used in coming back, all furrows being turned in one direction. Thus it will be seen that two plows, a right hand and a left one, are both carried on the same frame, only one of which is used at once. Other advantages of this plow are:

It leaves no back furrows or dead furrows in the field; thus the ground is practically as level after plowing as it was before. The horses do not have to walk on the plowed ground at the corners and ends. No time is lost at the ends.

One horse does not have to walk in the furrow all the time. All the plowed land is always in one body.



A Geiser Outfit at work, consisting of a Geiser Sieveless Separator and Geiser Gasoline Engine

THE HARROW ATTACHMENT FOR PLOWS.

The harrow attachment is made to be used in connection with the plow, usually of a sulky or gang type. By its use the ground is harrowed or pulverized as fast as it is plowed.

The farmer knows that there is no time when plowed ground will pulverize better than immediately after it has been turned. At this time no moisture has escaped, and by harrowing at once the ground is not only better pulverized, but is placed in a condition to conserve the moisture better.

By using this attachment in connection with the plow, two field operations are performed at once. The field is harrowed as fast as it is plowed and the crop can be planted at once.

By harrowing at this time less horse power is required to put the ground in good condition. Ordinarily less than one half of the energy of one horse is required to pull the harrow attachment.

H. M. BAINER,
Colorado Agricultural College,
Fort Collins.

The above was written for Colorado and of course will have to be applied to Western Canada as conditions warrant.—Editor.

Through her grand mistress, the Czarina has issued orders tnat the ladies of the Russian court must not smoke. She will not tolerate as a lady-in-waiting a woman carrying the odor of smoke on her breath or in her clothing. This is a revolution in Russia, where smoking is common among women. The Czarina holds that a cigarette in a woman's lips is as vile as an oath on the lips of a man.

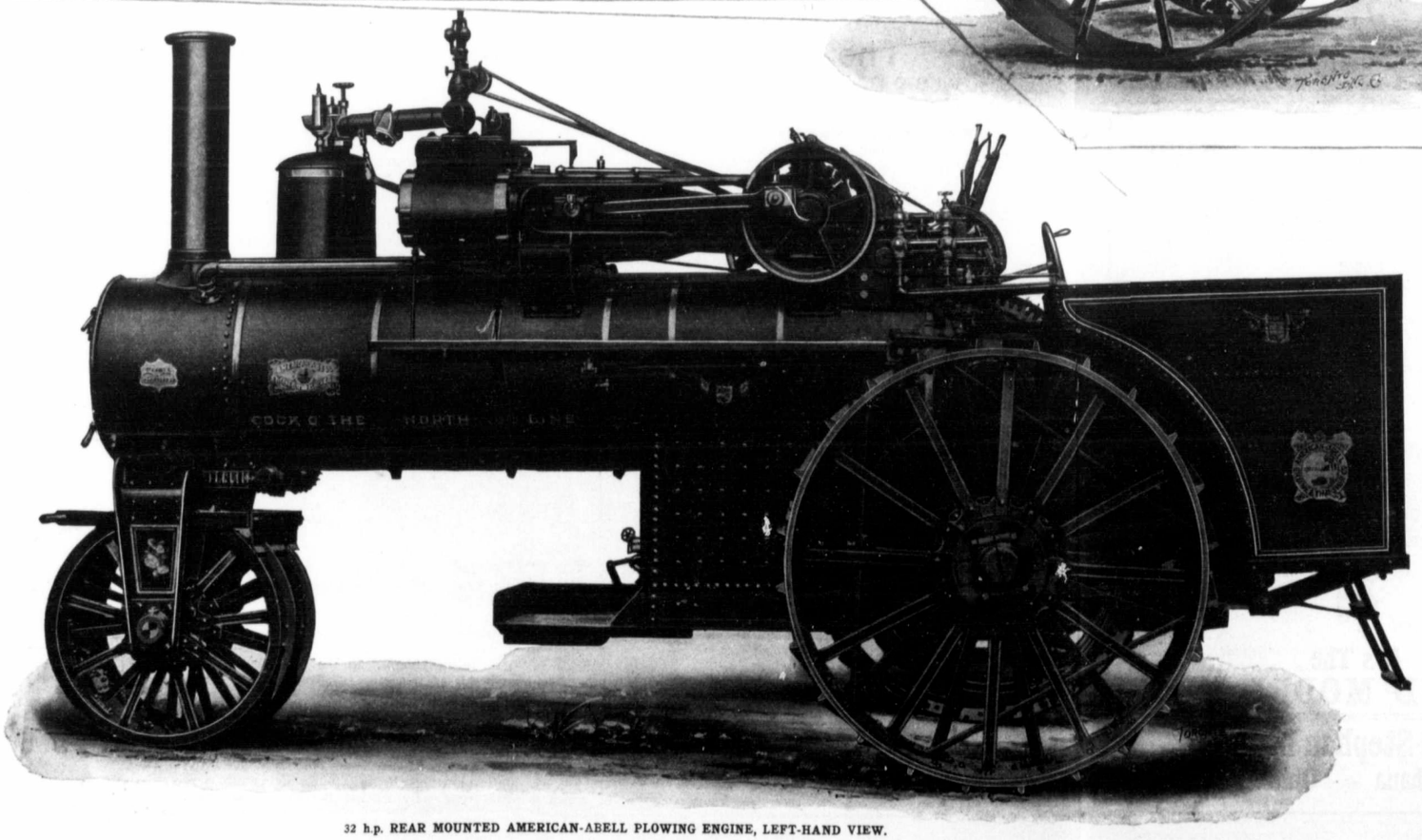
Doesn't This Plowing Engine Look Good

to you as a farmer or thresherman with land to break? It is the wonder and admiration of all of those who have seen it. It is built to plow and it will plow.

We ask you to look it over carefully, for we know that after you have put it to the test of your own knowledge as to what a plowing engine should be, you will decide that we have the real thing.

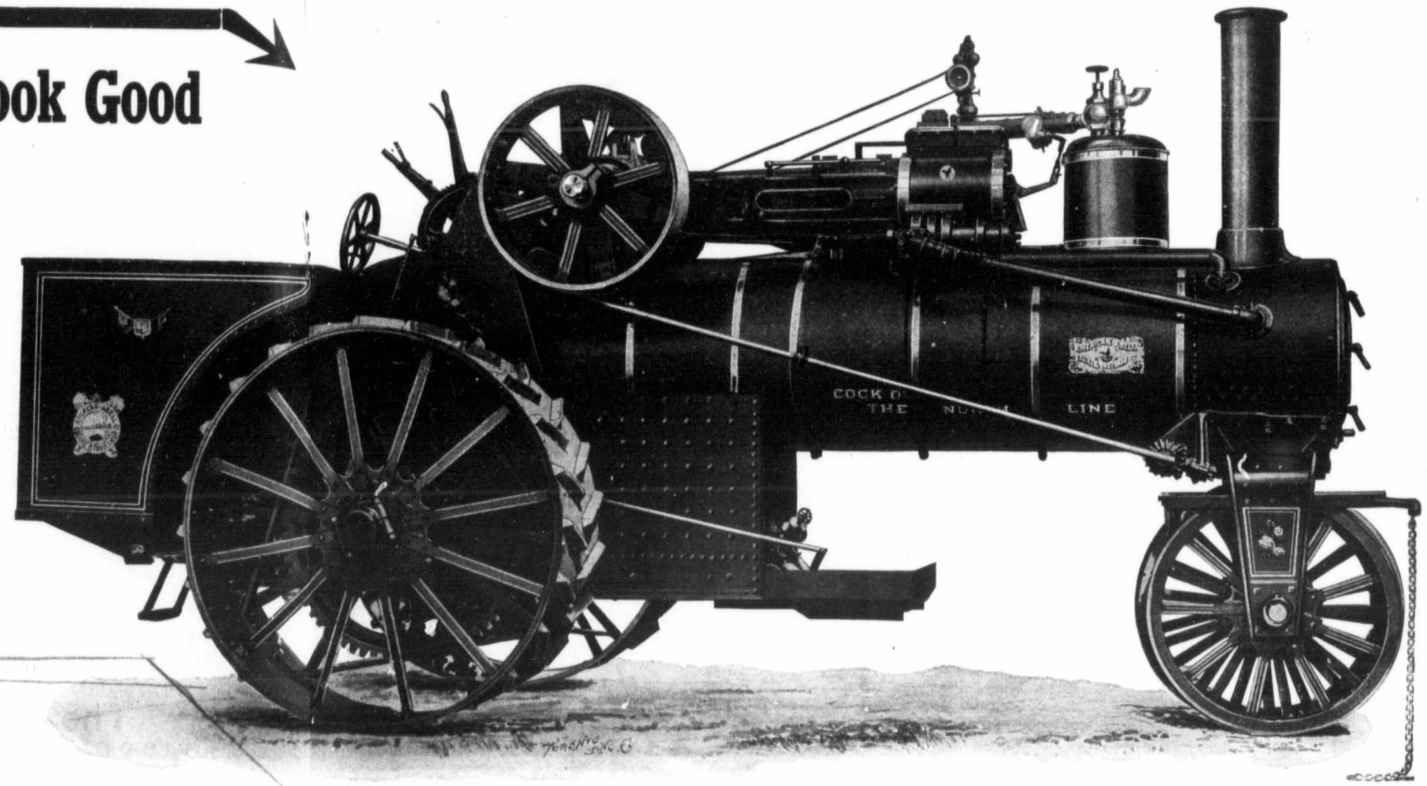
It has many special features too numerous to mention in an advertisement, but we will give you just a few; the rest are all fully explained in our 1910 catalogue. Write for it.

It is rear mounted. It has a worm steering device, consequently there are no chains to break. It is equipped with step gears, which are the strongest and most durable known. It is cross componnd. It is equipped with the best balance valve on the market to-day. It has an intercepting valve that is automatic in its working, giving an extra amount of power when needed, yet never causing an undue strain upon the engine. It has unusually large water and fuel carrying capacity.



32 h.p. REAR MOUNTED AMERICAN-ABELL PLOWING ENGINE, LEFT-HAND VIEW.

Cylinder sizes 9" and 13" by 14" Drivers 7'6" x 30"



32 h.p. REAR MOUNTED AMERICAN-ABELL PLOWING ENGINE, RIGHT-HAND VIEW.

Don't forget in your enthusiam over our plowing engine that we also make the Famous Toronto Combination Grain Separators. They are grain savers and money makers. Our complete catalogue describing our full and complete line of threshing and plowing machinery is yours for the asking.

The American-Abell Engine and Thresher Company, Ltd.

Toronto Regina Winnipeg Calgary Edmonton

We also represent the Advance Thresher Co., of Battle Creek, Mich. and the Minneapolis Threshing Machine Co., of Hopkins, Minn.

The Thresherman's Question Drawer

Answers to Correspondents

A. A. J. STANSEY, ALTA. **Q.** My engine foams, or primes, very easily on a hard pull, even if the water in the boiler is fairly clean. We clean the boiler every week, and always have this trouble as soon as the boiler is the least bit dirty and the water in the gauge shows a little high. Toward the end of the week we have to run only a little water in the glass, for as soon as it gets a little higher the engine is ready to foam. The boiler has a very small dome and we believe this to be the cause of the trouble. Would a small dome, connected to the other one, be the remedy?

A. There are a great many places in this country where the water is so apt to foam that it will have to be changed after two days' run; and there are some places where the boiler water has to be changed every day. While the boiler may be run longer than one or two days, yet it becomes so troublesome that it does not pay, and the engineer finds that it is far less work to refill the boiler than to worry along with a foaming boiler. There are a few things that may help in your case. If the engine is hooked as far as possible, thus using less steam to the work, it will lessen the foaming. The use of plenty of good cylinder oil on an unbalanced slide valve helps also. Another thing is to keep the boiler raised in front, thus increasing the steam space in the boiler. The boiler can be raised to the extent that it will expose the front end of the tubes on a straight flue boiler to the steam; which will not hurt if it is not carried too far. This can be done while threshing by placing blocks under the front wheels for a trial; and if it is found to be a good thing the post can be lengthened to the same extent, which will do away with the block and serve for both threshing and traction work.

Another dome will not help A boiler will not foam any more without a dome than it does with a dome. In England, traction engines are built without domes, and to-day very few stationary boilers have domes; and the time will come when traction boilers will be built in this country without this useless appendage. However, this will depend upon the education of the user. Already some manufacturers see the folly of a dome on a boiler, but the man who has to contend against bad water might not at this time be satisfied with a boiler without a dome. Yet it is known to be of no value in this regard. The design of the fire box has more to do with foaming than any other single part of the boiler.

F. R. H. ROULEAU, SASK. **Q.** Explain how to attach a three-furrow disc harrow plow to an engine.

2. Explain how to stop the valve steam out of the valve in the bottom of the steam chest, when the throttle and globe valves are closed.

A. Most of the three-furrow disc plows that are made to-day are constructed with a long, flat piece of steel, which acts as a sort of a tongue. It is quite customary to attach a short piece of chain to this piece of steel and this to the draw-bar of the engine. This piece of chain does not want to be too long as the tendency of the disc plow is to draw sidewise.

2. There must be something wrong with either your globe or throttle valves if steam comes out of the bottom of the steam chest. The engine itself has only the one connection with the boiler, which is through the supply pipe, and if the globe and throttle valves are in good shape, there is absolutely no reason why steam should come out of the bottom of the steam chest when either the one or the other of these are closed. The valve seats are probably worn and need to be re-ground.

A. D. G. VONDA, SASK. **Q.** The front wheels on my traction engine are badly worn on the inside hub, which is cast. I have used babbit but it does not last. Would it be possible for me to melt brass on a blacksmith's fire instead of babbit?

A. It is possible for you to melt brass, but the trouble would be in getting it sufficiently smooth and true so that the axle would run on it properly. It would be almost necessary to put this in a lathe in order to turn it down. Unless your engine is too old, it would seem that the best thing to do would be to get new front wheels.

F. R. F. ALLAN, SASK. **Q.** My engine will be running all right and will pull good, and suddenly the hanger on the reverse gear will begin to jerk, and the engine will have no power. The reverse lever will also jerk. What do you think is the matter?

2. Do you think the lubricator is better than the oil pump?

A. The trouble is practically with your lubricator. The valve becomes dry and sticks, with the result that while there is just as much steam going into the cylinder, there is a large amount of the power taken up by the valve and we believe that if your lubricator is all right, and if your engine is getting the proper amount of oil, that you will have no trouble.

2. In our estimation, the lubricator is just as good as an oil pump, although the suction is not so positive. Lubrication with an oil pump is forced, while with a lubricator it is not so certain. If they are working properly, there is absolutely no reason why one should not be as good as the other.

W. M. PORTAGE LA PRAIRIE, MAN. **Q.** Do you think a 25 h.p. double engine large enough to be a profitable plow engine?

2. Do you consider the Corliss engine, with link reverse, more economical than the Woolf valve gear?

3. Is the single-cylinder engine more economical than the double-cylinder engine?

A. During the past four or five years we have received hundreds of letters from engine owners in Western Canada who have used a 25 horse power engine for plowing purposes, and on the whole we would say from these letters that the 25 horse power engine makes a very satisfactory plowing engine. You, of course, cannot do as much work per day with it as you can with an engine of larger size, but on the other hand you are not under a heavy expense. A 25 horse power engine will pull six plows in breaking an do it very economically.

2. No.

3. The single-cylinder engine is, and should be, more economical than the double-cylinder engine, although the difference is very slight. This was evidenced last summer in the Motor Contest. There is, however, no question but what the double-cylinder engine is an easier handling engine than the single cylinder, but you pay for this ease of handling in an extra fuel and water consumption.

E. A. P. ANERLY, SASK. **Q.** Would like to know which of the following engines you would consider the most economical, both engines working on the same load, about 60 brake horse power, and cutting off at the same point.

1. A simple engine, 11 x 11, 130 pounds pressure, and 250 revolutions per minute.

2. A Woolf tandem compound, 9¼ and 13 x 11, 250 revolutions per minute, 145 pounds pressure.

A. With both engines on the same load, and with the same cut-off, there should be little or no difference, although with your tandem compound you get two expansions and, of course, in the second expansion you get down almost to atmospheric pressure; consequently you will reduce the back pressure due to the exhaust. This would have the effect of giving you slightly more power, and you would have less power wasted. The difference would, however, be slight.

G. W. HAZELCLIFFE, SASK. **Q.** I would like to get an injector which I could regulate so as to pump just what the boiler needs when working, and have the injector on all the time. The two that are now on the engine pump too much when working at the lowest capacity. What I want to know is, if I got an injector a size smaller, could I put it on the same delivery pipe or would I have to get a smaller pipe all through?

A. It would not be necessary to get a smaller delivery pipe, but you would need a smaller suction hose. It would not be wise for you to depend on this entirely, but it would be all right to use it as one of your injectors. In case your small injector went wrong, you would have your large injector to fall back upon.

E. B. SEAFORTH, ONT. **Q.** Is it necessary to have a license to operate a plowing engine in Manitoba, Saskatchewan, and at Edmonton for the

2. If necessary, where can same be obtained?

3. What qualifications are needed to obtain the license?

4. Does a fireman need one also?

A. 1, 2, 3, 4.—A license is necessary in Saskatchewan or Alberta, but is not necessary in Manitoba. Application should be made to the Department of Public Works, Regina, for the province of Saskatchewan, and at Edmonton, for the province of Alberta. If you have had experience with a steam engine, a provincial license can be obtained, which is good for one year, but the regular license is granted only upon an examination backed up by a certain amount of experience in running a steam engine. The fireman does not need a license.

A. J. M. WEST FORT WILLIAM, ONT. **Q.** Will you please tell me, through your paper, if there is any way to fix a crack in a pump barrel? This pump has a cylinder 9 x 10, and is driven by a 10 horse power gasoline engine at 40 revolutions per minute and delivers the water about 42 feet high. The crack is about 8 inches long and does not leak until it has almost full pressure on it.

A. There are two ways to fix this crack. The first way is to shrink one or more bands around the barrel, which will hold it up tight. Considerable care must be used in shrinking these bands on in order not to get them too tight, or they will burst when cooled. Another way is to drill holes in the crack and also drill out the crack slightly, or what is better, run a hack-saw through it. Where the holes are drilled out they should be reamed, so that the holes would be smaller on the outside than on the inside. Pour both the crack and holes full of babbitt metal, and the difference in the size of the holes will hold it in.

Look out for the chronic hand-shaker—he may have something up his sleeve.

The man on the way to heaven can make a living for his family these days.

Industry need not wish, and he that lives upon hopes will die fasting. There are no gains without pains; then help, hands, for I have no lands; or if I have, they are smartly taxed.—Franklin.

Practical Talks to Threshermen

Conducted by PROFESSOR P. S. ROSE

TALK No. XXXI.

In order to give a concrete meaning to some of the points discussed in the last lesson, let us assume an example and figure out the various items of expense connected with the operation of a threshing rig and, if possible, arrive at what should be a reasonable price to charge for threshing. It must be borne in mind that the values which I shall assume are liable to carry in different sections of the country, but the general treatment of the subjects will be the same for all sections. All that need be done to make the results fit the local condition is to insert the proper values for labor, interest, etc., that obtain in the given locality.

We will assume that a thresherman, located, say in North Dakota, bought an outfit consisting of a 30-horse power engine a 40x66 separator, with self feeder, weigher, wind stacker, and main drive belt. Besides this he purchased two tank pumps, two water tanks and a cook car. The total cost of the outfit, after paying freight and equiping the cook car, amounted to $4,000. He had $400 to begin with and gave four notes of $900 each for the balance. This first note was made payable October first, after delivery, and the other three notes ran one, two and three years respectively, falling due on October first of each year. Interest was charged at the rate of eight per cent. per annum. The rig was delivered on August first and settlement was made on that date.

The average life of a threshing outfit may be figured at eight years. The engine may last a little longer, but the separator will probably not last quite so long; so that an estimate of eight years is fairly liberal and actually a little more than the average for the section of the country where this thresherman lives and where farm machinery does not always receive the best of care.

The average number of days of acutal threshing will be about twenty-four. In some places it runs as high as thirty days, and in other localities eighteen or twenty days will complete the season's run.

Following the custom of the country, the thresherman will furnish a complete crew, as follows, and pay the scale of wages set forth below:

1 Engineer	$5.00	per	day
1 Fireman	3.00	"	"
1 Separator man	5.00	"	"
1 Water boy with team	5.00	"	"
6 Bundle teams with drivers	30.00	"	"
4 Spike pitchers	10.00	"	"
4 Loaders	10.00	"	"
1 Cook	4.00	"	"
1 Manager	6.00	"	"
20 Men. Total—	$78.00	per	day

The cost of board for the men will not be less than fifty cents. per day, making an additional charge of ten dollars per day. The wages of the crew do not have to be paid in wet weather when they cannot work, but board must be furnished regardless of the weather, and it is an item of considerable importance in wet seasons.

In the last lesson it was suggested that two dollars per day should be charged to repairs. It is doubtful if this is figured high enough. With good luck the first year, repair bills will be light, but after that they will get larger each year until the rig is worn out. In regions where alkali is found in large quantities in the feed water, it makes flue repairs heavy. A set of flues will last only about four or five years and a new set will cost about one hundred and twenty-five dollars. It will thus be seen that two dollars per day is a low estimate for repairs.

Oil for engine and separator will cost about one dollar per day, and incidental expenses another dollar. These incidental expenses cover such items as tools, waste, packing, belting repairs and small extras.

We are now ready to consider the total expenses and figure out how much they amount to per day. These may be tabulated as follows:

Interest on $4,000 at eight per cent	$ 320.00
Depreciation per year for eight years	50.00
Total wages paid for 24 days at $78 per day	1,872.00
Total for board and crew for 24 days	240.00
Total for repairs, oil, incidentals	96.00
Total expense for 24 days	$3,028.00
Total expenses per day	$ 126.16

The usual price for wheat threshing in this thresherman's part of the country is nine cents per bushel. In order to meet expenses, therefore, without making any profit for himself, he must thresh on an average 1,402 bushels per day. This average takes in account all delays, time on the road, and time consumed in setting. Working at this rate, the thresherman would come out exactly even at the end of eight years, provided he had no bad weather and no bad luck, on an outfit such as I have described. However, he would have a good deal of trouble meeting his notes when they came due and would have an extension of time on all of them.

Let us now see exactly how much he must thresh each day in order to meet his notes when they come due, assuming, as before, that he runs twenty-four days each season and that running expenses are as before indicated.

The debt of $4,000 was assumed

on August first, two months afterward. While it is true that $400 of this amount was paid in cash, it does not alter the fact that it was worth eight per cent., consequently we must charge eight per cent. on the entire $4,000 for two months. Tabulating all expenses and adding $900, the amount of the first payment, we have:

Interest on $4,000 for two months at eight per cent.	$ 53.33
Wages of crew and board for 24 days	2,112.00
Repairs, oil and incidentals	96.00
First note	900.00
Total	$3,161.33
Charges per day	$ 131.72

The number of bushels that must be threshed to cover this daily charge on the basis of nine cents per bushel must be 1,464 bushels.

The next year and each succeeding year, until the machine is paid for, the account will stand as follows:

Interest on $4,000 at eight per cent. for one year	$ 320.00
Wages and board for crew.	2112.00
Repairs, oils, incidentals	96.00
Second note	900.00
Total	$3428.00

Dividing this total by twenty-four, the number of days, shows that there must be charged to the daily expense account the sum of $142.83. Again dividing this sum by nine, we arrive at the figure 1,598, which represents the average number of bushels of wheat that must be threshed per day in order to meet all payments on the machine as they come due.

It may be asked why no charge is made in this case for depreciation. In order to answer this question it is necessary to state that the depreciation charge is a fixed yearly charge which is introduced to offset the original cost. If this is taken care of in four years, by means of four annual payments, no other depreciation charge need be considered.

Working on the basis above set forth, and with no bad luck, the thresherman would at the beginning of his fifth season have his rig paid for, but during that time would have made no money except the six dollars per day as wages for acting as manager. He would, however, have an outfit good for three years more work. If he could, during that time, average 1,598 bushels of wheat threshed, per day, twenty-four days per year, he would make a profit of $990 per year.

His total profit on the rig at the end of eight years would therefore be $2,700 plus the interest on $900 for three years at eight per cent., or $216, making a total profit of $2,916. This is the maximum he could make on the figures I have shown above. He could, however, realize probably $150 on his outfit at the end of this period as extras and scrap iron, making a total profit of $3,066. In case of bad luck it might be much less.

On the other hand, exceptional crops or good luck might make his profit larger by a considerable amount.

Figuring his profits on the yearly basis, we find that they amount to $383.33 per year. This represents a net profit of about nine and one half per cent. on the original investment.

In the case of accidents, bad weather or poor crops, all of which are certain to occur in any period of eight years, the net profits will be smaller.

It may be urged that an average of only 1,600 bushels per day is rather low for such an outfit and doubtless it is, yet the fact must not be lost sight of that averages are always low. Figured on the basis of the average wheat yield of North Dakota, it means that the wheat growing on about one hundred and twenty acres must be threshed every day. Figured on this basis it looks a pretty fair average after all.

I have reduced the expense account to a daily average for the reason that I believe it is the correct method for the thresherman to pursue. It allows him to check up with his machine measure each night and tell approximately how he stands. He is thus able to tell very closely from one day to another whether he is making money or losing it. Furthermore, it gives him a keener appreciation of the value of time. For example, suppose he wants to know how much he loses in the case of an hour's delay. He can tell in a moment. Take the last case where his daily expense account was $142.83. If he works fourteen hours per day, the hourly charge is $10.20. If he has to shut down fifteen minutes to lace a belt, it costs him $2.22,—rather expensive, isn't it? After he figures a few items like this, he will see that his separator man and engineer look things over and get everything in shape before the machine starts.

Tool Boxes for Wagons Etc.

To go from home with a wagon without taking a few tools, is to risk a break-down from some unforseen accident, without the means of repairing it, and perhaps a consequent serious or costly delay. Those who do business regularly upon the roads, as those who haul lumber, wood, coal, or ores of different kinds, should especially be provided with a set of tools, as a regular appurtenance to the wagon, and the careful farmer in going to market or the mill, or even to and fro upon the farm, should be equally well provided. We have found by experience that a breakdown generally happens in the worst possible place, and where it is most difficult to help one's self. The loss of so simple a thing as a nut or bolt may wreck a loaded wagon, or render it impossible to continue the journey, or some breakage by a sudden jerk upon a rough road may do the same. It is safe to be provided for any event, and the comfort of knowing that he is thus provided greatly lessens a man's labor. At one time, when we had several wagons and teams at work upon the road, we provided the foreman's wagon with a box such as is here described, and it was in frequent use, saving a considerable outlay that would otherwise have been necessary for repairs, besides much loss of valuable time. It was a box about eighteen inches long, sixteen inches wide, and six inches deep, divided into several compartments. It was supplied with a spare king bolt, a hammer-strap, wrench, some staples, bolts, nuts, screws, a screw-driver, a hammer, cold-chisel, wood-chisel, punch, pinchers, a hoof-pick, copper rivets, a roll of copper wire, a knife heavy and strong enough to cut a small sapling, a roll of narrow hoop-iron, some cut and wrought nails, and such other as experience proved convenient to have. The middle of the top is fixed, and on each side of it is a lid hinged to it, and which is fastened by a hasp and staple, and a padlock or a spring key. The box is suspended to the wagon reach, beneath the box or load, by two strong leather straps with common buckles. Being only six inches deep, it is not in the way of anything, and is readily accessible when wanted.

When troubles start coming your way, they come like a string of beads.

The man who can't do things himself always has a prescription for others.

Blessed is the man who expects nothing, for he shall not be disappointed.

FARM DEPARTMENT

Housing Farm Tools.

Because of the scarceity of farm labor we are compelled to employ more labor-saving and speed making tools and machinery than we would otherwise. The providing of shed room for them is one of the important problems in farm economy. With the exception of the wagons and manure spreader the use of implements averages less than a month during the year. With the use of the implement one month of the twelve and the condition in which it is kept the remaining eleven explain why many farmers are always hard up and ready to condemn farming as an unprofitable business. Just why so many farmers permit their machinery to rust out is one of the unanswerable questions.

Did we provide shelter for all our implements and take the pains to put them in shelter when not in use we would be turning our time and labor to great profit. Any farmer handy with saw, hatchet and square can provide shelter for his tools, even though it be cheap and roughly built. A shed built of pole posts and sided with rough lumber and covered with some of the prepared roofing advertised in The Guide would not cost much and would shelter the tools all right. However, with the ruling prices of farm products most of us could afford to erect implement buildings in conformity with the appearance of the other buildings on the farm.

The average implement costs enough to begin with and it stands us in hand to cause each piece to last as long as possible. At least it should not become less valuable except by actual use. It is not possible to secure the full value of a tool or to use it to its full capacity unless it is properly cared for. Some of us get less than one-half the actual life of our tools because they are not properly handled and housed. It is time we were more saving of our earnings by stopping the waste in letting tools rust out. Here is an opportunity to do a lot of saving.

While upon this subject let us take a word of caution about two other very important items which, if used freely, would lengthen the life and use of our tools, namely, oil and paint. Many a piece of machinery is worn out long before its time from a lack of proper and frequent oiling. They are run dry, boxing and shafting heat and cut, and soon the implement is worn out, the junk dealer gets it and the farmer buys a new machine which shares similar treatment and goes the same way, and the farmer curses his fate and the manufacturer and wonders why all his tools are of such inferior material and construction.

It is a fact that very few implements are painted as they should be. Paint is not expensive and every farmer should learn to use it. There are many days during the year in which very little outside work could be done. The time could be well employed in giving the implements a needed coat of paint. This is almost as essential as good shelter, and it is quite necessary where the implements are not properly housed. Were we all to cast up the amount paid out for farm machinery during the past ten, fifteen or twenty years we would be surprised at the amount, and we could have saved a good portion of this had we provided proper shelter and used plenty of oil properly and given the needed coats of paint. Let's give this matter of tool shed more than the usual consideration this fall.

The Farm Cream Separator—Its Selection and Care

I want to buy a cream separator, which is the best? or which make do you find gives you the best satisfaction? or which do you recommend? These questions are probably more often asked than any other and are seldom answered.

First a machine must be a close skimmer, for no matter how many other good points a machine may have, if it fails in this point, pass it by. Unless a machine will skim down to .05 (and under favorable conditions it should be less) it is not a desirable machine. In this connection the richness of cream might be mentioned. A machine should give at least a 30 per cent. cream, and skim to the point mentioned, in fact a 40 per cent. cream should not affect the thoroughness of separation. There are many advantages of having a rich cream, such as, more skim milk being left on the farm, less cream to cool and care for, less to haul to the creamery, less vat space required, acid develops more slowly, lower churning temperature can be used, insuring a better body in the butter. The adjustment of the cream screw is very delicate, and care should be taken when changing.

Get one with a capacity in proportion to the size of the herd, and in this err on the large side; give the herd a chance to increase, for a separator of large capacity turns but very little harder than a smaller one. The larger one will take no longer to wash, and will skim a given quantity of milk quicker, thus saving time, and time is money.

Then look for a machine that will turn easy. It is just possible that it may be necessary for you to be absent sometime, and your wife will have to do the turning, so for her

sake get one that turns easily. Sometimes it is found that there is as much difference in the ease of turning different machines of the same make, as there is between the different makes. Some makes seem to turn easily at first but have not lasting quality in this respect.

Also look for one that you can readily get to every part that needs cleaning, so that all parts can be thoroughly and easily cleaned; not always do we find that the most difficult looking machines are the hardest to wash and vice-versa. It depends more on where the sediment lodges and how difficult it may be to get at.

Get one having a good capacity in proportion to cost, and one having the appearance of being durable.

The durability of a machine is one point that cannot be decided at an institution of this kind, on account of so many changes being made by the manufacturers, and the abuse machines receive from students and visitors.

Then there are a number of minor points more or less stress may be laid upon, such as height of supply tank, space between cream spout and bracket intended for cream pail. To my mind this space should be sufficient to allow a shot-gun to be placed under the spout, for by using this type of can for cream, it can be more quickly cooled. The skim milk delivery should be high enough to allow an ordinary milk can under the spout.

Before buying a machine a suitable place should be provided for it, preferably a place especially for the separator. It should be situated so it can conveniently be kept clean, ventilated, free from dust, dampness and bad odors, and convenient to the place of milking to make the work of carrying the milk to, and skim milk away from, the separator as light as possible. Also having the water supply for cleaning the machine as handy as possible. The foundation or floor under the machine should be solid, and the machine set level.

Get the speed up gradually, see that all parts get the necessary amount of oil. Every week or ten days it is well to flush the bearings with coal oil to clean out the dead oil or grit that may have gathered, and will cause the machine to run hard. If warm water is convenient use enough to fill the bowl; this will warm and wet all parts so the cream will not stick. Keep steady motion and full speed all the time the milk is running through. And after the milk is all separated use enough warm water to flush out the cream remaining in the bowl; if the water is not convenient, skim milk can be used. The water is preferable because it is nearer the specific gravity of the cream, and more readily displaces it, than does the skim milk.

All parts of the separator coming in contact with the milk should be thoroughly washed and scalded every time they are used, and the best time to wash them is immediately after using. A good washing compound is a great aid in cleaning the parts.

The cream should be cooled to 50 degrees or lower immediately after separating. Never mix the fresh cream with that previously separated until it has been cooled. No doubt failing to observe this one point causes more poor flavored cream than all other causes combined. The lower the temperature at which the cream is kept, previous to churning, the better.

Some of the most likely causes for a variation in the per cent. fat in cream separated on the farm are variation of per cent. in fat in milk separated. Variation of speed, the higher the speed the richer the cream will be and vice-versa. The faster the feed, the thinner the cream, and vice-versa. The amount of water or skim milk used in flushing the bowl.

If a herd of from 15 to 20 or more cows are kept, possibly some power such as a tread power, or a gasoline engine could be used to advantage. How long should a separator last, is a question often asked, but which cannot very well be answered. Providing it has been properly constructed and receives good care, it should last a lifetime, apart from some of the main wearing parts which are interchangeable. But too many operators fail to realize how delicate the fine cut gearing is, and how soon neglect, lack of good oil, dampness, or rough usage will cause the machine to run hard, and shorten its time of usefulness.

Finally, it is well to buy a machine from a reliable firm, or, in other words, a machine past the experimental stage, that has been on the market for some time—a tried machine.

After you have decided that you want a machine, don't be in too big a hurry to buy; be sure you are thoroughly satisfied before you settle for any separator. The agents are good talkers, and you may have a long time to repent for your haste, if you are not satisfied.

Does a Fanning Mill Pay?

It would be difficult to name a piece of machinery needed by every farmer, whether he be a farmer on a large scale or on a small scale, whether he be the owner of a farm or the renter, equal to that of a good fanning mill. "As ye sow so shall ye reap." If you are going to sow grain or seeds, what kind of grain or what kind of seeds do you want to reap? This is a momentous question for every farmer to ask himself at seeding time.

Have the thousands of agricultural colleges and experimental farms scattered throughout the whole civilized world been of any real use to the farmer? Are we getting any return for the large sums of money annually expended for this purpose? If not, would it not be wise to convert those colleges into lunatic asylums so that more of us would be properly taken care of?

Surely this would be the most appropriate place for people who would insist on annually throwing away large sums without even a chance of having a little fun out of it. But we think our readers will agree with us that the people have been, at any rate, sane on this point.

We think they will agree with us that every year science is rendering farming more a work of the brain

than of the hands. We know that at different stages of our history, when various pestilences threatened almost total destruction of our stock and of certain grain and fruit crops the knowledge gleaned from these experiments resulted either in eradicating or in greatly minimizing the loss that would otherwise have resulted.

We know that the knowledge gained by these experiments has greatly improved the quality of our stock as well as our fruit and cereal crops. We know that even with the small use made of this knowledge the corn crop of the United States alone has been increased millions upon millions of bushels. Let us see what these experiments have done in demonstrating to what extent the yield of other grains can be increased. There is not one agricultural college in the country but that will strongly advise the use of large, plump grain for seed. All colleges use good fanning mills.

The results of actual experiments made at the Ontario Agricultural Experimental Farm, Guelph, Ont.:

"In a report upon experiments with winter wheat, conducted at the Ontario Agricultural Experimental Farm, several points of universal importance are referred to, such as the selection of seed, the different quantities of seed per acre, and the method of seeding. As regards the selection of seed, it was found from tests made with two varieties in 1897, and again in 1898, that large plump seed produced a yield of 6⅔ bushels per acre more than that produced from small plump seed, and 8¼ bushels per acre more than that produced from the shrunken seed. It was also shown that seed grain which had been broken by the threshing machine gave a yield of only one-fifth as much as that grown from the large, plump seed. The weight of grain per measured bushel and the yield of straw were equally and similarly influenced by the different selections of seed.

"The differences between the heavy and the light weight wheat from the same seed force are so marked that it is of great importance to know whether characteristics can be traced to the plants and what the differences in chemical composition are between the healthy and vigorous and the poor and sickly wheat plants.

"At harvest time a sample of thrifty, stocky, vigorous plants, straw four feet long, heads well filled and over four inches in length, was selected, and at the same time another sample of wheat, sickly plants, straw about two feet long, heads two inches long, was sorted out from the same field. A complete chemical analysis was made of each sample.

"Nine hundred thrifty plants gave three pounds of dry matter.

"Nine hundred sickly plants gave about 1.2 pounds of dry matter.

"In the same weight of dry matter of each lot there was more nitrogen, phosphoric acid and potash in the healthy and vigorous plants than in the sickly ones, which contained more silica, soda and magnesia. These are the same general characteristics that are noted between the heavy and the light weight wheat.

SUMMARY

"1. Heavy-weight seed wheat contains a larger quantity of more valuable food materials for the young plant in the form of nitrogen, phosphoric acid and potash than light weight wheat of the same variety. This additional reserve food is supplied to the young plants, and produces a more vigorous growth.

"2. The additional fertilizer material that is present in a bushel of heavy-weight wheat is from three to five cents more per bushel.

"3. The same characteristic differences that are noted between heavy and light weight seed wheat are observed between healthy and vigorous and poor and sickly wheat plants even at the time of harvest.

"4. The wheat plant takes up over three-fourths of its food from the soil before heading out.

"5. The soil must be cultivated and managed in such a way as to supply the growing wheat crop with at least three-fourths of its food from the soil before heading out.

"6. The soil must be cultivated and managed in such a way as to supply the growing wheat crop with at least three-fourths of its mineral food and seven-eighths of its nitrogen before the first of July."

Every farmer will admit that there has been a wonderful improvement made in the corn crop, but it is simply the same old question of selection that has been brought up and forced on the farmers that has caused this great improvement.

Now, how can this selection be made?

THE FANNING MILL

Now, it is an established fact that fanning mills, such as are advertised extensively in the farm magazines, will do everything that the makers claim for them. They will not only separate good wheat from chaff, but will remove all seed of any nature and at the same time will remove all shrunken and inferior kernels, leaving nothing but the large, plump, heavy kernels, which will produce a maximum crop.

It seems a very unwise policy for farmers to continue from year to year sowing a lot of undesirable seed. Price of land is so high and farm labor so scarce that all farmers

should strive to make the land produce a full and complete crop.

Now, if the land will produce sixty bushels of wheat per acre, why be content with twenty-five or thirty bushels? It costs just as much to plow the land and prepare fields for a small crop as it does for a large crop. It costs equally as much to harvest the small, inferior crop as it does the bumper crop. These ideal conditions can be secured by sowing seed that is large and plump. The crop will not only be larger, but all grain will ripen at the same time. Added to the extra yield of grain will be a large increase in the straw, the one way possible to make the land produce a maximum return.

A great many farmers will make up their minds and promise themselves that next year they will prepare their seed carefully, but when seed-time comes they have not attended to it before the ground was ready; then at the last minute they will go to their bins and take any old grain and use it for seed. There are others who will take their grain to an elevator to have it prepared for seed. The elevator does little more than the threshing machines. While they do remove a certain amount of the weed seed, they make no pretense of grading it, and it is very often the case that a farmer will bring home a new and dangerous weed seed from the elevator.

There is no place where a farmer can get his seed or grain cleaned without paying well for it, and no way in which it can be as conveniently and cheaply done as by having a fanning mill at his own place where he can grade it on wet days. He saves the price he would otherwise have to pay for grading, and has all of his screens, etc., at home for feed, and the additional price he would get for his seed on the market would amount to very considerable.

The farmer who is a business man in matters of this kind will be a business man in other things, and in driving through the country it is a very easy matter to determine who the business men of each section are; you will find that they are buying extra sections, while the shiftless man wonders how to meet the next payment on the mortgage.

A very important item which every farmer should consider is that by owning a good fanning mill he will be saving a large amount of timothy seed from his crop of wheat. A field where sod has broken or where the timothy grows up around stones, stumps, and along fences will yield a considerable amount of timothy seed; where timothy hay has been fed a great deal of timothy goes into the field with manure. This will come up with the crop. There is never a grain crop that does not yield some timothy seed. Sometimes there is a saving of from ten to fifteen bushels. A large amount of money can be made by cleaning out the mangers in the barn and running the fine chaff and seed found there through the fanning mill. Sweep up the floor where the hay has been thrown down from the loft all winter. Save the chaff and shells after the hay bailer has been at work. Clean the timothy out of the foul seed that comes from the separator at threshing time and you will find that you have hundreds of dollars which formerly went to waste.

In selecting a fanning mill it certainly pays to get the best; one that is equipped to do any and all kinds of work. There are on the market fanning mills that will do everything the manufacturers claim for them—in fact, they are general purpose farmer's mills. There is one that will separate timothy seed from wheat before it strikes the blast of wind; with the old-fashioned machines all this valuable seed was blown out with the chaff.

Get one that will secure all of the large plump kernels, for seed, one that will not only grade all small grains such as oats, wheat and barley, but that will also grade seed corn.

Now, we would like every farmer who reads these pages to consider if it will not pay him to have a fanning mill. We have only touched on a few of the different ways whereby this machine will earn extra profits for you. Not many of you are farming for your help, and in any case, each and every one is anxious to get the largest possible returns for his labor. If, after due consideration, you decide that it does not much matter what kind of seed you sow; that all other things being equal, inferior seed will produce just as good a crop as the best seed obtainable, that it is not worth a small expenditure to help keep your farm clean and assure those extra profits for years to come, then we say: Do not bother with a fanning mill, because we ourselves would not buy anything which we did not think would pay and certainly would not advise anyone else to do so.

To produce bigger returns is what the fanning mill is for; it is purely and simply an investment, not a luxury.

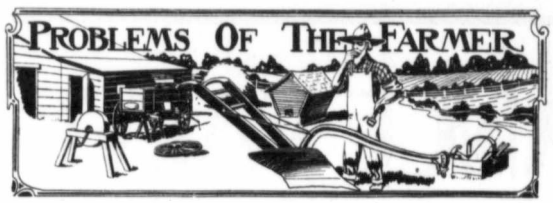
If, however, you decide that it will pay you to sow good seed, that it will pay you to prevent any more weeds getting on your farm either through the manure or the seed, that it will pay to make that farm yield you the fullest possible returns for each cent of capital invested and labor expended, then we say that the fanning mill is a necessity.

Have all this grading done and everything in readiness when seeding time comes; there will be no joyous harvest-time if this matter of preparing the seed has been neglected, because "like begets like" and it is unreasonable to expect you can raise wheat from mustard or oats from tares.

When somebody offers you something for nothing, look out for the reason.

It is a wise man who, instead of harvesting his crop of wild oats, reforms and lets it go to seed.

"A parting glass"—The girl's final look in the mirror at her hat.



I.

Why does a farmer, when he plows a piece of land that is V or wedge-shaped, always pack down a narrow strip of land in the center, when turning on it, until it is unfit for planting or seeding? Suppose you try a new way:

When the piece of land being plowed is 6, 8 or 10 feet wide, according to size of team used, when you reach that desired width of land, as you are driving toward the narrow point, tip the plow over on the side, and thus throw it out of the ground. At the same time turn the team around across the land, and go back on the other side of the land without going clear to the point. The next time turn a little farther from the point, so as to keep the land as near an even width as possible. With a little practice you will be surprised at the result; you can turn much quicker and easier that way.

When the wide end of the land is cut down to the width of the narrow center which you have been turning on, you can finish it all at once, and have a complete fresh-plowed tract with no hard road in the center.

Again, when you wish to plow a tract that is small and will have many short turns, like a garden, begin by back-furrowing a strip through the center and throw the plow out of the ground without crowding the team into the fence. If you wish to make an extra nice job, drive across the end of the land which you are plowing, letting the plow scratch enough to be a guide for the end of the furrow. If you wish you can plow two or more strips thus, and plow out the land between, "swinging on the headland". At the last go around the whole piece and plow the headland.

Again, when using the harrow, if it is not doing all you wish in the line of smoothing and leveling, the lever farther and slant the teeth back more. Then the framework will get right down to business and you and your neighbors will be surprised at the result.

II.

If I were to sum up as concisely as possible the most needed condition for permanent good roads, I would say—drainage. Not simply drainage of the road surface, which is very important, but a proper and complete drainage of the entire road-bed and foundation in such a manner that there would not be any standing water in the roadside ditches to seep back under and soften the road-bed, which is the foundation of any good and successful road.

As applied to highway construction, the lateral drainage would be largely by means of open ditches at the roadsides, with, in some cases, a covered drain of some suitable material in places where the necessary grades were lower down from the top surface than would be best or advisable for open ditches. This would mean the working out, carefully, of the contours, not only for highway, but of practically the whole drainage basin affected, in order that size, depth of ditches and location of outlets could all be balanced so that the maximum of results could be obtained with the minimum of labor and cost.

The proper drainage system would be governed largely by the area of the basin, contour of surface, character of soil and location of outlets, and in this I see a two-fold advantage to the farmers, at least to many of them.

First the advantage of improved highways; but the second advantage and the one I want to emphasize is that the improved drainage conditions in the highways would result in improved drainage conditions on the farms, the improvement in many cases being sufficient for all practical needs, but in addition would provide the opportunity in many more cases to follow up the road work with a system of tile drainage.

There are hundreds of farms, all or a part of which would be greatly benefited by tile drainage; but in many cases the work can not be done because they have no available outlet. Drainage work, as I have outlined it above, would give a general knowledge of the entire drainage basin and would, in a majority of cases, provide the farmer with an outlet in one of the highway ditches for his tile drainings.

III.

Send for and study the seed catalogues. They are interesting and full of suggestions. You may find some new ideas worth while. The pictures of vegetables and the colored plates stimulate a wholesome longing for the "good old summertime" and the garden, and maybe before the pressure of farm work drives thoughts of everything else out of mind.

Plan the garden now. That's the idea! Don't leave it until the time comes to plant, and then go at it haphazard. You can get good plans for the home garden from some of the good books or bulletins on the subject. But if you will use your own brains a little you can arrange a plan for your next summer's vegetable garden that will serve as well, perhaps, as any ready-made schedule out of a book.

Take paper and pencil, draw an outline of the plot of ground to be devoted to the vegetable garden; then, one of these long, winter evenings when it is pleasant to be shut in the house all by yourselves, call the good woman of the house to your assistance and together work out a plan. It will be more interesting than a game of checkers. Go over the plot on the paper and, with the assistance of the catalogue, arrange

what vegetables you want to grow, and the location of each particular kind.

A manure hotbed is practically nothing more than a board-edged pit in which there is fermenting manure covered with several inches of soil.

The top of the hotbed is roofed with sashes,which usually measure about 3 x 6 feet each. At night a straw or other mat is laid over the glass to keep out the cold. The space between the soil and the glass must nowhere measure less than about six inches in the start; the soil will sink as the manure ferments. Manure hotbeds are usually made of inch boards. If the boards on the back of the frame are twelve inches above ground, those in front should be several inches lower, thus giving a slant to the sashes. Strawy horse manure is best for hotbeds. Collect it under shelter and let it heat for about a week before using, turning it often. The pit for the hotbed may be one to three feet deep. Good drainage is essential.

Test the hotbed before planting. Push a stick through the soil and manure, and if, on withdrawing the same, it is found comfortably, but not excessively warm, the seed may be sown. The temperature should be about 90 degrees.

To secure strong plants of any kind, plenty of air and sunlight is required as soon as they are well out of the ground and leaves begin to form. A slow and steady growth is best. A quick, forced growth under excessive heat and closed sash makes a weak plant that will not stand up when exposed to the open air in the field.

The skill of the operator is put to the test in regulating the heat and ventilation of the beds. It is an art that can best be acquired by experience, under the eye and instruction of one who knows how. It is very difficult for the one who knows to tell another how to do it; he can more easily show him.

IV.

The great trouble with most farmers in the past has been the lack of working capital. By this, we mean capital sufficient to properly equip their farms with machinery and farm animals, to pay all current expenses during the season without going in debt, and to hold their crops for a favorable market.

For a long time in the early history of the Western States this lack of working capital was unavoidable. Many farmers, however, from force of habit, are putting their money in the bank at a low rate of interest, or none at all, when it might be used much more profitably as working capital on the farm.

There was a time twenty-five or thirty years ago when about all a man needed to set himself up as a tenant was a team, a wagon, some plows and harrows. That day has passed. Each year it requires more and more capital, and every year the danger of tenants undertaking to farm with insufficient capital increases. The credit of farmers, whether on their own farms or renting, has been good for a long time in this western country, and there is no danger, particularly in the case of tenants, of overstraining their credit. A banker spends six months of the year trying to get his money out when it is cheap: but when the rate of interest advances he works even harder to get it in, and the men who overstrain their credit are likely to be forced to sell stock or grain to pay their debts, and at prices which wipe out the profits of the year.

English farmers told us last summer that it required from eight to one hundred dollars an acre of working capital to properly stock and conduct a farm. These, mind you, were tenant farmers paying from seven to fifteen dollars per acre rent. The grain and live stock on the farm of the forehanded man generally sell for more than the same grain and live stock on the farm of the man who is working with insufficient capital and is therefore liable to be sometime pushed into a corner.

The prospect is very rosy just now, but it will not do to conclude that it will always continue so. Something may happen in some part of the world, or during political turmoil in our own country, that will call a halt in business investments; and while the beginnings may be in a far country or far distant from the farm in our own country, it will surely reach the farm. Therefore, we do not think it a good time for a man to undertake to do business with insufficient capital, or to strain his credit in any way.

Profits in Potatoes.

Potato raising, either as a side issue or as a main crop, proves profitable to the farmers everywhere. Few farmers, however, realize as much from their potato "patch" as they should. Good cultivation, planting good seeds, using good tools, fertilizing, spraying, etc. — will make the same space double or treble its production and greatly improve the quality. And quality potatoes get the top prices.

On Long Island the average gross return from potato land is $225 per acre, the cost of production $56.50, and the net profit $169 per acre.

One way to learn how to increase the yield is for the farmers in a neighborhood to organize a potato club. Invite half a dozen of your neighbors in and talk over methods and markets, etc. Wonderful results in the way of larger crops will follow.

The 1910 "Iron Age" booklet should be sent for and used as a text book at the first meeting. It contains much valuable information and a copy will be sent free to yourself, as well as one for each member of the club. The ladies, too, should be invited, for if they do not take part in the potato "discussion," they can surely spend the evening pleasantly and profitably.

For the 1910 "Iron Age" booklet and other literature, address the Bateman Manufacturing Co., Box G, Grenloch, N.J., makers of the "Iron Age" farm and garden tools, which includes a complete line of potato machinery.

Enquiry into Sheep Industry

in Saskatchewan

By A. FRANK MANTLE

Paper read at Saskatchewan Winter Fair, Regina, Sask.

During the fall and early winter an enquiry was conducted into the present status and future prospects of the sheep raising industry. A schedule of questions was sent to several hundreds of sheep raisers—both farmers and ranchers—throughout the province. A gratifying number responded and many went to some trouble in expressing their opinion as to the advantages and disadvantages connected with sheep raising in Saskatchewan.

Letters of enquiry were also sent to a number of the leading packing house operators, wool dealers, and smooth wire fence companies, asking them a number of questions as to those aspects of the sheep industry with which they were concerned. Here again a gratifying response was met with and there was evident upon the part of these companies a desire to co-operate in any movement looking to the fostering and building up of this neglected industry.

An analysis of the replies received from sheep raisers indicates that the industry of sheep raising is in a transition stage in Saskatchewan at the present time. The large flock of the exclusive rancher of sheep is being replaced by the more numerous and smaller flocks of the grain growing farmers who keep sheep merely as a side line.

Without exception, those ranchers who replied to the circular of enquiry, considered the industry as viewed from their standpoint to be on the decline. Some accepted the inevitable and were either disposing of their flocks or were bringing their methods into harmony with the changed conditions of their districts; others desired that old conditions might be restored and the ranching industry perpetuated—not recognizing that the homesteader and farmer had come to stay and would vastly increase the production of wealth per acre in their locality. Said one Maple Creek rancher, "My opinion of the sheep industry is that it will soon be a thing of the past on account of the ranch being taken up by farmers." In addition to this cause, the difficulty of controlling watering places and preserving them from entry, the scarcity of winter pasturing grounds near home, the competition for range rights and privileges of horse and cattle ranchers, and the increased cost of holding large range areas due to the Supplementary Revenue Tax, were given as reasons for the decadence of the ranching industry.

In view of these adverse and unalterable conditions it would appear to be inadvisable to attempt to stimulate the industry of sheep-ranching. The hope of the province from the standpoint of sheep production lies, (a) in assisting those farmers who at present are sheep owners by placing before them information as to how they may improve their flocks, how handle them to best advantage, and how secure the best returns when marketing; (b) in so setting forth the advantages and profits accruing to sheep production that more farmers may be induced to make the experiment.

To these ends it would be advisable that the Department issue a bulletin dealing with this phase of farming in Saskatchewan and place it in the hands, not only of every owner of sheep at the present time in the province, but also of every farmer who is open to argument upon the subject.

A large amount of interesting and valuable data was compiled from the returns sent in, and it is gratifying to report that the pessimistic note, either as to the present state of the sheep industry on Saskatchewan farms or as to its outlook, was seldom struck. The consensus of opinion undoubtedly was, that, despite certain drawbacks, which will be enumerated later, sheep-raising is an easy, sure, and very profitable adjunct of grain farming.

The following facts, being based upon a large number of returns, may be regarded as authoritative. Forty-eight sheep comprised the average farm flock, where more than five sheep are kept at July 1, 1909, when lambing was completed; the composition of this flock is in the following proportion: 15 aged ewes, 8 shearling ewes, 7 shearling wethers, 17 lambs, 1 stud ram. Most lambs came between April 15th and May 15th and most correspondents considered that the best time of the year for the lamb crop to come. If suitable quarters are available and a supply of succulent feed has been arranged for during the previous summer, early lambs can be made very profitable and the farmer can sell larger and superior lambs at 7 months than those of the rancher at 18 months. Several farmers advocating early lambing gave the price realized for their lambs as being figures from $1.00 to $2.50 above the average.

The percentage of lambs saved is 83 out of every 100; when the number of twins is taken into account a man would be justified in expecting to save and raise, on an average, one lamb for every ewe. Without doubt this number could be much increased if proper attention were paid to the securing of a good ram, to the feeding of the ewes at the time of breeding and to the care of the lambs at, and after, birth.

The average weight of fleece was 7¾ lbs. and the average price obtained for the wool was 9¾ cents in 1909 and in 1908. Thus the average income from wool per flock of 48 sheep (excluding 17 lambs) was $23.42 in 1909. The average price obtained for lambs was $5.50 and for sheep $7.25. The usual amount of stock to be marketed each year from a flock constituted as above described would be 4 wether lambs (the best and most advanced), 7 shearling wethers, and 5 of the 15

aged ewes. Such a selection for the market would leave ample margin for the renewing and expanding of the flock and is a moderate estimate. At the average prices given above the 4 lambs would realize $22.00 and the 12 shearling wethers and aged ewes 87.00, a total of $109.00. Add to this the value of the wool clip, $23.42, and it will be seen that the prospective sheepman may safely count upon a cash return each year of about $132.00 upon a flock averaging in size at July 1st each year 48 head, even after liberal provision has been made for increasing the flock, providing his methods and equipment and market are up to the average standard now obtaining throughout the province. These figures are merely offered here as a guide to the large number of farmers who are thinking of going into sheep-raising, chiefly as a means of controlling their weed problem. They are based upon averages and must not be considered as approaching the income possible if approved methods are followed.

Nearly all correspondents reported that the local butcher shop afforded a sufficient market for all they produced, though, Winnipeg, Brandon, Prince Albert, and Regina occasionally were named as shipping centres. The ranchers in the south-western portion of the province, of course, find in Winnipeg their principal market for both mutton and wool. With the local markets not fully supplied and the number of sheep for shipment east declining each year, there is no danger of overproduction for years to come. This is further borne out by the testimony of the packers to which reference will be made later on.

The most popular breeds among Saskatchewan farmers are:—Shropshire, Oxford, Southdown, Leicester, Merino, Cheviot and Rambouillet, and they are named in the above order of frequency. Thus the short wooled mutton breeds largely predominate. Pure bred rams are very generally used when obtainable, but many correspondents report a desire to use such but have no knowledge of where they may be obtained. Here is further evidence of the need for a bulletin dealing with the whole subject.

Coyotes, or prairie wolves, were named as almost the sole source of loss by the sheepmen of the province. A number of other sources were named by different correspondents but each was reported by but one man so these cannot be regarded as sources of more than very occasional loss. Dogs, unseasonable weather at lambing time, ewes too fat when lambing, poison, spear grass, castration, and stealing were the sources of loss named by one or another, but coyotes were named as a source of loss or as a disadvantage of sheep-raising by fully half those reporting.

Coyotes are undoubtedly a factor that must be reckoned with in this connection. Two methods of disposing of this pest are available. One is to increase the present bounty and thus encourage greater slaughter of them, and the other is for the individual sheep owner to fence against them. It requires but little better fencing to keep coyotes out than to keep sheep in, and the cost of such fencing when its durability, appearance and usefulness in many ways other than as an essential of successful sheep keeping are considered, is not excessive. These two methods of solving the coyote problem should go hand in hand. Their extermination should be encouraged in every way, while the individual should gradually equip his farm with such a system of permanent fences as will permit him to place sheep or other stock requiring to be pastured off or on which pasture for the use of the sheep at certain times has been grown. The inner division fences need not be so strong and expensive a type as the line fence. From the data submitted by a number of fence companies it is estimated that the entire cost in labor and material, including good cedar posts and all necessary braces, etc., of a first-class coyote proof 10 or 12 strand fence, 44 to 48 inches in height, at points having about the same freight rate from the east as Regina has, would not be more than $300.00 per mile. By the farmer supplying his own labor, and in a variety of other ways, this figure could be materially reduced. It is named as the outside figure for a first-class, durable, woven wire, coyote proof fence. Sheep can be kept in at less cost than coyotes can be kept out, however, and a much smaller investment in fencing would suffice in districts where the coyote problem is not acute. Such a fence as above indicated is no more than every well equipped farm should have, whether or no sheep are kept, and such fences are being erected to an ever increasing extent in the older districts of the west.

One enterprising keeper of a large band of farm sheep near Carlyle offers the following as his solution of the fencing problem. It is worthy of careful consideration. For smaller flocks less woven fences would be required. He says: "This is a bluffy country on the edge of Moose Mountain and is badly infested with coyotes. I use a woven wire fence 49 inches high, 11 strands, cut into lengths of 10 rods each, and never let the sheep out of it without a herder. I have them in this portable fence without a herder but find a daily visit necessary. I have one and a half miles of the woven wire and 3 men can take down the fence and enclose a fresh 40 acre pasture in less than a day. It is not stretched tight and can be hung on any barb wire fence with an occasional 3 inch nail at the bottom to keep it close to the ground: (use 2½ inch or 3 inch nails not staples). When there is no fence to hang it on, a stake every 15 feet, lightly driven in, will suffice. With the portable fence every patch of rough land or summer-fallow that will keep the sheep a week can be made use of. I have had my flock on a neighbor's weedy stubble before summer-fallowing for a month at no cost. We do not put the sheep in a corral at night and have only lost one lamb in four years and it was taken when the sheep were in the open and the herder was at dinner."

Enquiry of the hide and wool dealers in Winnipeg elicited the information that Eastern Canada is the ultimate destination of all the wool sheared in the west; that during the clipping season is the best time to sell the wool, as then the buyers are looking for it; and that from 12 to 12½ cents per pound at point of shipment was the average price paid by them for wool during the past season. A considerable disparity will be noted between these prices and those given by the sheep raisers themselves. In figuring up the average proceeds obtained from a flock of sheep the lower prices—those given by the farmers—were used.

As the transition of the sheep industry from a ranching to a farming basis gradually takes place a decline both in quantity and quality of the wool crop must be looked for. At the same time wool is an important product for which there is at all times a market, and in the attempt to secure large, heavy and well fleshed carcasses, the demand for wool should not be lost sight of even though, with the disappearance of range conditions, the necessity for some long wooled strain of blood in the flock no longer exists. The Shropshire or Suffolk and Merino cross gives a sheep recommended alike by the butcher, as yielding a desirable carcass, and by the wool dealer, as supplying a desirable fleece.

Some interesting data was secured from the leading firms buying western sheep and also

from those importing eastern mutton. The extent to which the West falls short of supplying even the existing demand for mutton was variously estimated at from 40,000 to 100,000 head. The former figures applied rather to the Winnipeg market, and the latter to the whole country, including British Columbia. All firms agreed that there was no danger of the supply being stimulated to the point of over-production. The chief sources of outside supply named were: Ontario, Maritime Provinces, Australia and the United States. Winnipeg houses draw largely upon the three first named, and western houses upon the two last named sources. It was pointed out that Australian and American mutton costs between 4 and 4½ cents per pound, dressed, in freight charges and duty, and the western producer has this great advantage over foreign competitors at the outset.

These firms handling both the native and imported mutton were agreed that the western product is superior in quality and flavor to that imported. The breeds recommended for mutton production were, Shropshires, Suffolks, and the cross of these with the Merinos. None of the firms consulted, recommended breeding for an early lamb crop, on account of the greater risks involved. It was admitted, though, that the early fall market is a better one than can be expected later. These firms were also agreed that the feeding of a bunch of lambs through the winter with the idea of marketing them on the strong spring market would be a profitable enterprise if cheap food were available and care and judgment in feeding were exercised.

Apart altogether from the cash returns and the undoubted possibilities for profit from mutton and wool sales, there was remarkable accord between the sheep raisers who sent in returns as to the advantages of sheep keeping as an aid to agriculture and as a source of convenient, cheap and tasty meat supply for the farmer's own table. Perhaps a few extracts from the reports will cover this part of the subject better than any generalizations. They clearly reveal that, in the minds of many, the direct profits are of secondary importance to the effect of sheep keeping upon grain yields and as an aid to good farming.

A Prince Albert farmer says: "A bunch of sheep will kill more weeds on a farm than two teams of horses and every farmer should have a band of sheep for that purpose besides the profit they make."

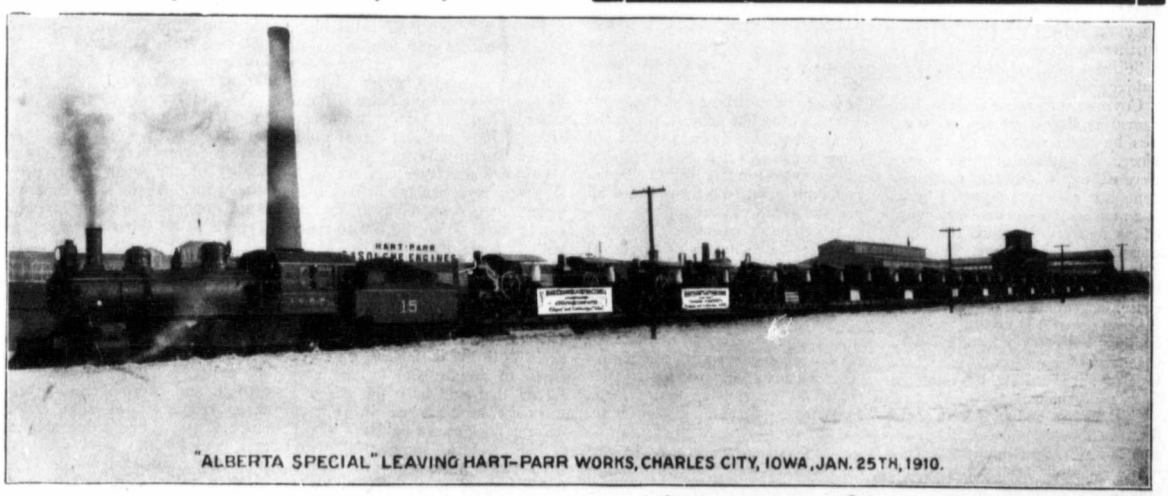
A Broadview farmer says: "I claim that sheep are one of the best four footed animals that ever stepped on to a farm for the average man as money maker. The advantage of raising sheep to other stock is, they need no tying up or clearing after them in winter. I feed prairie hay in winter and a little sheaf oats in spring after lambing. With proper care at lambing time the trouble with them is over as I turn them to pasture."

A Valley farmer says: "Many would keep sheep if they had their farms fenced. To get full benefit from a flock of sheep one's farm would have to be fenced so that sheep could be allowed to run on fallows and destroy weeds. They require very little attention in winter."

A Birch Hills farmer says: "Every farmer should have a small bunch of sheep. They are very easy to keep and of good value in the destruction of foul weeds. I fail to see any disadvantages."

A Prosperity farmer says: "It is an all-important matter. Sheep are harmless, perfect to handle, are managed in droves that need no tying or leading, come to call, need very little water, thrive with a cheap straw-and-pole shelter, require only weeds and scrub in summer and straw and screening in winter, digest all seeds swallowed, afford palatable nutritious meat in a handy sized carcass, convert waste into wealth, and are altogether the most profitable of stock."

A Logberg farmer says: "The time is coming when sheep will be kept on every well tilled farm. They eradicate weeds, cultivate the soil and under ordinary conditions return 100 per cent profit."



"ALBERTA SPECIAL" LEAVING HART-PARR WORKS, CHARLES CITY, IOWA, JAN. 25TH, 1910.

solid train load of traction engines is an unusual sight. This train load was shipped by the Hart-Parr Co. to the Chappin Co., Calgary and Lethbridge, alberta, and made the run entirely by daylight attracting considerable attention enroute. The selling price at destination was over $100,000, the freight and duty alone amounting to $20,000 Every engine was sold before leaving the factory.

A Wynyard farmer says: "Sheep raising should be practised more as there is more money in it than anything else."

A Nesscliffe farmer says: "The advantages in keeping sheep are that wool and mutton are a good side line and sheep are weed destroyers costing little to keep compared with profits made."

A Hobar farmer says: "Sheep husbandry will increase as the province grows older. There is profit in sheep to the extent that they keep down weeds and produce mutton and wool on feed that other stock will not eat. They also require very little care except at lambing time."

Course in Gas Engineering

Continued from page 45

cylinder it jumps the spark gap, giving a spark, and goes back to the spark coil by a path which will be described. It is here necessary to tell what the commutator or curent-breaker is and what it does.

In its simplest form, the commutator or circuit-breaker, or, to give it a third name, "timer," is a ring of some non-conducting material. Vulcanized rubber will do, and a convenient size for the ring will be about 1½ in. diameter inside. Passing through the rim of the ring, at equal distances apart are pieces of metal, one for each cylinder in the engine. At the outside of the rim these pieces of metal are fitted with screw terminals, to which wires are to be fastened. Inside the ring a polished steel rod or cam turns. This rod or cam is fixed at one end at the centre of the ring, and the other end touches the inside of the ring. The cam or rod is driven from the cam shaft. When the engine is properly wired up, a circuit is made as long as the turning cam or rod is touching one of the metal pieces in the rim of the ring. The circuit is broken when the cam or rod passes on to the rubber part of the ring.

Scientific Protection from Lightning

The tremendous increase in the number of losses, and the value of property destroyed each year by lightning has called forth investigations and research by scientific men, also the lines of protection from this the greatest and most powerful force of the elements the DESTRUCTIVE LIGHTNING STROKE.

Before stating the results of this investigation it is well to give a few statistics in regard to the damage done each year. The Farmers Mutual Insurance companies, after keeping a careful record of losses by fire in the rural districts, all of which they have come in contact with, report that the most hazardous risk they have to contend with is LIGHTNING, and that from 60 to 75 per cent. of their losses are caused by lightning to too exposed and unprotected buildings. In the United States the entire loss by lightning alone is conservatively placed at over 6,000,000 with a loss of life of over 700, while in the Dominion of Canada the increase in the number of large barns and homes together with the severity of the electrical storms has caused the approach of the thunder storm season to be received with a feeling of fear and anxiety to those whose homes are unprotected.

In regard to the protection now in reach of all, we marvel at the progress made in the electric world. Street cars are propelled by a current of electricity flowing over the cable wire, cities receive their lights by the use of electricity, you talk through miles of space over wire by the use of electricity, and other inventions too numerous to mention, all of which prove that man has some control over one of nature's greatest forces ELECTRICITY. When we deal with lightning we have to deal with electricity, as lightning is a current of electricity passing through the air. Telegraph and telephone companies have discovered that by grounding their poles they protect them from lightning.

The greatest authorities on electricity such as Thomas A. Edison, Prof. Lodge and others state that copper cable lightning conductors properly installed will certainly protect from lightning. Insurance companies here and elsewhere have recommended and advised the use of copper cable as the only means of securing absolute protection.

We are gratified to know an experienced and responsible firm from the States have established their factory, and are now manufacturing the very best copper cable lightning conductors, and have lifted the business, and placed it on a reputable and scientific basis, and who conduct their business through honoragle trade channels, which is through the dealer who is schooled in his work, and authorized to issue our guarantee as to quality of goods and protection. It is conceded that no prudent man can overlook this hazardous risk.

Booklets giving further information on this subject, also endorsements received by this company from insurance companies in this and other countries may be had by writing to the "Canadian Lightning Arrester & Electric Co.", the sole owners of the well known "Townsley System" which is and has the approval of the Manitoba Fire Commission. Address all communications to the Canadian Lightning Arrester & Electric Co., 199 Main St., Winnipeg, Man.

Annual Cattle Sale

The Annual Cattle Sale of Manitoba Cattle Breeders Association will be held this year in Brandon June 1st, entries for which close with the secretary A. W. Bell, April 23rd.

This will be the sixth sale under the auspices of the Association, and they all have been a great success, as it enables the purchaser and seller to come together on equal grounds and the purchaser has an opportunity of seeing the stock offered by some of the best breeders in the province.

As the sale is open to the Dominion, some of the principal breeders of Saskatchewan have promised entries for the sale, in addition to the best breeders in Manitoba.

Both males and females will be offered this year.

Catching up on the News.

Rip Van Winkle, according to an exchange, awoke as fresh as a daisy and made his way to a barber shop to be shaved and—to "catch up" on the news.

"Let's see," said he to the barber, after he was nicely tucked in the chair, "I've been asleep twenty years, haven't I??"

"Yep," replied the tonsorialist.

"Have I missed much?"

"Nope, we bin standin' pat."

"Has Congress done anything yet?"

"Not a thing."

"Platt resigned?"

"Nope."

"Panama Canal built?"

"Nope."

"Bryan been elected?"

"Nope."

"Carnegie poor?"

"Nope."

"Well, say," said Rip, rising up in the chair, "never mind shaving the other side of my face. I'm going back to sleep again.'

The better you behave, the better you will get along.

Traction Engines

Continued from page 37

the characters denoting the same thing as before. This is for one cylinder and of course with double engines the result must be multiplied by two.

To show the way this formula applies to the engines as built by the various manufacturers, the following table is given. This table represents seventeen different makes of engines, no one make appearing more than twice in the table. The "brake horse-power in public test" is given in a few cases taken from the Winnipeg and Brandon tests and is not necessarily the maximum power of the engine, as these tests were made principally to determine the fuel consumption, and in this case the load selected was naturally less than the maximum.

We can use a formula similar to the one given for steam engines for internal-combustion engines, assuming as before an approximation for the mean-effective pressure and mechanical efficiency. We may take these the same as in the A. L. A. M. formula for those figures approximate the actual conditions in well designed vertical engines in good order. However, we cannot eliminate the piston speed as was done in the A. L. A. M. formula for this varies considerably in the internal combustion motors of traction engines. Our formula is then (for one cylinder)

$$(B) \qquad B.H.P. \text{ equals } \frac{66 \, L \, D^2 \, N}{1{,}000{,}000}$$

in which L equals length of stroke in inches,

D equals diameter of cylinders in inches,

N equals number of revolutions per minute (4 cycle).

For multiple cylinder engines, multiply the result obtained by the number of cylinders. To show the way this formula applies to engines built by various manufacturers, the following table is given for vertical gasoline engines.

The current practice, with horizontal gasoline engines, is to make the stroke longer in proportion to the bore than in vertical engines. As the longer stroke gives a higher efficiency, we must increase the constant in the formula in order that the results obtained may be sufficiently accurate. Taking the constant, then, as 75 instead of 66, our formula becomes (for one cylinder)

$$(C) \qquad B.H.P. \text{ equals } \frac{75 \, L \, D^2 \, N}{1{,}000{,}000}$$

in which the characters represent the same thing as before and as before the result must be multiplied by the number of cylinders in case there is more than one. Table IV shows the way this formula applies to engines built by different manufacturers of this type of engine.

Formulae A, B and C are proposed as being simple ones that may be readily applied by the average operator. It would perhaps be better to use a formula common to all types of gasoline engines in place of changing the constant if one sufficiently simple and accurate can be found.

We will take the usual formula for indicated horse-power as determined by the indicator,

$$H.P. \text{ equals } \frac{P \, L \, A \, N}{33000}$$

where P equals mean effective pressure,

L equals length of stroke in feet,

A equals area of piston in sq. in.,

N equals number of power strokes per minute.

TABLE III.

HORSE POWER OF VERTICAL GASOLINE ENGINES

Seven examples computed by formula compared with horse-power by other methods.

Eng.	Cyl. Bore (inches)	Stroke (inches)	Number of Cylinders.	Rated Horse Power	R. P. M. Rated.	Brake H.P. Claimed.	H.P. by Formula Av. Stated Speed.	R. P. M. in Public Test.	Brake H.P. in Public Test.	H.P. by Formula at speed in Public Test.
1.	4.75	5	4	12	1000 to 1500	36	36.5	865	17.9	25.7
2.	7.0	7	2	12	700 to 800	30	34.	...	....	....
3.	6.25	7	4	30	650	45	45.	520	29.7	37.4
4.	6.0	8	4	25	500 to 800	35	49.4	...	....	....
5.	7.0	7	4	25	700 to 800	60	68.	730	58.5	66.0
6.	7.5	8	4	40	500	60	59.2	468	45.6	55.4
7.	8.0	10	3	20	350	44	44.3	311	26.2	39.3

For one cylinder B.H.P. equals $\frac{66 \, L \, D^2 \, N}{1{,}000{,}000}$

TABLE IV

HORSE POWER OF HORIZONTAL GASOLINE ENGINES

Seven examples computed by formula compared with horse-power by other methods.

Eng.	Cyl. Bore (inches)	Stroke (inches)	Number of Cylinders.	Rated Horse Power	R. P. M. Rated.	Brake H.P. Claimed.	H.P. by Formula Av. Stated Speed.	R. P. M. in Public Test.	Brake H.P. in Public Test.	H.P. by Formula at speed in Public Test.
1.	8	14	1	15	250	19.5	16.75	249	19.7	16.7
2.	8.75	15	1	20	240 to 290	28	22.8	254	22.0	21.85
3.	8.75	15	1	20	240 to 290	28	22.8	235	24.2	20.3
4.	8.75	14	2	35	320 to 325	45	50.0	292	46.0	46.7
5.	10	15	1	25	240 to 290	30	29.8	253	31.6	28.5
6.	9	13	2	17	260	30	41.0	...	....	.....
7.	10	15	2	22	260	40	51.6	...	....	.....

For one cylinder B.H.P. equals $\frac{75 \, L \, D^2 \, N}{1{,}000{,}000}$

A Traction Plowing Expert

Mr. L. W. Ellis, whose photograph is reproduced herewith, on March 1st began his work with the

M. Rumely Company, of LaPorte, Indiana, as head of the department organized by that Company for the purpose of collecting and giving to their customers and friends information on the subject of intelligent and productive farming. The M. Rumely Company, long since one of the leaders in the threshing machine field, and for twenty-two years builders of traction engines for all kinds of power work, have recently put upon the market their oil pull tractor, using kerosene and the heavier oils as fuel, and which machine effects a wonderful saving in the cost of cultivating the soil for all farm crops, as well as for all other power needs.

Mr. Ellis is a graduate of the Iowa State Agricultural College, and has had a wide range of experience in farm machinery work. In 1907 he left the employ of the International Harvester Company to enter the U. S. Government Service, in the Office of Farm Management, Bureau of Plant Industry of the Department of Agriculture. Realizing the importance of the use of machinery by the farmer, he has for years made a close study, not only of the actual operation of hundreds of different plowing outfits in this country and Canada, but by careful and systematic research has gathered a large amount of valuable information showing the good results that accrue from the intelligent use of modern farm machinery. The result of Mr. Ellis' study of the problems of traction plowing, the most important question before the farmer to-day, has been put into Bulletin No. 170, soon to be published by the Bureau of Plant Industry of the Department of Agriculture at Washington.

By reason of his long and varied experience in dealing with the problems of the farmer, in connection with the men in charge of the various State Agricultural Departments, as well as his having been able to realize and carry out the work of the United States Agricultural Bureau, he has become recognized as a pioneer and authority in this great work, and will have with the M. Rumely Company, a field almost unlimited for carrying out the work for which he is so well fitted —to show, by plain and sound advice, the way to lighten the burden which has so long borne heavily on the tillers of the soil—"In the sweat of thy brow shalt thou labor for thy bread."

Mental Influence upon the Bodily Functions

The different organs are especially susceptible to certain kinds of mental influence. Intense hatred, outbursts of hot temper, violent fits of anger, and some forms of worry have a very irritating influence upon the kidneys and materially aggravate certain forms of kidney disease.

Excessive selfishness and envy seriously affect the liver, while liver and spleen are strongly influenced by jealousy, especially chronic jealousy.

It is well known that violent, long-continued jealousy affects the heart's action most injuriously, as do all sorts of mental discord, such as worry, anxiety, fear, anger, especially where they become chronic. Multitudes of people have died from heart trouble induced by the explosive passions.

Jaundice often follows great mental shocks and violent outbursts of temper. People are frequently made bilious by long-continued despondency, fear and worry.

A physician says, "I have been surprised to find how often the cause of cancer of the liver has been traced to protracted grief or anxiety." Dr. Snow, an eminent English authority, says that the vast majority of the cases of cancer, especially cancer of the breast and uterine cancer, are due to anxiety and worry.

Sir W. B. Richardson says that irritations on the skin will follow excessive mental strain. "It is remarkable," this great physician says, "how little the question of the origin of mental influence has been studied."

These structural changes in the different organs are due to chemical changes in the development of poisonous substances in the tissues through mental influence.

As the entire body, for all practical purposes, is one mass of cells closely bound together, every thought that enters the mind, every change in the mental attitude, is almost instantly conveyed to every cell in the body, which is affected according to the nature of the thought. We are nothing but a mass of cells—brain, nerve, and other tissue cells—and the whole mass is very sensitive to every mental process.

In a sense, the body is an extended brain, and every thought, every mood, every emotion is transmitted the thought is discordant, if the instantly to the remotest cell. If emotion is vicious, it will carry its poison to the farthest cells.

Many people so poison their entire system by habitual melancholy, worry, fear and other discordant phases of thought that they ultimately wreck the physical body.

Love is the normal law of our being, and any departure from the love thought must result in anarchy of the physical economy, because the law of our being has been violated.

But all people can rid themselves of their pernicious thought-enemies, enemies of the mind and body, if the will take the trouble to do so.

It is not difficult to shut out all poisonous thoughts from the mind. All you need to do is to substitute the opposite thought to that which produces the fatal poison. It will always furnish the antidote of the latter. Discord can not exist in the presence of harmony. The charitable thought, the love thought, will very quickly kill the jealousy,

Concrete Fence Posts

Continued from page 23

the best grade of Portland cement.

Many failures in concrete work are due to the use of dirty sand. Sand may seem, from superficial inspection, to be perfectly clean, yet tests will show it to contain vegetable loam in varying proportions. A very small percentage of vegetable loam in sand will make it absolutely unfit for use in concrete work, owing to the fact that this loam prevents the cement from properly forming a union between the sand particles. Sand must be clean and sharp, and must not be too fine; if it is composed of both fine and coarse grains mixed, it is to be preferred, because less cement will be necessary to fill the voids than if either fine or coarse sand is used alone.

The precautions to be observed in the selection of sand apply equally well to gravel. It should be composed of hard, clean pebbles, sharp, and irregular in shape. For use in fence posts, it is important that pebbles not larger than a hickory nut be used, because larger ones both decrease the strength of the post, and interfere with the reinforcement. When broken stone is available it is much better to use it for the coarse aggregate than gravel. It should consists of pieces of hard limestones, granite, or coarse crushed gravel, small enough to pass through the meshes of a three-quarter inch sieve. The only precaution to be taken in using the water for wetting the mixture is to see that it is clean and free from alkali. The presence of alkali seems to reduce the strength of concrete.

The problem of reinforcement for concrete posts is one that has caused a great deal of trouble in the effort to select a form of reinforcement which will give a maximum of strength with a minimum of cost. Many forms have been used, giving varying degrees of satisfaction, but the reinforcing that perhaps best fills all requirements is one consisting simply of two strands of No. 10 wire twisted together, placed in each corner of the post at a depth of about a half or three quarters of an inch from the surface.

The size and shape of posts is of course a matter governed only by the purpose for which the posts are to be used. Generally, concrete posts are made seven feet long, a length which permits of deep, solid setting, and yet leaves enough of the post above the ground to allow the fastening of wire high enough to serve all ordinary purposes. The cross section of the posts may be either triangular, square, or rectangular, the latter form being preferable because it admits of a more advantageous arrangement of the reinforcing than do the other forms. A post 6x6 inches at the base and tapering to 3x6 inches at the top, is quite strong, and serves admirably when placed with its longer dimensions at right angles to the line of the fence. Its cost may be reduced slightly, at the expense of its strength, by tapering it to 3x3 inches at the top. Triangular posts are used and advocated to some extent, and the advantage gained in lower cost may make their manufacture desirable.

Molds, while playing an important part in the manufacture of concrete fence-posts, are yet so simple in construction that anyone possessing ordinary ingenuity can make them. Metal molds, made of sheet iron braced with heavier strips of heavier iron, are especially advantageous, and where a quantity of posts are to be made, their use is eminently advisable. For ordinary cases, however, wooden molds give excellent results, precautions being taken to use green lumber, which is not so likely to warp as seasoned stuff, and to make the molds as nearly water tight as possible.

The proper mixing of materials so as to make a good post concrete requires care and attention. The materials must be thoroughly mixed, and wetted. The Colorado Experiment Station, in an excellent bulletin on "Cement and Concrete Fence Posts" (Col. Exp. Sta. Bul. 148, by H. M. Bainer and H. B. Bonebright) advocates the use of a mixture so wet that it can be poured into the mold, showing by results of tests that poured posts are stronger, smoother, more impervious to water, and more easily cured than tamped posts made by using a comparatively dry mixture; the cost of the poured post is somewhat higher than that of the tamped post. All molds before being used should be given on the inside a coating of some kind of grease; crude oil, where obtainable, is good. A satisfactory grease can be made by mixing axle-grease, lard and gasoline.

When the posts are finished and the concrete has set well, the molds should be carefully removed. When practicable, it is advisable to leave the posts in the molds for three or four days. After removing the molds the posts should be allowed to cure for at least sixty days, keeping them damp by sprinkling the first two weeks.

Numerous forms of patent wire fasteners for concrete posts are on the market, possessing varying degrees of desirability in the way of cheapness and ease of attachment. A very satisfactory method, however, is to insert in the mold, before putting in the concrete, a No. 10 wire with loops bent in it sufficiently long to project above the surface of the finished post. Barbed wire or woven wire fence may be easily fastened to these projecting loops.

Concrete posts are not a new thing, but their use is comparatively recent. When well made, with proper and sufficient reinforcement, they give excellent service and entire satisfaction.

Pruning Trees for a Cold Climate.

By D. W. Buchanan

There are perhaps few questions upon which there is a greater divergence of opinion among horticulturists than is the case in this matter of pruning. We find all sorts of theories regarding pruning. One man is quite sure that it should be done in the fall, while another will advocate the spring. Others will declare that winter is the correct time to prune and still others will advocate summer pruning. Then there are a good many who think that it makes little difference at

what season of the year the work is done. This has given rise to the saying that the time to prune is when the knife is sharp, meaning that it can be done any time. Now, there is a good deal of wisdom in the saying that the time to prune is when the knife is sharp, for a good, sharp knife is by all odds the best pruning instrument. It makes a clean cut that will heal up readily and does not injure the bark around the cut, thus retarding the healing over of the wound. Moreover, if all pruning were done with a knife, it would not matter greatly what time of the year the work is done, for such light pruning as can be done with a knife may be done with safety at almost any time.

There is, however, a proper time to prune, I believe, and that time is when the tree, shrub, or plant really stands in need of the application of the knife; when there is something in the condition of the plant itself that calls for pruning. While I believe it is important to know what is the best time of year to prune, it is also of even greater importance to know whether or not the plant under consideration really will be the better for pruning. Pruning should not be done at any time, unless there is some intelligent and definite object in view in undertaking the operation. Who would undertake to perform a surgical operation upon a human being without some good reason? Then why undertake an operation upon a tree without knowing why you are doing it and what you expect to gain thereby. Some people imagine that they must prune occasionally, and at certain irregular intervals, when the spell comes on, they gather together saw, knife and shears and proceed to butcher up the defenceless trees in wholesale fashion. Such rough and tumble pruning is usually more injurious to the subject operated upon than otherwise. In our severe climate many species and varieties of trees will not stand liberal pruning. With the apple, for instance, pruning must be done with great care and never to excess.

In order to prune intelligently, the operator should understand something about the nature of plants in general, and of the particular varieties upon which he proposes to operate on in particular. If he does not know the why and wherefore of his proposed pruning, he had better put his implements away and give the plant the benefit of the doubt. Great harm is often done by indiscriminate pruning by persons who do not understand the habit and requirements of the plant they are operating upon. Ornamental shrubs are not infrequently prevented from blooming by mistakes in pruning. Different species of plants require quite different treatment. The rose and the hydranges, which bloom on the new growth of the current season, may and should be cut back quite severely in the fall or early spring. The cutting back while the plant is dormant, encourages a strong growth of new wood, upon which the bloom will be produced. The same treatment with the lilac and many spireas would derive the plant of all its blossom buds and no bloom would be the result. The same principle applies to pruning for fruit. Black currants produce fruit most abundantly on wood in the second and third seasons of its growth, while red currants produce best on wood one year older. Knowledge of these facts as applied to the different plants, gives the key to the proper pruning of the plants generally. With the currant, for instance, cut away the wood older than three years, so as to provide for a continuous supply of wood of the best fruiting age, for by cutting away the wood that has passed its day of usefulness, you make room for and encourage the growth of new wood. By cutting away a little of the oldest wood every year, you will always have new wood coming on to take its place.

The apple, I have said, should be pruned with great care and moderation in this climate. Severe pruning is very liable to injure, or perhaps destroy, the trees. In our dry and severe climate, trees generally will not stand as much pruning as they would in a moist and mild climate, I have known even our native maple to be badly damaged by severe pruning. A tree butcher, who had gained his knowledge of pruning in a soft and mild climate, would be a dangerous man to turn loose with pruning implements in a Manitoba apple orchard. Might almost as well give such a man an axe at once and let him

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Remember this, that all Pinions on Avery Engines, are Steel, and all other Gears are Semi-Steel. This means that Avery Gearing is almost unbreakable, and that means a whole lot to you.

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Form 107-C-07-1500

Cast Cupola Report 10/26/07

Number of Charges 16

Test Bars 1850 - 3 1/2

" 1300 - 3 3/4

" 1300 - 3 1/4

The above report is a gray iron test

Form 107-C-07-1500

Steel Cupola Report 12/2/07

Number of Charges 7

Test Bars 1950 — 5 1/2

" 2070 — 5 1/2

" 2070 — 5"

The above report is a Semi-Steel test

Mr. Thresherman :-

I want to explain the above statement a little, in order to make the meaning more clear to you.

When we say that Avery Machinery is built from the Users' Point of View, we mean this—every workman in the Avery Factory has these instructions—First. Do not put a piece of material into any machine, that you would not put into the machine if you were building it for your own use. Second. Do your work in just exactly the same way that you would do it if you were building the machine for your own use. The result of these instructions is that Avery Machinery is built from the Users' Point of View, and that is how it has come to be known for its exceptional durability and long life.

Now a word about the special construction of an Avery Engine and Separator to show you just how strongly they are constructed.

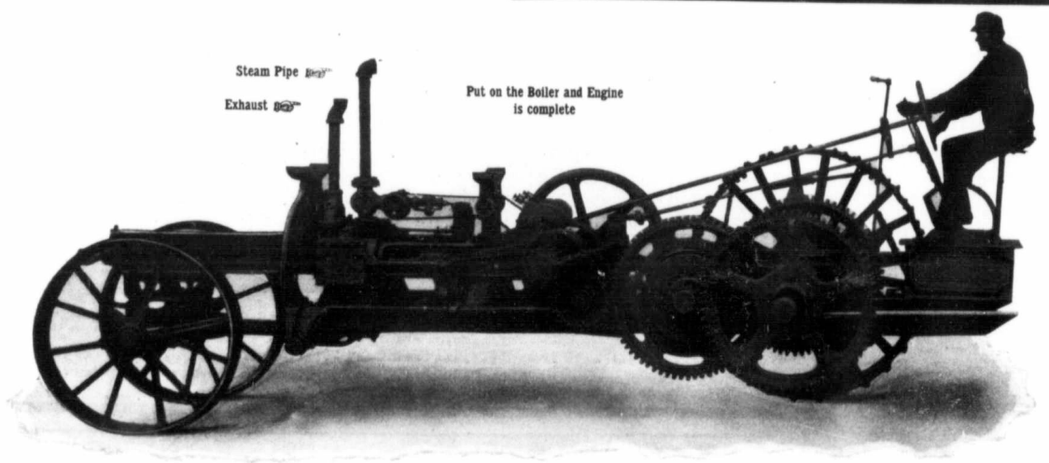
THE AVERY UNDERMOUNTED ENGINE. The only Traction Engine on the market where the boiler is relieved from all pulling strains. Traction Engines are now used as much, if not more, for Traction purposes as for belt work, and an engine which is to be used for plowing, hauling, grading, house moving and such work, certainly ought to be an engine where the boiler is relieved from all pulling strains. A good question to think over in this connection is this: If the Top Mounted Construction were the correct construction for for an engine which is to be used for Heavy Pulling, why do not the Railway Companies use the Top Mounted instead of the Under Mounted Construction. The fact that all Railroad Locomotives are Under Mounted ought to be sufficient proof to anyone that the Under Mounted style of construction is also the correct construction for a traction engine which is to be used for all around Traction and belt purposes.

THE AVERY YELLOW FELLOW SEPARATOR. We have never seen a man who made a careful investigation of the construction of the Avery Yellow Fellow Separator, and was not convinced that it was a strongly built machine. Study the illustration and the framework below. The best evidence, however, is that of the machines that have been in use constantly for from 12 to 15 years. Just recently we received a letter from a Thresherman in Minnesota, who said that he had been using his Avery Separator for 15 years, and from all appearances he would be able to use it for several years more. He wouldn't be doing this if it hadn't been built TO LAST.

ALL THIS GOES TO SHOW THAT AVERY MACHINERY IS BUILT FROM THE USERS' POINT OF VIEW THAT IS, IT IS BUILT TO LAST. Don't miss this point in deciding as to the make of the next machine you will buy.

Yours very truly,

J. B. BARTHOLOMEW, Prest.

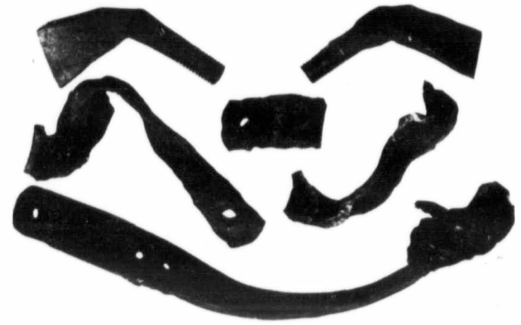


An Avery Double Undermounted Engine with Boiler and Left Wheel Removed Showing Angle Steel Frame Work on which the Cylinders, Gearing, Shafting, Ground Wheels and all Other Parts are Mounted Independent of the Boiler

The Cylinders are bolted to the steel frame—not the boiler. The gearing and ground wheels are all fastened to the steel frame—not the boiler. The load is all pulled by the steel frame—not the boiler. The boiler is entirely free from all pulling strains—the steel frame work takes them all. And besides being relieved of all pulling strains, the strength of the boiler is not weakened by being punctured full of holes for attaching brackets, as is the case with Top Mounted Engines. It is plain to see an Avery Double Undermounted Engine, with its independent boiler, has a construction that will last much longer, and stand up in better shape under heavy pulling strains than Top or Boiler Mounted Engines. This is a point to consider strongly.

Ask for our 64 Page Engine, Thresher and Steam Plow Catalog and learn all about Avery Machinery that is built from the Users' Point of View

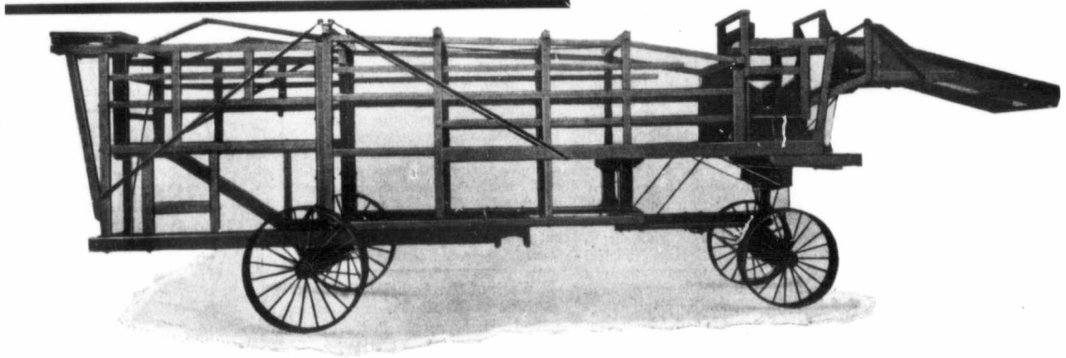
Some Evidence to Show the Strength and Durability of Avery Jumbo Tool Steel Cylinder Teeth



Showing a Feeder Knife Bar that accidently went through an Avery Separator and the only two teeth in any way injured by it. Notice what happened to the Knife Bar and also how the two teeth are bent.

It is almost impossible to break an Avery Jumbo Tooth. The reason is—they are made from Genuine Tool Steel.

An Avery tool Steel Tooth that accidently went through an Avery Separator and what the other Jumbo Teeth did to it. No damage except two slightly bent teeth. Notice where the blows struck and the furrows plowed in it.



The strong construction of an Avery Yellow Fellow Frame is evident to all at first sight. We have not spared expense in material or labor, in order to secure a rigid and durable frame. The sills, posts, girts and cleats, of which there are many, are securely mortised and gained together and long steel rods and bolts tie each part firmly in place. One of the most valuable special features is that of the two diagonal steel brace rods just underneath the deck, which connect the upper end of each of the two front posts of the main frame, with the upper end of the rear post on the opposite side. These form a cross tie which effectually prevents twisting and sagging of the frame. This, construction together with the Avery high grade workmanship, makes up an unusually strong and long lived separator.

AVERY COMPANY, 675 Iowa St., PEORIA, ILLINOIS, U.S.A.

HAUG BROTHERS AND NELLERMOE COY. LTD.

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start on the trunk of the tree. The young apple tree should be cut back severely when it is first planted out, but after that give very little pruning, beyond keeping down suckers and water sprouts, which should be cut out when they are quite small. Limbs which will rub or interfere with others should of course be cut out, but with care and watchfulness this can be done while the branch is quite small. If trees are given reasonable attention, there will seldom be occasion for cutting large limbs. It will be found possible to do about all the pruning that is necessary when the limbs are so small that they can be cut out with a sharp knife, or even rubbed off with the hand.

Plums will stand rather more pruning than the apple. But the same plan of cutting out branches when they are small should be followed. In training the plum the object should be to form a rather close and compact head and prevent the formation of weak crotches, as the plums split down easily at the crotches. Trees are sometimes destroyed by this splitting down from the crotches. Where a tendency to split is noticed, no time should be lost in bolting up the tree. For this purpose an ordinary carriage bolt, with washers, may be used.

Now, in regard to the best time to prune, I have said that light pruning, such as can be done with a knife, may be done at almost any season. There are certain conditions, however, which should be taken into account in considering the best time of year to prune, considering the question in a general sense. In the early spring the trees are full of sap passing upward, and if the trees are freshly cut at this time, severe bleeding will result with some species. Pruning at this season sometimes results in decay setting in about the wound, or what might be called a dying back. Later the sap is worked over in the leaves and goes to the cambium layer. At this season the healing process is very rapid. Pruning done now, when the tree is in its most vigorous state and is building up new tissue rapidly, will soon heal over. It is for this reason that we prefer to look over our trees in June and do such pruning as is considered necessary. Nature is then in her most vigorous state and is better able to heal over the wound and bring about a speedy recovery from any injury that may have been caused by the surgery performed on the tree. We are beginning to find out that trees and plants are very much like animals. Nature seems to be working very much along the same lines in the vegetable as in the animal kingdom. That mystery which we call life, has its inception, development and decay under wonderfully similar conditions of the animal and the plant. The human animal, even, is no exception. If we had to perform a surgical operation upon a human being we would endeavor by every possible means to bring the party to be operated upon in as vigorous a state of health as possible. So we think that when the tree is in its most vigorous state is the best time to prune.

I have just referred to the resemblance between the animal and vegetable kingdom, and while the idea is before us we may make further like comparisons. In pruning trees, care should be taken to protect the wounds. Trees and plants are subject to attacks of fungi and bacteria. The microbe which causes lock jaw in the human animal, is quite harmless when only sound, healthy epidermis is presented to it, but scratch the skin and lockjaw will be the result. Cuts and wounds on trees likewise require to be protected to prevent the introduction of disease germs. All cuts should be immediately painted with a heavy paint. If the presence of disease is feared in any tree pruned, the implements used should be disinfected before operating on another tree, for disease may be carried from one tree to another, or even from a diseased to a healthy limb on the same tree. We carry a can of lamp oil, into which the knife or shears can be dipped.

Pruning a tree while is is dormant stimulates new growth. Pruning heavily while in leaf, might give the tree a severe check, by removing so much of the leaf surface, for it must be remembered that the leaves are the stomach and lungs of the tree. If severe pruning must be done, it might be better to leave some of it until fall, taking care to paint all cuts well, so as to protect them from the weather and germs, until the healing over can start the following spring.

Pruning, as we have said, should be done with a definite object in view. With fruit trees and plants, the main object is to secure more and better fruit, and at the same time control the form of the plant. We have seen, as shown in reference to the currant, how the quality of fruit can be greatly increased by proper pruning. The size and quality of the fruit is also improved. Trees can also be kept more symmetrical in form, and in such shape that they will withstand the action of wind, or at least be less liable to damage from storms. With shrubs, the main object is to keep them in good form and secure abundance of bloom. The best form of plant depends to a considerable extent upon the species or variety. The carving of trees and shrubs into various absurd and fanciful forms, is often to give them a hideous appearance, in my opinion. The form which the plant naturally takes is usually the best form for that particular plant. In pruning we should study and assist nature. For an avenue or street the best form is a straight central trunk, with the branches radiating therefrom in symmetrical order. Pruning at the right time is of great service in giving good form to such trees. Species or varieties that do not lend themselves readily to this form, should be avoided for avenue purposes.

We go into the forest and observe all the trees about us, tall, straight and majestic, all, as it were, vieing with each other to reach up to the sunlight. But here and there we see a puny, stunted specimen, that, instead of reaching straight up to the light, has grown off in an oblique direction. It has now been far outdistanced by its neighbors and is doomed to slow and early decay. It is being robbed of light and air by its more prosperous fellows. These are the failures in the forest of tree life. When but a tender sprout, it met with some obstruction in its upward course. Perhaps a leaf of the forest settled upon the tiny seedling and turned it from its straight upward course. And here, again, how close the resemblance to human experience. Speaking figuratively, the woods are full of the human derelicts who, by bad influence or the formation of bad habits in early life, have doomed themselves to lives of wretchedness and misfortune.

Trees growing in a block in the forest, support and assist each other in taking on a straight, upward form. When grown in the nursery or under cultivation, they require the care of the skilful gardener to watch over and care for them, and assist them in taking on a desirable form. They must be given special attention while young. Strong side branches may form, which threaten to outgrow the main, central stem, and which would leave the tree badly balanced, unsymmetrical, and perhaps in a weak condition, subject or liable to break down in the storm. These bad habits in the tree must be corrected at once. The longer they are left the more difficult it will be to secure a beautiful, symmetrical tree. If left too long, there will come a time in the life of the tree when it will be too late to overcome the bad habit. The tree must remain deformed or badly balanced through life. The bad formation may even lead to early destruction, through the splitting or breaking down of the tree when the storm comes. In the hands of the skilful gardener, a little correction here, by cutting back an overreaching branch, and a little cutting out there, and the tree is kept in strong and symmetrical form, well able to resist the storm. As the tree grows older it will require very little attention from the gardener. Its habit will become fixed and it will remain, a straight, strong, compact, symmetrical tree. A thing of beauty. The delight of all. Ladies and gentlemen, I am not here to moralize, but what a sermon there is in the tree.

Work of the Association in Manitoba.

By L. H. NEWMAN, B. S. A.,

Paper read at Brandon Winter Fair.

Mr. Chairman and Gentlemen:—

I have pleasure in submitting herewith a report of the operations and standing of the Canadian Seed Growers' Association in the Province of Manitoba for 1909.

The work of the Association in Manitoba is on a substantial footing. Although the membership is not large, the quality of the operators is such as to offset, to some extent, any deficiencies in numbers, and excellent work is being done. At the same time, there should be a greater number engaged in this sort of work and we are adopting every available means of encouraging as many of the best grain growers as possible to affiliate themselves with

us. At present there are 23 on the membership list and 29 on the list of applicants. This is not enough. There should be a member every few miles at least throughout the great grain growing districts of the province. According to statistics, there were 2,808,000 acres of wheat, 1,390,000 acres of oats and 696,000 acres of barley under cultivation in Manitoba during the season of 1909. To sow these vast areas, it required approximately 4,212,000 bus. of seed wheat, 2,780,000 bus of oats and 1,044,000 bus. of barley, total 8,056,000. While much of the seed used was doubtless of fair quality and presented a fair appearance yet it is safe to say that there was lacking in a great deal of it the inherent capacity to produce large yields. 'Better bred seed' is one of the crying needs of the present hour if Manitoba is to maintain her reputation as a great grain growing province.

At the last general meeting of the Association held at Ottawa on February 10th and 11th, 1910, only two new members for Manitoba were elected. These were Mr. Jas. R. Stewart of Gladstone, and Mr. Jno. Wiemer, Miami. Many remain on the list of applicants owing to the fact that they do not comply fully with the regulations governing the course of procedure although the majority are doing considerable good work, some of which is considered as preparatory.

Those who have applied to take up special work under the direction of the Association, but who have not yet complied with the regulations sufficiently to entitle them to the right of membership, are classified as follows:—

Seed wheat growers	21
Seed oat growers	16
Seed barley growers	8
Growers of seed potatoes	1
Growers of seed of miscellaneous crop	2
Applicants not yet specifying crop	2
	50

Each year arrangements are made to inspect the plots of those known to be operating, hence early in the season enquiry cards are issued to all members asking them to state definitely what they are doing. The following is a summary of the work of inspection during the past season (1909) showing the number who replied to these cards, the total number on inspector's list and the total number inspected.

(1) Number of growers on inspector's list prior to beginning work of inspection 49

(2) Number answering enquiry cards and stating they were operating, or that they wished to be visited 29

(3) Total number visited by inspectors 29

(4) Total number of plots at present known to have been operated during the season of 1909 23

The crops receiving greatest attention from our members are wheat, oats, barley and potatoes, in the order in which these are named. In wheat, the Fifes still retain their popularity, although such early varieties as Preston, Stanley, and Marquis are receiving considerable attention in the later districts.

In oats, the Banner variety is to the front as usual and seems to retain this position with little difficulty. The Abundance has given good results in some places but has not yet proven itself superior to Banner as a general variety.

In barley, the Mandscheuri and Mensury varieties are the only varieties grown by our members in the province.

The weather conditions in Manitoba for the season were quite favorable as a whole. While the spring was late and backward and seeding was much delayed, unusually propitious weather followed with the result that harvesting began about the usual time. Some districts suffered from lack of moisture in late July with the result that the plumpness of the sample has been somewhat affected in grains while in potatoes the drought also acted adversely.

The amount of seed produced in Manitoba of the 'General Crop Class', that is, seed grown on what we call the Improved Seed Plot and which traces directly back to a hand selection, is as follows:—Wheat 1,551 bus., oats 2,137, barley 1,525 bus. and potatoes 390 bus. making a total of 5,603 bus. Of this amount only 725 bus. of wheat, 741 bus. oats and 1,100 bus. barley, are offered for sale in the Seed Catalogue, the remainder being kept for private or local use. A considerable quantity of good seed produced directly *from* registered seed, but which is not itself eligible for registration has also been offered the public through different channels.

In closing this resume of the work in the province, it is gratifying to feel that while the numerical standing of the Association has not yet reached large proportions, yet we are steadily gaining ground. Many inquiries re the matter of good seed have been received at headquarters and there are many evidences that the future growth of our organization will be much more rapid than it has been in the past. We now have a good foundation to work on and if every member will do his part well and will endeavour to encourage his neighbors to take up work with some special crop, the work should spread rapidly and effectively.

Petrie Mfg. Co to Build

Our readers wil be interested in knowing The Petrie Mfg. Co., Limited, makers of the well known "MAGNET" Cream Separator will commence immediately to erect a large warehouse and office in Winnipeg, on their own property, in order to supply the ever increasing demand for this FIRST CLASS machine.

In order to supply the growing demand for the "MAGNET" their Factories at Hamilton have been largely increased, which goes to show there is a big demand for a superior article.

These people are sending out their magnificent Calendar, lithographed in eight colors, and those desiring a Calendar with large figures should communicate with the Company at any of their Branches.

Gleanings From Field Work in the Seed Plots of Fellow Members of the Canadian Seed Growers' Association.

By Geo. H. Bradshaw,.Morden, Man.

It was my privilege the past season to inspect the seed plots of the members of the Canadian Seed Growers' Association in the Province of Manitoba, and some of the things I learned and some of the observations I made while engaged in that very congenial work I shall set down here in the hope that they will be of interest and possibly of benefit to those who recognize in the Canadian Seed Growers' Association one of the factors in the advancement of agriculture.

The members of the Association in Manitoba are few in number but what they lack in numbers is made up in enthusiasm and devotion to the work. Possibly the most encouraging, the most gratifying feature of the work in Manitoba is the zeal and earnestness with which they have taken up the work of plant improvement. Recognizing the need of better seed and purer seed, and finding in the plan of the Canadian Seed Growers' Association a practical way of attaining these ends, they are working away patiently, hopefully, and with a gratifying measure of success. They are, I think, animated with the spirit of the Association, namely, improvement, always improvement, and find the work as such men are sure to find it, congenial and fascinating. The plan of improvement by selection, always looking for the most perfect types, is a plan that appeals to the man or woman who by nature craves for higher ideals, and the work I saw while on this trip of inspection leaves no shadow of doubt in my mind that the plan of the Canadian Seed Growers' Association for improving crops by hand selection is sound and practical.

While travelling over the Province I could not help regretting that more men were not engaged in this work. Large districts were traversed without a solitary member of the Association while on every hand the need of local sources of supply of pure, high grade seed was plainly evident. Fields of grain containing a mixture of different varieties, or of different kinds, were the common rule which clearly indicated the need of a few more enterprising members of the Association to increase the supply of desirable seed.

I might here relate an incident of my trip to illustrate how few farmers grow only pure, high grade seed. I had started out one day on a long drive to visit a member with a fine record for good work, and the man who drove me did not know the country very well and finally concluded he was out of his bearings. I had been watching the crops on either side of the road, as was my custom when suddenly we came to a farm where the fields of grain were all pure and all true to type and of such fine quality that I straightway informed my driver that he was on the right road and at the very farm I wished to visit—we turned in and found it was the farm all right. The good work this member had done was so plainly evident that I, a stranger, driving along the road, was able to tell his farm by the purity and excellence of his crops.

In every district where a member of the Association was actively operating the influence of his good work was plainly evident in the crops of other farmers in that district. They had availed themselves of the opportunity to get improved seed and the improvement in their crops was very noticeable to one whose eye was trained to discriminate between crops posesssing the ideals set by the Canadian Seed Growers' Association and the ordinary crops of the country.

But while there is an opportunity and a need for more members of the Association to engage in the active work of crop improvement by hand selection, it might be well to point out that success depends on certain qualifications. The member who achieves success must *delight in improvement*, he must have fixed in his mind a high type of excellence and must have the patience to work away for years, if need be, to attain results. It is essentially work that demands exactness, care, thought, and perseverance; but if these requisites are put into the work there will be a reward in satisfaction and increased knowledge as well as bigger and better crops and greater financial returns.

The ambition among members of the Association to grow crops of big yields and high quality, I found had been the means of leading them to give a close and intelligent study to the different questions that enter into the cultivation of the soil. They have learned to recognize that fertility, conservation of moisture and rotation are important factors in the production of high grade seed. In other words, the successful grower has come to realize that seed selection and the best cultural methods go together. So I think the Canadian Seed Growers' Association may justly claim that their influence for good has extended beyond the bounds of improving crops by seed selection alone. Like other good influences it goes on in ever widening circles until it affects the whole system of agriculture.

There are some questions of local interest to the members of the Association in Manitoba which, I think, may be referred to here. I found that some members were not very clearly decided what previous treatment of soil gave the best conditions for the growing of ideal plots. In some cases a piece of virgin soil was selected, and while this had the merit generally of being clean it frequently grew too rank. Others sowed the plots on well worked summer fallow or on an exceptionally rich piece of land, and the growth in such cases was nearly always too rank and soft. The heads were generally a phenomenal length but poorly filled and the sample spoiled by a mixture of shrunken grains. From my observations I came to the conclusion that a piece of corn or root land which had not been plowed or otherwise loosened up, or a piece of sod land that had been worked up into a good bed gave the finest types of heads. The stand was not so heavy as on the fallow land or virgin soil, but was stiffer and stronger and produced heads of good size and well filled with grain of good quality. Some members had great disappointment because in their desire to have plots show a thick heavy stand they selected the richest piece of land they had for the purpose. The result was a great crop of straw, without grain to correspond. I should say in selecting a piece of land for the seed plots, the great aim and the first consideration should be to find a piece that is likely to grow a fine type of head in preference to a rank growth of straw.

I found some members who showed rare skill and judgment in fixing the type of head they wished to predominate in their crops and in some such cases where the work had been carried on long enough to get results those results were a tribute alike to the skill of the grower, and to the value of seed selection with definite ends in view. Some other members I found, however, who were after the longest and biggest heads regardless of their other qualities. My experience and observations convince me this is a mistake. The head of fair length, compact, and filled from top to bottom with plump kernels is my ideal.

A word might also be said about the market for high grade seed. I found on enquiry of members during my trip that the selling of their product where they had grain of the right quality to offer was the least difficult part of the business. There was a demand for high class seed that it was impossible to satisfy and at prices that were quite remunerative. There is a growing appreciation of the importance of selected seed particularly where the work of selection has been carried on by an intelligent and skillful grower, and as the merits of such seed become better and more widely known the demand will be still greater. All of which it seems to me should offer a strong inducement to a few good men here and there throughout the province to take up this work as a practical part of their farming operations.

There is only one member (Mr. Harold Orchard, of Lintrathen) engaged in improving potatoes under the rules of the Canadian Seed Grower's Association. His plots were very fine and much credit is due Mr. Orchard for the excellent work he has done. The results of his work are convincing testimony of the value of selection.

Another member of the Association (Mr. E. A. James, of Rosser) is doing some experimental work with corn which proved to be highly interesting and instructive. Mr. James is working with a view to developing a variety of corn suitable to the climate of Manitoba and the results promise to be of much value to the West.

A New Plowing Engine

Through a typographical error in the advertising for the American-Abell Engine and Thresher Company in our March issue, their new 32 horse power rear mounted plowing engine was described as a 30 horse. This plowing engine is only made in the one size.

This machine, which the American-Abell Engine and Thresher Co. have put upon the market for the first time this year is meeting with a very popular demand. It is new in so far as the public is concerned, but is not new in so far as the American Abell Engine and Thresher Co. is concerned, for they have demonstrated conclusively to themselves that the machine was up to the requirements of a plowing engine in every respect before placing it upon the market.

Calgary Milling Company, Limited

The grain milling industry in Calgary dates from 1892, when the Calgary Milling Company started operations in a three-story building with a capacity of 160 barrels per diem; by 1907 the business of this company had so greatly increased that they had to build an entirely new plant with ground floor for time only worked it to the extent 1,000 barrel capacity, but at that of 600 barrels pe rdiem.

However, it was very soon found advisable to increase it to the full floor capacity, and the ever-growing demand for their "Seal of Alberta" which they call "the faultless flour," is urging them to build an additional annex with a capacity of 500 barrels, which would make the total capacity of their mill 1,500 barrels per day, and at the same time, make them quite the largest millers in Alberta.

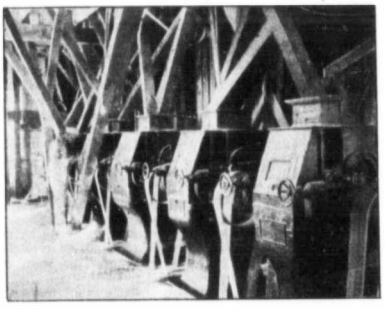
A comparison between the two interior photos reproduced on this page, gives some idea of the difference between a 160 barrel mill and 1,000 barrel mill.

These photos are of the "rolls"—as they are professionally called—and are they which do the actual reducing of the wheat to flour. They are composed of solid steel circular rolls, the first being widely grooved, which grooves gradually diminish until at the last they are perfectly smooth.

These differences in corrugation are made necessary by the fact that the wheat cannot all be reduced at the one process, but has to be done gradually; the first, *i.e.*, the widely grooved rolls, merely cracking the wheat and taking a little of the bran off.

Their elevator at the mill which you see in the photo, has a capacity of 250,000 bushels.

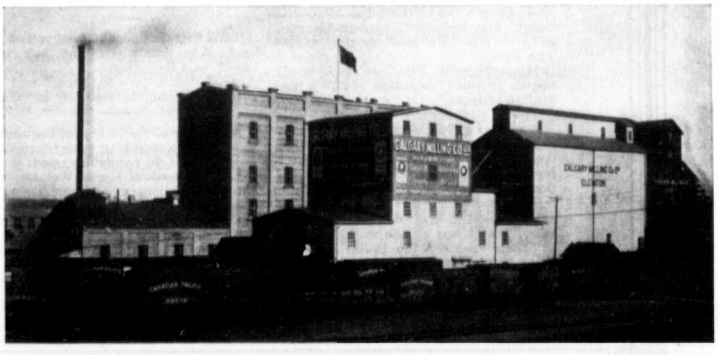
Farmers must realize that it is very much better for them to sell at the same price to home millers, than it is to ship their wheat to the east, thereby helping the growth and affluency of these provinces to the detriment of their own; and then again, when shipping to The Calgary Milling Company, the farmer gets his money in full at once; whereas if he ships east, it is five or six weeks before he receives these full returns.



Old Mill Rol

The requirements of the Calgary Milling Company's mill are 1,000,000 bushels or more of wheat per year; therefore they are always in the market for milling wheat at the highest price, and require considerable at the present time.

Rolls of New Mill.



Mills at Calgary.

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.

A Philadelphia lawyer, who spends most of his time at his country estate, employs a sturdy Irish gardener, whose one desire in life is to live until the banner of freedom is unfurled over Ireland.

One evening the lawyer strolled through the grounds of his place and stopped to have a chat with the gardener.

"Michael, do you know that while we are here enjoying the beautiful twilight it is dark midnight in Ireland?" he asked.

"Faith, an' Oi'm not surprised," replied the gardener. "Ireland niver got justice yit."

Husband—"I should like to have one good long smoke without your interference."

Wife—"Well, you may have your wish granted soon enough. You know you don't come of a long-lived family."

Mrs. Hen, having performed her oviparous function, took a constitutional around the yard. Returning to her nest she found it empty and clucked angrily.

"What's the trouble, ma'am?" asked the rooster.

"It's mighty funny," she grumbled, "that I can never find a thing where I lay them."

Marion, who had been taught to report her misdeeds promptly, came to her mother one day, sobbing penitently.

"Mother, I—I—broke a brick in the fireplace."

"Well, that is not very hard to remedy. But how on earth did you do it, child?"

"I pounded it with father's watch."

In the soft twilight of a summer afternoon mother came upon Young Hopeful standing in a brown study by the greenhouse door. His hands were clasped before him and his lips were dejectedly parted.

"Why, what's the matter, lamb?" mother asked, bending over him.

"I'm finking, muvver."

"What about, little man?"

"Have gooseberries any legs, muvver?"

"Why, no, of course not, dearie."

A deeper shade fell athwart dearie's face as he raised a glance to her.

"Then, muvver, I've swallowed a caterpillar!"

Reporter.—It's queer, isn't it, what names they select for apartment buildings? Now, there's the Garfield, the McKinley Court, The Roosevelt, Lincoln Court—all in our city. I suppose the next will be The Taft.

Moriarity.—Oh, The Taft would be all roight, provided, av coorse, it had a bay window in front.

A scholar in Iole wrote to the editor of the Iole Intelligencer and asked where "cupriferous" could be found. The editor replied that it could be found in the dictionary, under C.

"You used to say," declared the angry wife, "that I was all the world to you."

"That," sneered the brutal husband, "was before you grew so moon-faced."

And he saw stars before he could escape from her orbit.

Chelly—"Before I had sat in the game ten minutes I had lost fifteen dollars; then my luck began to change."

Fred—"Of course!"

Chelly—"Yes; and in the next two hours I only lost seven dollars and a quarter, bah Jove!"

Agent—"I am introducing a new typewriter, a neat little thing you can take in your lap—"

Author—"Not for me! I'm a married man."

Mrs. Newpop—What's the baby crying for, I wonder?

Mr. Newpop—Oh, he tried to swallow my cuff links.

Mrs. Newpop—What did you do?

Mr. Newpop—Gave him a couple of cuffs.

Mamma—Come, Willie, give your new governess a kiss.

Willie (who sees everything that goes on)—I don't want to; I'm afraid.

Mamma—Afraid! Of what are you afraid, my child?

Willie—Why, she slapped papa when he kissed her.

"Old Titewad gave his wife five plunks this morning and told her to make it stretch as far as she could."

"I suppose she did it?"

"Yes; my wife went shopping with her and she says she bought herself a pair of fancy garters with it."

"The man who is always waiting for something to turn up——"

"Usually has his eyes fixed on his toes!"

Farmer Jones (in office of "Weekly Argus Intelligencer").—I was a-goin to renew my subscription to-day, but I find I ain't got nothin' smaller than a twenty-pound tub uv butter.

The Editor.—I can break that, all right, neighbor; how'll you have your change—in 'taters, beets, carrots, pie-plant, or raspberry jam?

While on his travels he was thunderstruck at receiving from his wife a telegram which ran as follows:

"Twins this morning. More later."

"And that young man kissed you on the lips? Why didn't you offer him your hand?" said the father.

"O, I didn't have to, papa," said the girl; "he's going to ask you for that!"

A member of the Nebraska Legislature was making a speech on some momentous question and, in concluding, said:

"In the words of Daniel Webster, who wrote the dictionary, 'Give me liberty or give me death!' "

One of his colleagues pulled at his coat and whispered:

"Daniel Webster did not write the dictionary; it was Noah."

"Noah nothing," replied the speaker. "Noah built the ark."

An Irishman recently went before a judge to be naturalized.

"Have you read the Declaration of Independence?" the Court asked.

"I hov not."

The judge looked sternly at the applicant and asked:

"Have you read the Constitution of the United States?"

"I hov not, yer Honor."

"What have you read?"

Pat hesitated but a fraction of a second before replying, "I have red hairs on me neck, yer Honor."

"Why do you always go out on the balcony when I begin to sing, John? Can't you bear to listen to me?"

"It isn't that, but I don't want the neighbors to think that I'm a wife-beater."

"I've just been reading about the power of the will. It's a wonderful thing."

"Yes. I know of a will that makes seven children and thirty-two grandchildren behave."

When George Ade was coming from New Orleans last winter he noticed, among the race-track men on the train, one tan-shoed sheet writer with the largest feet he had ever seen.

And he furthermore testifies and affirms that the sheet writer, on rising in the morning, discovered that the porter had shined one shoe and a suit-case.

A couple of city men were playing golf when they saw an old gentleman looking at them wistfully. They asked him to join the game, which he did with alacrity. He was mild in speech and manner and played well. But once when he made a foozle he ejaculated vehemently the word "Assouan!"

A few moments later, when he had made another bad play, he repeated: "Assouan!"

The fourth time he said this one of his new-made friends said:

"I do not want to be inquisitive, but will you tell me why you say 'Assouan' so often?"

Well, said the old gentleman, "isn't that the biggest dam in the world?"

He was a Presbyterian clergyman.

Mistress—Get dinner to-day on the gasoline stove, Bridget.

Bridget—Plaze, mum, I did thry, but th' stove went out.

Mistress—Try again, then.

Bridget—Yis, mum, but it's not come back yit. It win't out t'rough th' roof.—New York Weekly.

Little Edwin, in answer to his question, had been told that God made him. At his bath the next morning his mother saw Edwin examining his skin closely, and looking at his arms and legs and trying to get a glimpse of his back in the glass. Finally he said, "Say, mamma, God made a good job not to leave any seams."

UNTIL MAY 31ST, 1910

YOUR CHOICE OF

This Jack Knife

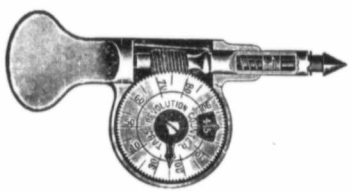
Above is shown actual size, the strong single bladed jack knife we are offering for sending in only two subscriptions for The Canadian Thresherman and Farmer at $1.00 a year. This knife is a substantial one, and the blade is of the very best steel.

Awl For All

Sews Leather Quick

Above is shown the famous Myers Hand Sewing Awl. This Awl is so well known to most of our readers as to need no further description. We give you this Awl free, for sending us only two subscriptions for The Canadian Thresherman and Farmer at $1.00 a year.

Tabor Stop Motion Speed Indicator



Any one using Power Machinery should have a Tabor Stop Motion Speed Indicator, and we will send you one free for securing us only three subscriptions, at $1.00 a year.

Stem Winding and Stem Setting Watch

The above illustration shows actual size the splendid stem winding and stem setting watch which we are offering for only four subscriptions. These watches are furnished in either Gun Metal or Nickel cases, and are guaranteed by Porte & Markle, of Winnipeg for one year. When ordering please state whether Gun Metal or Nickel case is desired.

Help us introduce our magazine into the homes of your neighbors. You like our magazine—so will they. These subscriptions also includes two estimates on our Mammoth 2000 prize Wheat Guessing Contest, which can be credited as you desire, either one to the subscriber, and one to the person sending them in, or both estimates to the person sending in the subscription. As our Wheat Guessing Contest closes May 31, 1910 these subscriptions must reach us positively not later than that date. When sending subscriptions be sure and state how you wish the estimates credited, the premium wanted, and where you want it sent.

Send All Subscriptions To E. H.

SUBSCRIPTION BLANK

E. H. HEATH CO. LIMITED, WINNIPEG, CANADA

Date.....

Dear Sirs:—Enclosed please find.....for..... year's subscription to The Canadian Thresherman and Farmer to be sent to

Name.....

Address.....

His estimate on the number of kernels in 8 lbs. 8 7-16 ozs. No. 2 Northern Wheat is.....

Subscription sent in by.....

My estimate on the number of kernels in 8 lbs. 8 7-16 ozs. No. 2 Northern Wheat is.....

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Subscription sent in by.....

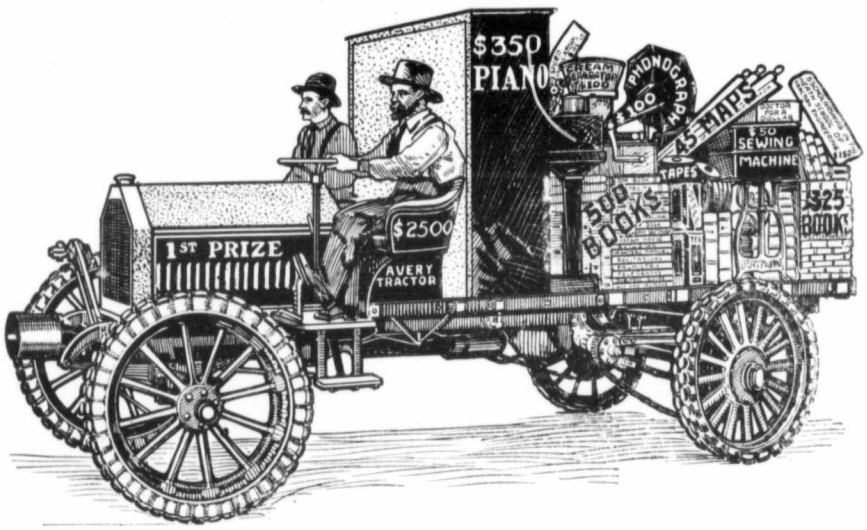
My estimate on the number of kernels in 8 lbs. 8 7-16 ozs. No. 2 Northern Wheat is.....

UNTIL MAY 31ST, 1910

You can put in an Estimate as to the Number of Kernels in 8 pounds 8 and 7-16 ounces of No. 2 Northern Wheat

2000 PRIZES FREE

To Those Guessing Nearest



Read this carefully

To put in an estimate on this Big Wheat Guessing Contest, all you have to do is to subscribe for "The Canadian Thresherman and Farmer." The subscription price is $1.00 a year.

Ending May 31st, 1910, "The Canadian Thresherman and Farmer" will carry on a Guessing Contest open to everyone in Canada, except residents of Winnipeg. 8 lbs. 8 and seven-sixteenths ounces of No. 2 Northern Wheat have been obtained, placed in a vessel and sealed up, to remain there until the Contest closes, when it will be taken out and counted by a Board of three judges, none of whom are in any way connected with "The Canadian Thresherman and Farmer." Everybody who sends in a year's subscription to "The Canadian Thresherman and Farmer," either new or renewal, is entitled to a guess.

The bottle was taken to the Dominion Weights and Measures Department at Winnipeg, was filled right to the top with No. 2 Northern Wheat and was found to contain exactly 8 lbs. 8 and seven-sixteenths ounces of wheat. It was then sealed right there in the presence of two witnesses. It was photographed and taken to the National Trust Company, and will remain in their vaults until the Contest closes May 31st.

257,885 was the number of kernels counted in 15 lbs. of No. 1 Northern Wheat in our Contest which ended July first last. 82,495 was the number of kernels counted in 5 lbs. of No. 1 Northern Wheat in the Nor' West Farmer Contest closed recently. 869,762 was the number of kernels counted in a bushel of wheat in 1903 in a Wheat Guessing Contest in the United States. With these facts to work from you should have no difficulty in arriving at an estimate that will win a prize; or better still, obtain a few ounces of No. 2 Northern Wheat and count them and form an estimate from that.

Guess early and increase your chance of winning one of these valuable prizes, for you will understand, it is the first ones who guess nearest that get the prizes. Remember, you may win a prize for every estimate you send in. Ask us to send you sample copies and extra subscription blanks to assist you in forming a club.

You May Get More Estimates thus:

2 years' subscription and	$2	gives you	3	estimates
3	"	"	"	$3	"	"	5	"
4	"	"	"	$4	"	"	7	"
5	"	"	"	$5	"	"	9	"
6	"	"	"	$6	"	"	11	"
7	"	"	"	$7	"	"	13	"
8	"	"	"	$8	"	"	15	"
9	"	"	"	$9	"	"	17	"
10	"	"	"	$10	"	"	20	"

Or, Better Still, Get your Neighbours to

Club with you, the subscriptions to cover one year. These subscriptions and estimates must be received in one envelope, so that we may credit them properly.

5 persons sending	$5	get	10	estimates	and each have		
6	"	"	$6	"	12	"	1 year's subs.
7	"	"	$7	"	14	"	" "
8	"	"	$8	"	16	"	" "
9	"	"	$9	"	18	"	" "
10	"	"	$10	"	30	"	" "

In Sending Subscriptions mail direct to E. H. HEATH Co., LTD., Winnipeg, Canada. Cut out the accompanying subscription blank, fill in the name, address and send in with the necessary amount to cover the number of years subscribed for. Send money by registered letter, express money order or postal money order. All checks must include exchange. In sending in a number of names, write the additional names and addresses plainly on a separate sheet of paper.

List of Prizes

1st	—Avery Farm Tractor	$2500.00
2nd	—Mendelssohn Piano	350.00
3rd	—Edison Triumph Phonograph with repeating attachment and complete with 75 records	100.00
4th	—Magnet Cream Separator	100.00
5th	—Raymond Sewing Machine	50.00
6-10	—Scholarships in The Heath School of Traction Engineering (by correspondence), $30.00	150.00
11-55	—Large Colored School Wall Map of Dominion of Canada, and Map of World on reverse side, $5.00	225.00
56-130	—Tabor Stop Motion Speed Indicators, $1.50	112.50
131-175	—Doctor for a Dollar Pocket Medicine Cases, $1.00	45.00
176-500	—Your choice of a number of Books, each worth $1.00	325.50
501-900	—25 ft. Linenol Measuring Tapes, metal case, brass barrel, .50	200.00
901-1400	—Your choice of a number of Books, each worth .50	250.00
1401-1500	—Your choice of one pound Gold Standard Tea or Coffee, .40	40.00
1501-2000	—Farmer's Rapid Calculator and Veterinary Handbook, .25	125.00
2000	—Total prize distribution	$4572.50

Heath Co. Ltd., Winnipeg, Canada

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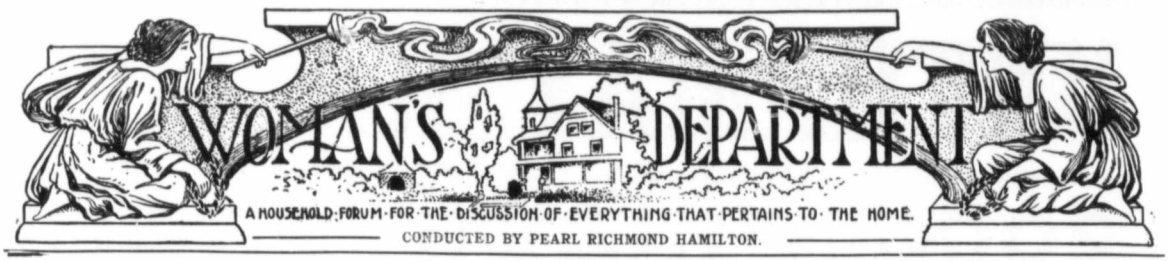


CONDUCTED BY PEARL RICHMOND HAMILTON.

Flowers.

Wondrous truths and manifold as wondrous
God hath written in those stars above;
But not less in the bright flowers under us
Stands the revelation of His love.

And the poet faithful and farseeing
Sees alike in stars and flowers apart
Of the self-same universal being
Which is throbbing in his brain and heart.

In all places, then, and in all seasons
Flowers expand their light and soul-like wings -
Teaching us by most persuasive reasons
How akin they are to human things.

And with child-like, credulous affection
We behold their tender buds expand;
Emblem of our own great resurrection
Emblems of the bright and better land.

—Longfellow.

The Gardens We Remember.

Nearly everyone has among memory's treasures on old-fashioned garden; it may have been your mother's or it may have belonged to a dear old grandmother or even a friend, but you remember it anyway and in your imagination the flowers come running to you with faces as happy as a day in June. You remember how the buds and blossoms came forth,—how the timid crocuses would peep their heads up through the cold earth, and the English violets from their green beds. Then the tulip would lift its chalices of red and gold and the half-wild daisy pushed itself ahead, as the human-faced pansy would look up to you for help and love.

You remember how these all in turn withered away as the summer days advanced but your loneliness for them waned when the annual summer visitors arrived. The marigold came, the seductive poppy and the gentle mignonette, the proud pink and the chrysanthemum putting on Eastern airs, then those old reliable friends the Phlox and Sweet-William; that lovely family of sweet peas—all jealous one of another in their maidenly color and grace. At your feet you felt the rambling nasturtium, and last of all your fair summer friends came the rose in queenly grandeur. Then you felt sorry when they one by one faded and drooped and died and you stood in the garden and philosophised on this great human lesson of life and death

But as the autumn days came other familiar faces peeped out from bed and bush. The China aster and deep-colored dahlia and the everlasting flowers all in turn came to greet you. Hardy friends they were and not so sweetly delicate as your summer friends, but you loved them just the same.

They were autumn friends and knew something of frost and cold and they taught you something about life's experiences.

Yes they all talked to you—and you understood them, for even babes understand the words of flowers.

Yes—

" In every flower that blows around
Some pleasing emblem we may trace
Young love is in the myrtle found
And memory in the pansy's grace.
Peace in the olive branch we see,
Hope in the half-shut iris glows;
In the bright laurel, victory!
And lovely woman in the rose."

My memory carries me back to my grandfather's garden. On sunny mornings or cloudy mornings his flower children danced and bowed and laughed in the breezes. I can see them now. As I entered the gate the glad warm faces of the peonies nodded welcome " Good morning's " to me and I would look down long aisles of roses and peonies and roses and peonies—all filling grandfather's world with color and gladness and wonder.

How the flowers loved grandfather as he stooped to pull a choking weed or to give a parched plant a drink! Then he would look up and about him and reverentially take off his hat in the presence of such wondrous flower-people. I think he communed with the flower-souls for they breathed harmony and love into the home of grandfather and grandmother. Nothing remains of that garden now but the memory.

I wonder if we are making gardens for our future grand-children to remember. Every home in this great new country should have a flower garden. Children love flowers. Their little hands fondle flowers and the tiny lips kiss them. Children naturally love the soil. The physical and moral world of the child will be beautified if you encourage it to plant and cultivate flowers. And so I hope every home will have a flower garden this year and that each child will have a corner for a garden of their very own.

It will make the child love the soil and he will become interested in farming because he is interested in the soil.

To force a boy to plow when only the work idea and not the " knowledge " idea is presented to him, is like making a prisoner " break stone ". The stone-breaking requires no thought or no uplifting influence. He does it because he is compelled to do the work. He is reduced to a level lower than the beast. So with the boy who " must plow " because he is ordered to plow.

If you take the same boy and teach him what that plow is doing —show him the structure of the soil and how the moisture and salts are richly scattered and what the effect of the sun will be on the upturned sod, what seeds that plowing will best nurture, you have opened a new world to him. This will open his eyes to a new interest in farm work and he will stay by you.

The same training applies to the girl. Every girl should have work in a garden—cultivating a vegetable garden is interesting work. I have heard physicians tell their patients to get out and work in the soil. The contact with the soil would make many a sickly girl well.

I have never seen vegetables that could equal those raised here in Western Canada. I believe we do not appreciate our opportunity in that line. There is scarcely a vegetable that cannot be canned in some way and yet farmers' wives buy canned vegetables. A traveling man who has seen much of the farm life in Western Canada tells me that he is surprised to see farmers' wives buy such quantities of canned vegetables when this land is so productive for vegetables, and the vegetables canned at home are much more wholesome than store goods.

Now I trust every country home and many town homes will have splendid flower and vegetable gardens this year. During the canning season I shall give you recipes for canning vegetables. Let us make the most of our productive soil and add years to our lives as well.

P. R. H.

Flower Boxes.

Where there is not sufficient space for lawn flower beds the children can be interested and a friendly rivalry indulged in the arrangement and care of piazza flower boxes.

Window boxes should be painted dark green.

Stocky, hardy plants should be chosen, and shoots and buds must be pinched off so the plant will grow busy and hug the earth.

Window gardens are properly started from slips in the very early spring; there is no limit to what the boxes may contain.

The rules of good taste are simple, and, with a thought as to the harmony of colors, one can choose almost any variety. If one attempts to copy the beautiful disorder often seen in nature, the larger plants should be so symmetrical that there will be no incongruity between them and the vines. A border of ivy and nasturtiums to trail over the box is most satisfactory, though the nasturtiums may be used sparingly.

Verbenas, petunias and sweet alyssum can be depended on for a succession of bloom.

Geraniums, if judiciously selected and combined harmoniously, are very satisfactory.

The soil in window or piazza flower-boxes should not be allowed to crust over, but be carefully stirred at least once a week

"Flowers preach to us if we will hear;
The rose saith in the dewy morn:
"I am most fair,
Yet all my loveliness is born
Upon a thorn."
The lilies say; "Behold how we
Preach without words of purity."
But not alone the fairest flowers;
The merest grass
Along the roadside where we pass—
Lichen and moss and sturdy weed—
Tell of His love who sends the dew,
The rain and the sunshine, too,
To nourish one small seed.

—Dante Rossett.

The Farm Girls Opportunity.

In a talk with the farm girl James J. Hill says:

"A young woman who applies herself to the study of what farming really is and goes at it with the same intelligence she would give to school-teaching has a freedom of life before her which no choked city can bestow. And it is gratifying to me to see that many young women have come to a realization of this, for we find them in the agricultural colleges, studying dairying and cattle, going out into the farm work; and opening successful henneries and squab enterprises, and even directing numerous irrigation enterprises where fruit is to be cultivated, and the sheep and cattle are to follow.

No city in the world can be prosperous unless the farms are. When you contemplate turning your back on the farm to enter upon a life you do not understand you are putting away from yourself a pot of gold, to say nothing of the lost contentment and freedom of life.

The study of the chemical (producing) values of various soils is one of the best pursuits a girl can take up."

Mr. Hill then tells this experience of a farmer's daughter in a north-west state.

"She had ambitions to become a practical farmer. Receiving her grammar school education, she formed the acquaintance of a teacher who had the wisdom to point out to her the excess in value of farm over city life.

This teacher gave her elementary and advanced books on soil chemistry, and had her address various farm authorities the country over on important farm topics. Step by step, as this girl gained the information she desired, she began to feel more secure of her ground, and finally felt that she could talk freely to her father and mother.

She asked them to give her control of a certain ten-acre corn patch of the farm that had not thrived. She asked if she might not use some of her new ideas upon this acreage and was told she might. This corn acreage had never been properly plowed, and, after seeding, little cultivation had been given it.

It had yielded thirty-one bushels of corn to the acre, and, one season, fifty-five bushels of oats to the acre.

The soil had been permitted to "bake" at the wrong season of the year, and the acreage was steadily decreasing in value. The girl believed the fault was not in the soil but in its care. Taking a farm-hand, she had the field plowed six inches deep in September. She watched this plowing herself, to see that every inch of ground was evenly turned and the sub-soil well broken. The field was then left to itself until the following spring.

In the spring it was carefully gone over again for planting, and seeded to corn. As soon as the crop growth appeared, the girl took her lone helper and cultivated the field.

She saw to it that the roots of the corn were not injured. She kept the top soil broken up and the weeds out. Once a week until harvest that field was cared for, and the yield was a gain of nineteen bushels per acre over the old yield.

The father and mother thought this pretty good, but the girl kept on. She began to fertilize her soil and to rotate crops, until she raised a corn crop of sixty-nine bushels to the acre. The value of that particular piece of land went up thirty-five to forty per cent., and the girl practically demonstrated that a woman could manage the land and get the highest results.

Any young woman who has ability enough to gain control of twenty acres of fair farm land, taken from her father or bought from others can, between her books and her common sense, wrest out of it, such a comfortable living as no city worker can ever enjoy. The opportunity is one of your own.

As one of long and hard experience, permit me to say frankly to you—the city is not calling you. It does not want you, it does not need you. The city is not suffering for lack of people or brains. Its great hunger is for food.

Step to the back door of your home. Stand on the step and look out over the fields that have not had one-half the attention they deserve. They are calling to you. They will reward you. And for what you do in this wise, those of the cities and the places where the marts of men make confusion and pain, will rise up and call you blessed."

The young women of Manitoba have an unusual opportunity in the course that the Agricultural College will open in May.

The managers are to be congratulated in their choice of such an able teacher of Household Science as is Miss Juniper, and the girls who are privileged to receive their training from this capable woman will not only become proficient in all branches pertaining to housekeeping and woman's out door on the farm, but they will have the advantage of the influence of strong womanly personality that is the soul of home-making. I have met Miss Juniper and I know whereof I speak.

When house-work is studied scientifically and it becomes a profession then girls will stay on the farm because they will love the work of home-making. As Miss Juniper says: "If instead of look-

ing upon home-making as work which any amateur can do, we realize our high calling and raise it to the important professional sphere to which it belongs, then we might hope for an increase of homes which are centres of health, culture and refinement. Training in household science makes girls more useful at home."

P. R. H.

An Ideal Flower Garden

For the woman who is very busy perennial flowers require less attention than any other. Some kinds bloom early others about mid-summer and still others flower late in the fall. One gets about as many blossoms from this class of plants as from annuals, and the amount of labour required by them is only a fraction of that which annuals must have to be satisfactory.

To grow any perennial well it must be given a good, rich soil. Spade it up to the depth of a foot, at least, and work some old, well-rotted barnyard manure into it.

In spring, the plants should be dug about with the hoe to remove any weeds that may have established themselves near the plants, and to loosen the surface of the soil.

Grass should not be allowed to encroach upon the plants. Keep a place of at least a foot, all about each plant, free from anything that will draw upon the nutriment in the soil. This must be held in reserve for the plants upon which you depend for flowers.

The best location for hardy plants is along the boundary line of the lot. Here they can be given a permanent place, and it will hardly ever be necessary to interfere with them in making changes about the home.

Do not set them very close together, at first, as one is quite likely to do because of the smallness at planting time.

The larger ones ought to be three feet apart to allow of room for development.

While they are small annuals can be grown among them or the gladiolus and the dahlia can be used.

The tallest kinds should be given places in the rear, or close to the fence.

Do not plant them in rows. A much better effect is secured by grouping them—here a bunch of hollyhocks, there a group of smaller plants and so on.

Get harmonious colors together.

Plant with method.

The catalogues will tell you the colors as well as the height of plants.

One of the best perennials is the hollyhock because it blooms with great profusion of color and quantity from summer till late in the fall.

Next on the list is the perennial phlox. It blooms with wonderful freedom and is a solid mass of color. Use white in order to bring out effectively the richness of its rose and crimson and carmines.

Every border should have its peonies—they are large and rich in color and grow better with age. One writer knows plants fifty years old.

A large collection of perennials will not require as much care as a few small beds of annuals will; of course this garden is for the busy woman.

" Sweet flowers, where'er I see you,
It seems, I know not why,
That you are heavenly foot-prints
Of angels passing by."

Read This

Dear Readers:

I am anxious to know if the topics discussed in this department are practical. Do you find the Mothers' Corner helpful?

Are the recipes just what you want?

I have tried many of the recipes myself and the others are tested by friends.

Do you use the hints in the experience extracts?

What part of this department do you like best?

Is there a department that you would like to see added?

Would you prefer a story or short articles?

Would you like to have a good correspondence conducted?

Will you write and let me know just what you want? This department is for you, dear women readers, and I want to help you in every possible way; if you will let me know what you need by writing me a letter, I shall endeavor to make this department just what you want.

Sincerely,
The Editor of the
Woman's Department.

The Mothers's Corner

Clifford Roe, former assistant state's attorney of Cook county, Ill., and now conducting the crusade against the traffic in young girls, has this to say to mothers:

"Ignorance in regard to sex problems is one of the great causes of the downfall of girls. They have been taught that human motherhood is too low a matter to be mentioned above a whisper. A girl is essentially a mother, and as soon as we can educate our girls so they will realize that motherhood is the highest realm of a girl, we have taken a great step toward solving the sex problem, for then a girl will not hold herself so cheaply. The girl of to-day, unfortunately, is not made to realize within her home and by her mother how important her functions in life and society are, what she is to be in the future, and in consequence that which she should know and study with the keenest interest is passed by as trivial or not to be spoken of at all. Through the false modesty of the mother, the girl is made to suffer a grievous wrong—a wrong which may ruin her entire after life."

Prof. Alford Jaehne of the German Criminology Society in an article on Why Children Go Wrong makes this startling statement: "The human soul, in all its nakedness, sin-stained, worn out, hopeless, is laid before us, and we must know what brought it to that condition. We have turned from the brothel for the real sources of the great amount of crime in existence in the world to-day. Something back of them, something deeper-

rooted than they ever can be, sends the boy to the call of the thief, the girl to everlasting shame.

That something is improper food in childhood, improper labor, and the neglect and ignorance and brutality of parents.

The beginning of the end of crime is within the home, within the environment in which a child works, in the kitchen where its food is prepared, in your own constant growth in patience, knowledge and love."

Think you then, mothers, that we have time to vote?

The Mental Influence of the Mother over the Mind of the Child.

The blighting force of the anger of a mother perhaps shows itself in the child with greater violence than any other mental disturbance.

Children have gone into convulsions and died after nursing when the mother was angry. Several cases of paralysis have been traced to this very cause. Sometimes the result is paralysis in one side of the body, with a contraction of muscles most suggestive of convulsions on the opposite side.

And in this manner we could write out long lists of things that have happened to the baby because the mother was suffering mentally, but surely enough has been said to convince the woman who is ignorant of these things that keeping a tranquil mind is the chief business of the mother while her child is nursing.

No woman will needlessly expose herself to accidents, but women do fret, do worry, do fear things needlessly, do go off into a temper over things big or little.

Knowing well that the babe she loves with all her soul must bear in its body the marks of these destroying agencies, she will cultivate calmness, peacefulness, repose of spirit, until her spirit is in harmony with the great Source of power.

We cannot leave this subject without a thought on how much or little the child is mentally influenced by these emotions of the mother. In these days of psychological deluge, women are reading, talking, listening to lectures; many, with deliberate intent, are practicing to demonstrate the power of one mind over another.

The woman who is interested along these lines has a most receptive and responsive subject in her own little babe. Suggestions mentally or given in words are eagerly grasped, retained and acted upon by this little beginner in the ways of the world. There is a disposition to be created here and now.

Shall this babe, when it grows into manhood or womanhood, meet the world with a whine and a growl? Shall it feel that it was born destined to be the helpless victim of circumstances? Shall it be weak and puny in spirit? Shall it lack purpose and be at the beck and call of every passing fancy? Or shall this man that you are giving to the world be so mentally poised that he looks the world straight in the face? He has no fear of circumstances; they move to his will. He knows no master but God. The work is yours, you mothers. Will you live up to the privileges of your obligations?

—From The Mothers' Magazine.

Do not give children coffee or tea to drink. They are stimulants.

As children grow older, the home-spirit comes to be an important element of environment—more important by far than dress, house-furnishings, or other material objects. Every home has an atmosphere of its own, the atmosphere of no two homes being alike. A child may live in a fine house, wearing costly clothes, and owning expensive playthings, yet—because of a lack of sympathy or confidence on the part of mother, or the person nearest to it, or a consciousness of being misunderstood—may fail of getting the benefits of the favorable incidents in its life. The child of a mother who creates a happy home-spirit has a better environment in a humble home than has the child of luxury who is obliged to witness parental quarrels.

As a rule the children of royalty are dressed simply. Fancy clothes, starched ruffles, velvet knee-breeches, lace ruffles, jewels and the rest of things like these, which to little children are abominations, are left to the children of the aspiring middle class, who imagine that by decking their little ones in gorgeous clothes they are exciting admiration. The garments chosen for royal children are simple linen frocks very plain—and they express common sense and comfort.

Raising Ducks for Money

Dear Editor:—

When my sister and I were young girls, the one thing she wanted more than anything else was a gold watch. How we all laughed at her extravagant wish for we had little more than the bare necessities of life.

But she was a girl full of determination and when she set about to raise ducks for the "Watch fund" we all knew that in the late fall our sister would be wearing a splendid gold watch.

There is money in duck raising worthy of the consideration of women. Any farm land where there is water, can be used for this purpose. Running water, though not an essential feature, is in many ways desirable. The constant motion is beneficial to the health of the fowls, as it keeps the water clean and carries off impurities.

To start duck raising the favorite breed for business purposes is the Pekin duck. These ducks are pure white without a touch of color and successful duck-raisers never allow a fowl that is not entirely white to remain in the flock. Even so slight a blemish as a single gray feather is enough to cause its immediate removal. In many white ducks the "button" on the upper edge of the bill, which also serves as a tooth, is black. This is one of the ways of telling that the breed is not pure and will aid the purchaser in selecting the best fowls.

The feathers from this duck are of fine quality and bring about a half dollar a pound.

After they are plucked they should be placed in a loft to dry and

air. Wire nettings are good to use in separating broods of ducks. Ducks are excellent layers.

The food of ducks consists of grain and meat chopped fine.

When ducks are being fattened for market they should not be allowed to go into the water. They should be kept quiet. Ten weeks after they are hatched they are ready for market.

At the end of the season my sister bought herself a beautiful gold watch and she was proud of it because it was earned by herself. But the best result of her season's experience was the knowledge she gained in poultry raising. She is the wife of a prosperous farmer now and all last summer the eggs from her chickens bought everything for the table for a family of seven and eight; and a bountiful table she sets, too.

Last winter when I paid sixty cents a dozen for eggs I wondered why more farmers' daughters and wives do not go into poultry raising.

Sincerely,

Mary H. S.

The editor would like more of such letters of experience.

A Early Riser.

A crocus awoke in her little warm bed,
"I hear some one calling and calling," she said.
And she pushed at her covers, and said, "I must see
Who it is that's so earnestly calling to me!"
And she donned her fair garments of green and of gold
And she pushed her way up through the brown garden mould.
And she looked all about her with wondering eyes,
And found it was Spring who had coaxed her to rise!
And a dear little girl cried: "O mother, my dear!
Spring surely has come, for a crocus is here!"

—E. A. Leute.

ABOUT WOMEN.

The labor struggle ever engaged in by women has lately been in progress in New York. It is a battle between manufacturers and women workers and is known as the Shirt-Waist Strike.

Clara Lemlich, a shirt-waist maker began the movement; Helen Marot organized and directed it; Annie Morgan, daughter of J. Pierpoint Morgan, backed it financially and socially. The struggle has involved 40,000 striking shirt-waist makers, college girls, society women and policemen.

Miss Morgan possesses her father's organizing and constructive ability, and struggle for just treatment in women's industries.

She has started a co-operative shirt-waist factory to make provision for girls out of work and to open a way whereby a better shop standard may be established. The first order for shirt-waists from this shop came from Wellesley College; the students sent for a thousand waists of a special Wellesley pattern.

Since the death of her husband, Madam Curil has continued her scientific work alone; she has succeeded in obtaining pure polonium, the latest of the rare and wonderful metals brought to human knowledge. This is another triumph for woman in the scientific world.

Mrs. Lulu Rice, of Longmont, Colorado, has passed the required examination for a certificate to practice embalming.

Mrs. O. P. H. Belmont, prominent worker in the suffrage cause, is suffering from a physical break-down.

Queen Alexandra's sundial at Sandringham bears the inscription:
"Let others tell of storms and showers
I'll only count your sunny hours."

Miss Dorothy Drew has recently made her debut as an actress in London. She was the favorite grand-daughter of the late W. E. Gladstone, with whom she was frequently photographed when a little girl.

Recipes

Rolled Oats Macaroons.

One and one-fourth cupfuls of rolled oats, one egg, two tablespoonfuls of cream, two of milk and two of water. Let stand until the oats have soaked up the moisture, then add one cupful of powdered sugar, one teaspoonful of ground cinnamon, and one tablespoonful of melted butter. Add enough whole wheat flour to make stiff and two tablespoonfuls of baking-powder. Make into balls as large as walnuts and flatten slightly. Bake in moderate oven.

Fried Chicken.

Only a young, tender chicken should be used. One weighing from two to three pounds is best. The chicken should be killed the same day it is to be cooked, if possible. It should be thoroughly cleaned and cut into sizable pieces. Put two heapng tablespoons of butter or dripping into an iron spider, and allow it to get piping hot. Season the chicken with salt, roll each piece in flour, place in the hot fat, and cover closely. When one side is nicely browned, turn the pieces, push the spider to the back part of the stove, and allow the chicken to cook slowly for one hour. When tender, take up the chicken on a hot platter. Add one level tablespoon of flour to the hot fat in the spider, stir until slightly brown, and add two cups of rich, sweet milk. Allow it to boil up once, and serve.

Stewed Chicken with Biscuit

There is no more taste in a yearling hen than in a chicken, but many people

prefer the latter. In any case, only a fat hen or chicken should be used, as a thin chicken is almost tasteless. If a rich gravy is not liked, a part of the fat may be removed before cooking. The chicken should be thoroughly cleaned, unjointed, and placed over the fire with sufficient water to cover. As soon as it begins to boil, it should be skimmed. Add more water from time to time, and cook until tender. Season with salt and pepper while it is cooking. One hour before the chicken is to be served, make a rich biscuit dough as follows: Take one quart of sifted flour, add three rounded teaspoons of baking powder, one-half teaspoon of salt, and sift again. Work into this one heaping tablespoon of lard, dripping, or chicken fat. Moisten with sweet milk, roll out into a sheet one inch thick, and cut with a biscuit cutter. Bake in a moderately hot oven until a golden brown. Thicken the chicken gravy, break the hot biscuits into halves, and drop them into the gravy. Allow them to remain for two minutes, and serve with the chicken in a large tureen.

Fashion Fancies

The Russian blouse coat is one of the features of spring styles.

The measure of woman's innate refinement may be very accurately gauged by her home attire. Personal daintiness is the hall mark of gentle breeding, wherefore the house gown demands no less attention than the out of door costume.

A graceful house dress is made of semi-princess style, with a front panel which extends from the neck to hem and forms the front gore of a five-gored skirt. The body is tucked in front and at each shoulder to bust depth, the back being plain at the skirts and back, body and skirt are joined together by a belt.

BIB EFFECTS.

Quaint and pretty are the bib effects upon the panels of lingerie frocks. You will probably see a great many such garments this year, made with tiny shoulder caps or short sleeves, with under-arm shield. All edges, over and under the arms and along the panel sides, are trimmed with narrow valenciennes. The style is practical when two materials are used.

A new trimming is used, either white or cream, made of a good grade of linen and worked in eyelet with some gold and a large amount of the palest pastel tints. It is beautiful and is intended to arrange with miniature tucks of less fragile material.

Patent leather belts are worn with Russian coats of linen and serge.

Dresses of thin batiste and lawn are shirred.

Modish toques are wound about with silks, with stubby plumes at the left side or back.

Big linen covered buttons with runs are prettily used in small numbers as dress adornment.

A SLIP-SKIRT.

A good slip-skirt may be made by sewing a muslin flounce to the bottom of a gauze or silk vest. The vest fits the form and will look well under the one-piece dress.

THE TUB FROCKS.

Fashions are elastic when tub dresses are concerned, almost as much so as the imagination. Whatever may be said of such dress in general, we must admit the tub dress is a treasure, for the one fact it always feels clean and comfortable on an extra hot summer day. The stores are showing a wealth of printed materials in good colors from which, it seems, everyone ought to be satisfied. Small coin dotted foulards rank high, as they did last year, but the dots were larger. They are selling any amount of the cotton stuff which, to tell the truth, looks equal to materials much higher in price. These fabrics have a voile appearance and look uncommonly pretty over lace petticoats.

THE Girls' Cozy Corner

PLAYMATES.

"My Grandpa is the nicest playmate,
I love him dearly," said little Kate;
"The difference in our years is nothing,
For he is 80 and I am 8."

—Mary K. Hyde.

AFRAID.

A timid little moon rose up,
And stole along the sky;
Her slender face was drawn and pale,
And when we asked her why
She dodged behind each passing cloud
She said, "Oh, dear! I'm faint with fear
I hope the stars won't shoot.

—Eunice Ward.

Dear Girl Readers:—This month I am beginning a girl's department and a boy's department. The girls' department will be named The Girl's Cozy Corner. I trust that my girl readers will send in many letters telling about anything of interest to girls. If you can cook, tell us about it, if you are going to have a garden let us know your plans, describe the country where you live, in fact anything that will interest girls. I will give a prize of a book every month for the best letter. Let every girl write to me. Sincerely, Cousin Doris.

GIRL'S PRIZE LETTER.

Meridian, Sask., Feb. 12th, 1910.

Dear Cousin Doris:—I have been reading your paper for quite a while and thought I would write and tell a few games. The first is a very amusing game to little ones, it is called "Poor Pussy," as many people as would like it, could play it. First a whole lot of people gather around quite close to each other, then the one that is in the centre goes around saying "meow," the person in the chair says "Poor Pussy" without smiling, the centre one says meow three times to each one and if they can resist laughing he goes on. The game can be played as long as liked.

Another game called "Potatoes" is quite an amusing game. You get two captains and choose up sides; then get as many potatoes as there are people. Set them at the opposite side of the room. The opposite sides stand in front of each other about one yard and a half apart. Each side has a spoon which the captains take and run at the potatoes and get them on the spoon without touching it with your hand and run and bring it to the other side without letting it drop off for if it does drop off he has to start over again. The captain's side who has their potatoes home first has the game.

I would like to receive the book and see my letter in print. Wishing your paper every success. I will remain, Your Cousin, Mary Duncan.

Dear Cousin Doris:—I saw so many letters in the paper that I thought I would write too and I hope to see it in print. My brother takes the Canadian Threshernman and I read the letters that are sent in by the boys and girls. I have four sisters and one brother. Their names are Leticta, Rena, Milton, Lulu and Verna. There are four of us school age but we are not going this winter. They closed school. It is three miles away and that is too far to go in the winter and we have no driving horse. We had a sale last October. We sold $2,000 worth of live stock and implements and had 19 head of cattle and 2 horses left, so my father bought a farm with good buildings. We are milking six cows this winter. We are getting 30 cents a pound for butter. We are only two miles from a store and post office. We went to the fair at Wawanesa last summer. Mother took first prize on butter and second on bread and there was a wagon load of butter there. We have two cats and one dog. His name is Carlo. He is a good cattle dog. He will go and bring the cows home if he can see them. I will close wishing your paper success and hoping my letter will miss the waste paper basket, I remain, Yours truly, Bertha Clark, Inglelow, P.O. Man.

You wrote a nice letter Bertha. Will you ask your mother to write to the Woman's Department and tell how she makes butter? I am sure there are many women who would like to learn to make good butter. Cousin Doris.

Here is a letter from a little girl in China who wrote to St. Nicholas. I think my girls may be interested in it.

Tungcho, Pekin,

Dear St. Nicholas: I thought you would like to hear about the Empress Dowager of China's funeral procession. We live about thirteen miles from Pekin, and as the procession did not leave Pekin until about eight o'clock, we started for the great road about noon. They had made a new road of yellow earth over which no one else had ever ridden, all the way from Pekin to the Imperial tombs. Crowds and crowds of people had come from all the country round. They had been waiting since early morning for the procession.

We found a little graveyard near the road and watched things from there. Ther wasn't very much order for a long time. A great many baggage carts came along and men on all sorts of horses. These were whipping their horses, talking and laughing, and evidently having a good time. After a while there came along about twenty carts that belonged to official ladies. These were followed by a whole lot of outriders.

After another long wait during which there was nothing but a mixed-up lot of people and carts, there came a company of foot soldiers, and they looked fine. Then came the present Empress Dowager's sedan-chair. It was all covered with yellow silk and very fancifully trimmed. Her chair was followed by several plain silk sedan-chairs, which probably held high officials and the highest ladies of the court. These were followed by a company of cavalry. Their horses were all white. After this there was nothing but carts and men dressed in long red silk garments. These were bearers of the coffin, whose turn hadn't come yet.

After a while there came another company of soldiers and some more princesses' yellow chairs, followed by another company of cavalry, all on beautiful brown horses. After another long space we heard people saying, "It's coming; it's coming," and looking down the road we could see the top of the enormous catafalque. Before it came into full view we could see the paper money that those who marched before it were throwing up in the air every once in a while. The catafalque was covered with heavily embroidered yellow satin, and it was carried by one hundred and twenty-eight bearers. The bearers were dressed in red with a little red hat, and a yellow feather sticking straight up out of the crown. This came at the very end of the procession.

There were thirty-two relays of one hundred and twenty-eight each, so that it took four thousand and ninety-six men to cary the coffin.

I enclose some of the paper money that was used.

Your faithful reader,
Margaret Wilder.

Every kind word you say to a dumb animal or bird will make you happier.

A PET SKUNK.

Lucille Bliss, a Nebraska girl of twelve years, has a tame skunk for a playfellow. The pet skunklet was adopted when very young and is now full grown and romps and plays with its little mistress just as any common house cat. The animal has grown fat under caressing and house care. When Lucille comes into the house the polecat races to her side, leaps to her shoulder, licks her cheeks and snuggles down into her neck.

One often hears it said that there is no animal more stupid than a hen. In vindication of the much-maligned domestic fowl, it seems but fair to relate a true story of a sagacious and affectionate hen.

On a farm in Nova Scotia there once lived a dear old lady who was blind. She had a love for all animals, particularly for the hens, which were faithfully fed by her hand. One tiny hen became exceedingly fond of its aged mistress, following her about the yard as devotedly as would the household cat.

When the old lady fell ill, it was noticed by the family that Mrs. Hen was not so lively as of yore. Evidently she missed the kind hand that had been in the habit of feeding her, and the gentle voice that had softly called, "chuck, chuck, chuck."

One day the sick woman in fumbling among the bedclothes came in contact with an egg, and called the attention of the family to the fact. The mystery was solved next day when the little hen was seen to enter the doorway, wend her way to the old lady's sick room, and perch upon the bed. The little feathered friend paid a visit to her mistress every day, leaving as a token of love a fresh egg to tempt the failing appetite of the invalid.

The faithful hen seemed to have an intuition when the Death Angel visited the home and bore away her beloved friend, for never again did she cross the threshold of the farm-house, and shortly after the decease of her blind mistress she pined and died, apparently of a boken heart.

THE Canadian Boys' Camp

WILLIE'S RAINBOW.

Our Willie gazed, with curious eye,
Up to the rainbow in the sky;
And as the colors, clear and bright,
Burst forth upon his eager sight,
Re cried, "Mamma, the pretty thing
I think must be God's finger ring!"

WHO IS A COWARD?

Who is a coward? Who?
The boy who cannot bear
A hasty word, a scornful look
A thoughtless jest, a damaged book,
Whose selfish spirit can not brook
The play he may not share.

Who is a coward? who?
He would rather fight
Than own that he is in the wrong
Or curb his wild unruly tongue,
Who rather would be fierce and strong
Than kind, and just, anr right.

Who is a coward? who?
The boy who never craves
For grace to help him to refrain
From taking God's own name in vain,
But idly follows in the train
Of Satan's willing slaves.

Who is a coward? who?
He who dares not refuse
To join in every evil way
With those who seek to lead astray,
The boy who is ashamed to pray,
Afraid the right to choose.

Dear Boy Readers:—We are beginning this month a department of your very own—a boys' department. I want to have in this corner interesting material for boys; therefore I ask you to write me letters describing anything that interests boys. Write about your work on the farm, your care of the stock, the games you like, your hunting and fishing experiences and your country. Let us see who will write the better letters—the boys or girls. We shall call this department The Canadian Boys' Camp. Sincerely, Cousin Doris.

BOY'S PRIZE LETTER.

Goodeve, Sask., Feb. 24th, 1910.

Dear Cousin Doris:—This is my first letter to your paper and I hope it will escape the waste paper basket. I saw in the last Canadian Thresherman and Farmer where the prize books would be given to the girls and boys who wrote the best letter describing one of their favorite games. I will tell your readers how to play a game we used to play at school last summer. We call this game the "Duck on the Rock." It takes at lest four or five to play this game. Take a stone or a block of wood about five or six inches high, this big stone we call "rock," then make a long mark on the ground about four or five yards from the rock. Now each boy must find a small stone about twice as big as a duck egg, each boy must know his own stone and always use the same one. These stones we call "ducks." One boy must put his duck on the rock and the other boys stand on the other side of the mark or line on the ground and throw their ducks to knock the duck off the rock; the boy who puts his duck on the rock stands beside the rock to try to catch the other boys when they have thrown their ducks and runs across the line to pick up their ducks. He can't catch them before they have picked up or touched their duck. When he has caught one boy, that boy must take his place and put his own duck on the rock. If the boy that has his duck on the rock is trying to catch a boy that has picked up his duck and if the other boys knock the duck off the rock he has to put it on before he can catch him. When he has got across the line with his stone he is free then. I remain, yours truly, Edgar Kjernaas, Goodeve, Sask.

Dear Cousin Doris:—I have read several of the boys' and girls' letters in The Canadian Thresherman. I thought I would join them in the game prize contest, as I wish to win your prize book, so I will describe my favorite game, which is "grunt," to be played by several boys and girls. Blindfold one of them, give him a stick and place him in the centre of a circle made by the others, who join hands and go around until th one inside tells them to stop, then touches one of the ring with his stick telling him to "grunt." When they grunt he guesses who they are. I fhe guesses wrong he has to do it over; but if he guesses correctly, he takes off the blind-fold and puts it on the one that grunted and they proceed like this until all have been blinded. This is my first attempt to write to you. Wishing your paper every success, I am, yours truly, Virgil Starnes, Lindvillie, Alta.

Dear Cousin Doris.—As I in my leisure turn the pages of the Canadian Thresherman and Farmer, my eyes fall upon the many pleasant letters of those young people who contribute. I suppose I had better tell you where I live. I live in Manitoba, near the Southern boundary, in the municipality of Argyle, near the small town Glenora.

I live on a farm and we have a number of horses and cows and the crop this year was exceedingly good

I play in the Glenora Baseball Club and this being our first season we only played eight games but were successful, and won five of them. I am the catcher. There is lots of game about here in the Fall. There is a lake about four miles from our place; it is Rock Lake and there is a beautiful summer resort there.

In the winter we young people have lots of fun going to socials and concerts; also skating on a beautiful lake; and Oh! what fun to get on the ice on a lovely moonlight night with a nice girl by your side, to laugh and in the "Bob" sleigh. Yours truly, A. Johns, Glenora, Man.

A Finland Boy's Bath.

When the boys of Finland want to take a bath, this is the way they do it:

In the first place, it is very, very cold in Finland, and the bathroom is not in the house at all, but in a building quite separate.

It is a round building, about the size of an ordinary room. There are no windows, so light and air can only come in when the door is open.

Inside the benches are built all along the wall, and in the center is a great pile of loose stones. Early on Saturday morning wood is brought in, and a great vessel standing near the stones is filled with water.

Then some one cuts ever so many birch switches, and these are placed on the floor of the bath-house. Next the fire is made under the stones, and it burns all morning. In the afternoon, when the stones are very hot, the fire is put out, the place is swept clean, and all is ready.

The boys undress in their houses and run to the bath-house. As it is generally thirty degrees below zero, you may be sure they do it in double-quick time.

As soon as they are in the bath-house they shut the door tight and begin to throw water on the hot stones. This, of course, makes the steam rise. More water is thrown on, and there is more steam, until the place is quite full.

And now comes the part that I think you boys would not like at all. Each boy takes a birch switch and falls to whipping his companions. This is to make the blood circulate, and, though it is a real hard whipping, no one objects, but all think it great fun. At last, looking like a lot of boiled lobsters, they all rush out, have a roll in the snow, and make for home.

Never Mind.

Never mind the other fellow, do as your conscience dictates.

Never mind, the other fellow remember there is plenty for all.

Never mind, the other fellow he cannot do all the threshing.

Never mind, the other fellow know your costs and get paid for your efforts.

Never mind, the other fellow do right by him always.

Never mind, the other fellow the power is most wonderful.

Never mind, the other fellow he will come to sooner or later.

"BLUE PETE"

How Greek Meets Greek in Yeggman's Land

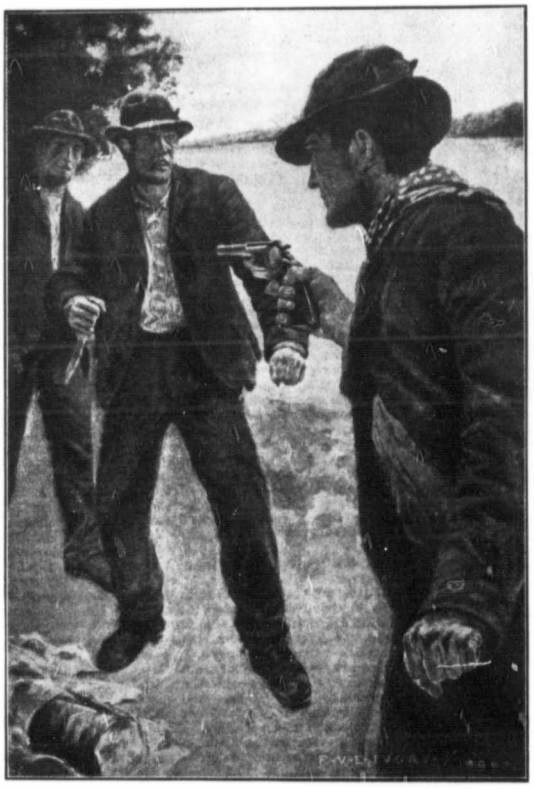
By George Randolph Chester

AS THE crackling and rumbling of the rails and the distant shriek of a locomotive warned him that a train, probably a freight, was slipping downgrade toward his shady retreat, Blue Pete looked up with a frown of impatience that had deepened on his cheek the ugly blue scar which had given him his name. Naturally, he did not like the prospect of being disturbed before he had eaten the meal he was then preparing, and perhaps his impatience was heightened by the fact that the meal was exceptionally appetizing, though simple. On a rusty-red little wood-stove, abandoned as worthless by some long-ago party of campers, a large fish simmered to a golden brown amid the snapping butter in a battered stewpan. On the back of the stove stood a blackened tin can, from which the coffee had already begun to send little curling wreaths of fragrance into the air. Upon the ground, on a clean newspaper, rested a loaf of home-made bread. By it, on another piece of paper, was a chunk of butter, and in two other small parcels were salt and pepper.

The whistle shrieked again, and the man gave a regretful look about him at the pleasant environment which had been solely his own all the forenoon. The clear little lake from which he had taken the fish early that morning lay dimpling under sunshine and gentle breeze; the thickly-wooded hills on the other side of the lake were clad in the lazy haze of noonday; the copse of trees in which he stood was a Paradise of broad shadows which were deepened by the patches of bright sunlight which streamed down here and there, wavering and tremulous from the intercepting leaves that let them through; a dense thicket of underbrush shut off all view of the railroad, which, at this point, dipped steeply, with a sharp upgrade in both directions, and, altogether, it was an ideal spot at which to alight from fast trains going either north or south. It was too ideal, in fact, for the continued presence of such visitors as the man who occupied it to-day had long since made Clear Lake an undesirable spot for camping parties.

The man himself was the only displeasing object in the whole landscape. His clothing bore the cinders and grime of much rough travel; they were creased and wrinkled from having been much slept in; they were rusty from long exposure to sun and rain and wind; they were snagged and torn from contact with briers and unexpected nails and splinters, and from the worn, roughened iron-work of boxcars. His slouch hat was practically shapeless, except for an upturn of the brim at the back which gave him an almost ridiculous air of jauntiness; his coarse, heavy shoes were scuffed and rusty-red, like the stove; a soiled bandanna handkerchief, knotted about his neck, did duty for collar and tie, and a soiled blue hickory shirt and a greasy-looking belt completed his costume. His face was unshaven, and the deep blue scar ran down his right cheek so prominently that one scarcely noted the heavy jaw, the pointed chin, the strong nose, the firm mouth and the clear blue eyes.

The train came rolling easily down the grade. Just as it reached the bottom the exhausts were opened and heavy puffs announced that the engineer was taking the upgrade with all the momentum he could muster. Blue Pete listened intently as the speed of the train perceptibly slackened, showing that the down grade advantage was being lost. Presently his ear caught the sound of a peculiar scraping thud on the roadbed gravel, followed but a second or two later by a similar one.



"Now you hike!"

"Two of them," he muttered, and hastily drawing the now nicely-browned fish from the fire, he put the stewpan behind the stove and concealed himself in the underbrush.

The crunch of gravel, growing more distinct as the noise of the retreating train grew fainter, announced the approach of the intruders, and soon two men parted the bushes at the slightly-defined pathway, emerging furtively into the clearing. The foremost was a heavy man of about Blue Pete's weight. He was a trifle better dressed than Pete, but his face was a repulsively brutal one and his hair was fiery red. Behind him trailed a much younger man, whose retreating chin and shifting eyes showed him to be of less courage than either of the other two. His hands and feet were smaller, and, like his face, were many shades whiter than those of his companion. There were certain marks upon him, too, which showed him to be out of his element, not the least of which marks were dust and grime, that had distressed him more and had marked him more ruthlessly than it had the other.

The newcomers displayed a caution that seemed habitual. Even after the leader had reached the centre of the clearing and had noted the fish and the coffee and the bread, he said nothing, but, motioning for silence, stepped stealthily forward to the edge of the lake and surveyed its clear expanse. There was no boat upon it. Turning, he examined the clearing as closely as he was able to do without exploring it tree by tree.

The younger man was the first to break the silence.

"Whoever it was," he whispered, tugging at the other's elbow, "I judge that there was only one, and I suppose we've scared him away for good. Eh?"

The answer startled him for a moment into a pallid-lipped panic.

"Well, well, well!" called out the red-haired man with sudden bold loudness, returning to the stove. "Me chef has lun-chun all ready for us. Draw up your chair, Jimmy the Rabbit, and tuck your napkin under your chin. Will you lap up some consom-may, or just soup?"

He coolly removed the now boiling coffee to the ground, then he tore off a piece of the newspaper, which he folded up to grasp the hot fish by the tail and lift it from the stewpan. Laying the fish on the paper, he divided it down the back with a huge clasp-knife, and, squatting on the ground, took up the loaf of bread. The younger man still hesitated, looking about him nervously.

"Well, Rabbit!" snapped the red-haired man impatiently, and the other instantly sat down with a weak smile, half of fear and half of ingratiation. Two thick slices of the bread had been cut when the man with the scar on his face emerged from his concealment and strode angrily toward the usurpers.

"You 'bo's have got your gall!" he exclaimed, paying no attention to the younger man but directing defiance to the other. "Tha t's my chuck, yous!—Skiddoo!"

The red-haired man was on his feet in an instant, his ugly-looking clasp-knife still in his hand. "The Rabbit" also scrambled up, but there was no menace in his attitude. He was clearly ready for flight.

"Well, what you goin' to do about it, demanded the red-haired man, gripping his knife.

"This!" bellowed Blue Pete, and suddenly whipped out a huge bull-dog revolver. "Now, you hike! . . . . Chuck that!" he exclaimed, as the other gave a quick twitch of his hand toward his coat-pocket. "If you make a move to your gun, I'll croak you!"

The red-headed man held his arms straight out and let his knife fall, the sharp blade striking into the turf.

"I pass," said he. "It's your prog, Bud. We ain't hungry, anyhow, are we, Rabbit?"

The younger man licked his dry lips and managed to shake his head. "If you'll dump your gun. I'll throw mine down and bat your conk off," belligerently offered the owner of the fish.

For a moment the red-headed man seemed to debate this offer seriously, and then he grinned.

"What's the use?" he said, with sudden cordiality. "You win, 'bo, but you might as well give us a hand-out. We've just hit the grit from Chi., with not a bite nor a drink all the way, and that's straight, old pal. The spread looked too good to pass up."

"That's the patter,' said the other heartily, lowering his gun and returning it nonchalantly to his pocket. "I'll do better than a hand-out, now, since you duck that stick-up game. I won't be stood up by any frowse that walks, see, pal? But just you plant your piano-keys into that fish and I'll fry some more. Look here!"

He went to a little cove at the side of the lake, where some bushes bent down over the water, and drew up a string of half a dozen fine pickerel.

"I got these at daylight this morning," he informed them, "and had two for breakfast at that."

He took off three of the fish, and hastily cleaned and fried them while the others ate. By the time he had finished cooking them, his guests were lying back on the grass in huge content, though watching him hungrily. The host sat comfortably down with them when the meal was ready.

"We ought to have more of the punk," he said, pointing to the bread. "If your pal here——"

"Jimmy the Rabbit," interposed the red-haired man.

"Well, then, Jimmy, if you'll go after it, I know where you can get it. That farmer, up where the road crosses, sold me this and the butter and salt this morning. It's the first time he ever seen a 'bo with the mezuma, I guess. Hop along, Bunny."

"I'd rather have fish," said The Rabbit complacently. "Walking might give me corns."

"Well, Rabbit, I'm goin' to make you work, anyhow," announced Blue Pete. "You see them bushes up by that little tree? Well, right there, ten feet back from the water, you'll find a pile of little branches on the ground. You take them up and you'll find some wet straw. You lift the straw up and you'll find a hole in the ground, and in that hole you'll find something that'll make your eyes bug out. Bring three bottles and cover the hole up just the way you found it."

"Jimmy," said the red-headed man, "you mind what J. Pierpont Morgan here tells you, and do it quick, see?—Or are you Willie Vanderbilt, travelin' incog.?" he continued, turning to his host with mock gravity.

"Never mind who I am," replied Blue Pete. "But say, when I hit the through freight last night, the car I jimmied into was loaded with nothing but bottled beer. When we struck the upgrade here, I kicked off two cases and made my getaway. I hid one case under the bushes up there and dragged one down here for my garglin's. We'll send your pal after the other one."

The red-headed man sighed ecstatically and laid down his piece of fish to wait for the beer, the while he casually confided that he was a plumber, receiving in turn the information that his host was a machinist. Both were looking for work, it seemed. The late comer expressed himself as especially anxious about it, but he eagerly watched The Rabbit all the way to the improvised "cellar" and back, and made short work of nipping the cap off his portion of the spoils.

"Can you beat it?" exclaimed the red-headed man with profound satisfaction as he finished his bottle. "Jimmy, drill up the track and get that other case."

"Too heavy," rejoined Jimmy, comfortably stretching out his legs. "I'm willing to do my share of the work, though. I'll go with either one of you and carry my end."

The red-haired man's answer was characteristic. Without a word, he grabbed a chunk of wood from the ground and hurled it at Jimmy's head. Coming so unexpectedly, Jimmy had no time to dodge it, but received it just above the temple with stunning force. The bruised skin was studded with pink perspiration, and from one raw spot a red drop or two trickled down. Surprised and dazed, The Rabbit put his hand to his head. His flash of anger gave way to a flash of terror as his fingers came away stained. The red-haired man made a quick lurch for a stone that lay beside him and The Rabbit sprang to his feet as if animated by an electric shock.

"Sure, I'll go," he said, affecting to treat the incident as a joke, and limped away in a mixed passion of impotent rage and all too potent fear.

Blue Pete laughed unpleasantly.

"You have to do it," he philosophically observed; "that is if you're goin' to learn 'em anything."

The red-haired man glanced suspiciously at him, but gave him no answer beyond a surly grunt. He was in no mood to repose confidences in total strangers, apparently. Blue Pete lifted his eyebrows, and then smiled slightly.

"I'll play you a game of seven-up, drink or smell," he offered, producing a greasy pack of cards, and in this absorbing game, where the winner drank and the loser got but a smell of the bottle, The Rabbit found them when he got back from his hot, dusty trip, dragging the heavy case after him. That accomplished, he was ordered to bring three more bottles and then to lift out the cool ones, empty the fresh case into the bottom of the hole and replace the others on top, all of which he did. Only one lesson had been needed to put him in his place as a lowly bearer of cups among these kings of the cinder highway.

The game of "drink and smell" is peculiar in that it is self-equalizing. The persistent winner is bound, sooner or later, to become either dull and heavy or joyously reckless, whereupon the "luck" invariably changes and the erstwhile loser wins often enough to attain the same beatific condition. In this case, however, Blue Pete seemed to hav unusually wretched luck, winning only often enough to quench what, even in an ordinary man,

would have been a very modest thirst. Even when his opponent began to grow heavy-lidded, he failed to take certain obvious and entirely legitimate advantages—such as turning jacks from the bottom of the pack, for instance—and, before he could get in comfortable possession of drinking privileges, the red-headed man drew out.

"Me for the hay!" he announced, with a glance of drowsy appreciation at the already snoring Rabbit, and, rolling up his coat, he laid his head comfortably upon it. Blue Pete followed suit, but it was plain that the two were extremely distrustful of each other. The red-headed man frequently turned his head in the direction of his host, and once, when sleep had almost overtaken him, he opened his eyes and raised to his elbow with a start. The man with the scar, however, was breathing easily and deeply, his broad chest rising and falling with the regularity of a sleeping child's. Reassured, the watcher lay back, and soon he too was bound in the exhausted sleep that naturally followed his long and arduous journey.

His snore had continued only long enough to assert itself as genuine when Blue Pete cautiously raised his head. He rubbed his eyes and yawned. It had been a desperate battle of will-power for him to keep awake, but he evidently felt that he could not trust his burly guest, for he sat up and watched steadily until he was sure that the man was lost in profond slumber; then, after studying the faces of the red-haired man and The Rabbit for a moment with curious interest, he played solitaire, to keep himself awake, for hour after hour until dusk began to gather, patiently dealing and shuffling again, with a mind sometimes intent on the fifteen dollars he had in his pocket. Men, knights of the same cinder highway, had been killed for less, and their bodies mocked.

At last the sleepers gave signs of waking. Hastily gathering his cards, Blue Pete lay down and closed his eyes, remaining in apparent slumber until after the others had scrambled to their feet. Then he, too, pretended to awaken. Arising, he picked up his coat carelessly, catching it by the bottom. From his inside pocket dropped a small bundle, so loosely wrapped in an old piece of newspaper that the paper came open, disclosing a cake of soap and a small bottle filled with a colorless liquid. The man hastily stooped forward to pick up the articles, but the red-haired man had seen them and he laughed aloud.

"A machinist, eh?" laughed the red-haired man. "What's that to you?" growled the other sulkily, wrapping up the soap and the bottle and thrusting them back into his pocket.

The red-haired man, however, sat down on the ground and slapped his hands on his knees.

"It's no use, Buddie," he said; "I piped you off for a Johnny, anyhow. Oh, you're a metal worker, all right!" And he laughed again, while the Rabbit vaguely grinned and looked knowing.

Continued on page 90

In Answering Advertisements in this Magazine be sure and mention where you saw the advt. Remember we guarantee the reliability of all our advertisers.

The Indian Summer of Dry Valley Johnson

Concluded from last month.

Old Antonia was building a fire in the kitchen stove. Dry Valley stopped at the door and laughed harshly.

"I'm a pretty looking old rhinoceros to be getting stuck on a kid, ain't I, 'Tonia?" said he.

"Not verree good thing," agreed Antonia, sagely, "for too much old man to likee muchacha."

"You bet it ain't, said Dry Valley, grimly. "It's dum foolishness; and, besides, it hurts."

He brought at one armful the regalia of his aberration, the blue tennis suit, shoes, hat, gloves and all, and threw them in a pile at Antonia's feet.

"Give them to your old man," said he, "to hunt antelope in."

Just as the first star presided palely over the twilight Dry Valley got his biggest strawberry book and sat back on the steps to catch the last of the reading light. He thought he saw the figure of some one in the strawberry patch. He laid aside the book, got his whip and hurried forth to see.

It was Panchita. She had slipped through the picket fence and was half-way across the patch. She stopped when she saw him and looked at him without wavering.

A sudden rage—a humiliating flush of unreasoning wrath—came over Dry Valley. For this child he had made himself a motley to the view. He had tried to bribe Time to turn backward for himself; he had—been made a fool of. At last he had seen his folly. There was a gulf between him and youth over which he could not build a bridge, even with yellow gloves to protect his hands. And the sight of his torment coming to pester him with her elfin pranks—coming to plunder his strawberry vines like a mischievous schoolboy—roused all his anger.

"I told you to keep away from here," said Dry Valley. "Go back to your home."

Panchita moved slowly toward him.

Dry Valley cracked his whip.

"Go back home," said Dry Valley, savagely, "and play theatricals some more. You'd make a fine man. You've made a fine one of me."

She came a step nearer, silent, and with that strange, defiant, steady shine in her eyes that had always puzzled him. Now it stirred his wrath.

His whiplash whistled through the air. He saw a red streak suddenly come out through her white dress above her knee where it had struck.

Without flinching, and with the same unchanging dark glow in her eyes, Panchita came steadily toward him through the strawberry vines. Dry Valley's trembling hand released his whip handle. When within a yard of him, Panchita stretched out her arms.

"God, kid" stammered Dry Valley, "do you mean it?——"

But the reasons are versatile; and it may have been Springtime, after all, instead of Indian Summer, that struck Dry Valley Johnson.

"Blue Pete"

Continued from Page 90

"Look here," exclaimed Blue Pete, "I don't know what you're talking about, and I don't stand for no guff, see!"

The red-headed man, however, only laughed the louder, and, reaching into one inside pocket, he drew out a narrow vial containing the same colorless liquid, producing from the other pocket his own cake of soap.

"We're both after the dull thud thing," he laughed; "and I can tell you who you are from that gash on your face. Every paper in the country has made a big spiel about that scar, and if you're Blue Pete you're king of us all."

"Who are you?" demanded Blue Pete, surlily.

"Well," was the reply in affected modesty, through which a justifiable pride struggled for expression, "they call me Chicago Red."

Blue Pete slowly grinned and came over to sit within easy talking distance.

"Is that so?" he queried, with eager interest. "Say, on the level, was it you who croaked Bull Connelly in K. C.? You know I took a plug at him myself once."

"Did I croak him?" boasted Red. "Ask Big Dan at the Headlight saloon, ask Yap Murphy, ask Piggy Williams. Six or seven of 'em saw me turn the trick, but when the inquest came up they was dummies. Yap Murphy didn't even know his own name, and the time Bull Connelly come up behind me I was standing in front of the Headlight talking to Yap himself. Connelly just puts his hand on my shoulder and says: 'Why hello, Red, I want you!'—and with that I wheels with my hand in my pocket and give it to him in the heart, right through the lining of my coat. See that hole?" He turned his coat inside out. "Then I makes my get-away through the alley, hops the street car, slips off under the viaduct where it's good and dark, hikes round and hits a freight train."

The Rabbit had all this time sat in open-mouthed awe. His admiration for Chicago Red had been built upon solid and substantial grounds: his was the hero-worship that is rightfully accorded to those who do great, brave deeds; but the reputation of Blue Pete was far greater than Red's. He added genius to his work, and his daring was insolence itself. The newspapers had been full of his exploits for the past six months,, and his name had become the symbol for all that was desperate. These men, who, with a little bottle of nitroglycerine and a cake of soap, could and did break open the strongest safes, who shot first and asked questions afterward, appealed to The Rabbit as representing all that was heroic in modern life. So far he had been unnoticed, but now Red turned to him with a laugh.

"I must give you a knock-down to my friend, 'Jim the Penman'," he said to Blue Pete. "He done a little fancy writing over in Columbus, an' got away with the kale."

"You on a job now?" inquired Pete.

When writing mention: "Canadian Thresherman and Farmer."

"I don't know," said Red with a frown. "We know where there's a nice fat crib."

"Where is it?" inquired Pete.

"St. Paul."

Pete shook his head doubtfully.

"They're lookin' for me up there.'

"They're lookin' for you every place," argued Red. "They're lookin' for me, too, but I'm takin' a chance. Look here, I'll put you wise. The Goodall Construction Company——"

"I know the plant," said Pete, nodding his head. "I've piped it off myself."

"Well, they pay off to-morrow. Their gang takes the six o'clock train in the morning, and at noon they pay off right on the work to save time. They draw the roll today and keep it in their safe over night. They never keep any guard—just the private police. Fatty Davis is the private watchman on that beat. At one o'clock he rings up and goes to Shag Henry's joint for a lunch. He always gets in a game of pitch after that, and at two o'clock he draws out of the game just long enough to ring up again, and then he hurries back and plays till three. See? Between one and three we've got nothing but the regular cops to look out for, except not to make any noise five minutes each side of two, so we have plenty of time to turn the trick. A fast freight goes past here to-night that lands in St. Paul at about twelve. The minute we hit the yards we separate. Three in a bunch ain't safe. I'll take Jimmy to a hang-out I know about, and wait till one o'clock. Across the street, catacornered from the Goodall plant, there's a big pile of barrels and boxes where Jimmy can keep a look-out. I'll take Jimmy and plant him there. You come around another way and meet me in the alley at ten minutes after one."

"It's a bet," said Pete; "but we'd ought to put Jimmy on the watch and get a little more sleep. Let's have some grub and get it over with. Jimmy, go bring some more beer!"

The Rabbit obeyed with alacrity, and as he walked away Blue Pete jerked his thumb over his shoulder after him.

"There's a price on 'im, ain't there?"

"Not so much. Five hundred. He's a piker," replied Red. "I'm keepin' him on, though, for that. It's like having money in the bank. If I have to keep out or stir or anything, I'll hand him up. I know a bull in St. Paul that'll take him in, keep mum an' hand me my bit."

After the supper had been eaten Blue Pete lay down, and this time he went to sleep with easy confidence. The two others played seven-up and drank more beer until they were tired, but before Red lay down for his strengthening and sobering sleep he thought long and deeply, with now and then a contemplative glance at the sleping desperado. A better plan had occurred to him than the giving of The Rabbit up to up to justice for a paltry five hundred dollars.

"You see that yegg?" he said to The Rabbit by and by. "Well,

When writing mention: "Canadian Thresherman and Farmer."

there's five thousand on his head. If we fall down to-night in this crib, you go tip him off to the bulls and cop that money, then we'll split up. They don't know you."

The younger man looked surprised and ventured a feeble remonstrance.

"Oh, you make me tired," said Red. And with that he stretched himself out.

Jimmy sat down to his lonely vigil, and it was not long until the night got on his nerves. The sharp, strident voices that infest the woods, in hoots and screeches, squeaks and chirps; the strange rustling of leaves and snapping of twigs, the unexpected splashes in the lake, and, over all, the disturbing memories that now flooded upon him, made this lonely spot a nightmare from which he would gladly have awakened. To shut out all these things, he presently buried his head in his knees, but at the end of a quarter of an hour he raised it with a jerk. He had been nearly asleep, and it was his place to watch. Twice more this happened, and then sleep overtook him and Jimmy dreamed a remarkably vivid dream. It seemed that he was trying to jump on a moving freight train, but that he missed his foothold and was hanging on by his hands, his hip bumping along on the ties, while Chicago Red, on the bumpers above him, cursed him most vilely. Both pain and oaths were so realistic that Jimmy awoke—to find Red brutally kicking him and showering a perfect flood of oaths upon him for having gone to sleep. The shriek and rumble of an approaching train were filling the woods and echoing from across the lake.

"Come on, you yap!" cried Red.

There was no time for further parley. The two older men started on ahead, leaving the humiliated Rabbit to scramble after them as best he might.

Though they were out of breath, it was an easy matter to catch the freight near the top of the steep grade, and all three got upon the bumpers between the same two cars. The brakeman came overhead by and by and stopped to parley with them.

"Well, you down there, beat it!" he called to them.

The answer was a chorus of startlingly vicious profanity, and from their voices alone the brakeman knew the class of customers with whom he had to deal. If he went down among them, they were diabolical enough to throw him under the wheels, and when Pete offered him four bits for security he took it, glad enough to keep out of trouble with these old-timers. At the first stop he stowed them in an empty box-car and closed the door.

The two yeggmen sat comfortably down against the side of the car.

"What's the matter with you?" demanded Red, turning suddenly on The Rabbit with an oath.

"Oh, I wish I could die!" wailed The Rabbit.

For a moment Red could find no word explosive enough to express his sentiments. "So you want to die, eh?" he growled at last. "All right, my buck! We don't want

When writing, mention "Canadian Threserman and Farmer."

any Molls in this push." And, suddenly pouncing upon the unfortunate Jimmy, he dragged him to the car door, which he slid open with a jerk.

"Oh, no, no! Please!" begged Jimmy.

Red released him with an ugly laugh which was echoed by Blue Pete as the latter closed the door.

"Got cold feet, kid?" asked Pete. "I don't blame you much. There's nothing in this life, anyhow. If you want a chance to start over and be straight, you can get off at the next stop."

"An' peach on us an' get us pinched!" ejaculated Red.

Blue Pete laughed lightly.

"Make up your mind quick, kid," he said not unkindly.

"Who said he could go?" roughly demanded Red.

"I did," Pete calmly replied. "And now I reckon it's up to who's the best man."

"I'll show you that, too!" cried Red.

But the other was ready for him. It was pitch dark in the car, but the two men could tell by the voices that they were facing each other. Pete, however, had deftly slipped off his coat, and now held it dangling from his arms as a shield. A sharp rip told him that Red had lunged at him with a knife, as he had anticipated, and even as he felt the stroke he hurled forward his whole weight in a swinging blow that, luckily calculated, caught Red on the jaw, hurling him to the floor at the other side of the car. Pete was upon him like a cat and there was the sound of a scuffle that drove The Rabbit into a panic of terror. The engine whistled sharply, there was a running of feet overhead and a sharp setting of brakes. The train began to check up and Jimmy slowly slid the door open.

There was a cry of pain from Red, and then the tense voice of Blue Pete said:

"Drop that knife! Drop it, I say, or I'll strangle you like a dog!"

The knife clattered on the floor and for a moment there was silence, then again came the voice of Blue Pete:

"Now's your chance, kid. Jump if you want to. Jump—or *shut that door!*"

The switch-light of a little station went sailing slowly by, but, now that the crucial moment had come, Jimmy the Rabbitt hesitated. To strike out alone again meant more hardship and dirt, the suspicion and hatred of every man he addressed, the certainty of being eventually caught, the misery of being without money or friends. Why he was starving when Chicago Red had taken him up! On the other hand, if he took this one risk and got through it safely, he could take his share of the money, go away somewhere, embark in a little business, and begin life all over again on an honest basis. Maybe——

There was another struggle in the car, but it was a brief one, ending in a sharp "Huh!" of expelling breath.

"Who's the best man?" inquired the voice of Blue Pete.

No answer. Another brief struggle and groan.

"Who's the best man?"

"You are," finally acknowledged Red between gasps of pain.

"Remember it, then, and let's stick to business," rejoined Pete. "Here's your knife. Say, you Rabbit, jump or shut that door—do you hear?"

The train was going faster and faster, and beyond the switch there was a sheer embankment. The question was thus answered, for to have jumped then would have been suicidal.

"I'll stick," announced The Rabbit, and this time he closed the door himself.

When they drew into the railroad yards of the city Red jumped off first.

"Remember, now, Pete," he cautioned in parting. "In the alley, ten minutes after one, and wait till I come. If I get there first I'll wait."

"I'll be there," said Pete.

He peered out of the door at them as they threaded their way among the box-cars of the yard. When he was within a block of the freight station he alighted himself and strode up the street, alert and wide-eyed, without a trace of the furtiveness that might be expected of one of Blue Pete's wide reputation.

Up the street he saw, advancing toward him, the gleaming brass buttons of a policeman, but, instead of avoiding the officer, he walked directly toward him. He kept in the shadows of the awnings as much as possible, however, and at the first alley-mouth he darted into the darkness until the roundsman, with the street light full upon his face, was just abreast of him. The officer had seen the square-shouldered figure dart back into the shadow, and he peered into the alley way suspiciously. He was somewhat surprised to hear a low and cautious voice call to him:

"Come here, Barney!"

Gripping his club, the policeman turned warily in, and, as he drew near, he flashed his night-light. Suddenly he held out his hand.

"Why, hello, Burton!" he exclaimed. "When did you get in?"

"Just dropped off the freight," replied Blue Pete. "I've got Chicago Red and a forger from Columbus; I didn't get his name, and we'll have to send there for descriptions. Poor kid! He'll be better off, though, to get pinched. Go to your box and call up the chief. Tell him to send you a relief at once. We're to break the safe at the Goodall Construction Company, and I want you in on it, because Red is a dangerous gunman. He shot Connelly in Kansas City, all right. Have plenty of men there as quickly as you can, but get them there quietly. We want our catch with the goods on them this time. And be sure you arrange for my escape better than you did in the last haul."

"All right, Cap'," said the officer, and hurried to the police-station on the corner.

Then detective Burton, who had, by carefully-placed bogus news-items, worked up a reputation, under the alias of Blue Pete, as a desperado second only to Tracy, sauntered away to meet Chicago Red in the alley back of the Goodall Construction Company.

Conducted for the benefit of Dealers, Threshermen and Farmers who have anything to sell or exchange. Three cents a word for each insertion.

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SOUTH AFRICAN SCRIP FOR SALE.—Cash and terms with good acceptable security to farmers in Alberta and Saskatchewan.—Address A. D. MABRY, Saskatoon, Sask.

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Our ten dollar hardy fruit collection is just the thing for those who wish to plant fruits and do not know what varieties to select. Only the very best varieties for this country supplied. BUCHANAN NURSERY CO., St. Charles, Man.—Catalogue free.

ENGINEER wants position on a plowing engine or a stationary for the season of 1910. Have had two years' experience am also a graduate of the Heath School of Engineering. Can furnish references. Chas. McMain, Summerberry, Sask.

WANTED—Position as assistant engineer on ploughing outfit for the coming season. Am experienced in steam ploughing, can do repair work and also handle blacksmith's tools. Can furnish best of references as a fireman and assistant engineer. When writing please give name of engine. G. A. Webster Cailmount, Sask.

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CERTIFIED ENGINEER and Machinist with fifteen years experience wishes position on steam or gasoline plowing engine. Can do own repairing. Apply D. Mark, Manville, Alta.

A COOK and Caker seeks place on big farm, ranch or other place where good board is appreciated. Wages moderate. State wages. Address F. M. Burns, 295 Thompson St., Winnipeg.

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HARDY Ontario Nursery Stock, apples plums, small fruits, hardy roses and ornamentals. Agents wanted immediately on vacant territory. Thos. W. Bowman & Sons Limited, Ridgeville, Ont.

WANTED—Position on steam plowing outfit, firing preferred, experienced. Frank Campbell, Marquette, Man.

WANTED—A job running engine through plowing season. Will take engine on through threshing season if desired. Can do own blacksmithing, flue work on engine a specialty, graduate of Heath School of Traction Engineering, also have papers to operate in Saskatchewan. Address G. Y., Box 3079, Winnipeg.

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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.
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18—CHAPIN CO., Calgary.
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27½—HAMILTON PULVERIZER CO., Winnipeg.
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31—HELGESON, H. T., Winnipeg.
32—HERO IMPLEMENT CO., Winnipeg.
33—INTERNATIONAL HARVESTER CO., Winnipeg, Regina, Calgary, Edmonton, Saskatoon, Brandon.
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Heney Buggies	11
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Munro-McIntosh Buggies and Cutters	11
Reindeer Buggies	21
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CREAM SEPARATORS.

Blue Bell	33
Champion	64
Dairy Maid	33
De Laval	22
Empire	24
Magnet	52
Massey-Harris	39
Melotte	44
National	13
Sharples	59

CULTIVATORS AND STUMP PULLERS.

Climax Stiff Tooth Cultivator	19
Cockshutt Cultivator	19
Deere No. 2 Cultivator	21
Deering Cultivator	33
Elk (2 horse) Cultivator	21
Fleury's Cultivator	21
Frost & Wood Scuffler	19
Hilborn Stump Puller	64
K. A. (2 horse) Cultivator	21
Massey-Harris Corn Cultivator	39
McCormick Cultivator	33
Paris Scuffler	49
Sylvester Cultivator	64
Verity Cultivator	39

DISC AND DRAG HARROWS.

Ajax Drag	21
Bissell Disc	21
Boss Drag	50-62-69
Canadian Moline Boss Drag	11
Canton Disc	33
Case, J. I., Disc and Drag	29
Cyclone Wheel Disc	21
Cockshutt Disc and Drag	19
Cockshutt Lever and Clip	19
Deere Disc and Drag	21
Deere King Boss Drag	21
Deere Steel Boss	21
Deering Disc Harrow	33
Defiance Jr. Disc	62
Economy Disc	11
Emerson Disc and Drag	64
Evans Disc	2
Fleury's Steel Channel Drag	21
Fleury's Clipped Drag	21
Fleury's Disc	21
Fuller & Johnson	61
Grand Detour Drag and Disc	69
Hoosier Wheel Disc	2
International Diamond and Lever	33
Massey-Harris Disc and Drag	39
McCormick Disc	33
Moline Flexible Drag and Lever	11
Paris Disc and Drag	49
Scotch Diamond Drag	19
Superior Wheel Disc	2
Universal Drag	21
Universal Tongue Trucks for Disc Harrows	21
Watson Drag	69
Wilkinson Drag and Disc	61
Windsor Disc	19

FEED AND ENSILAGE CUTTERS AND PULPERS.

Cockshutt Feed Cutter	19
Cockshutt Pulper	19
Fleury's Feed Cutter	21
Geiser Feed Cutter and Grinder	9
Massey-Harris Feed Cutter	39
Paris Feed Cutter	49
Watson's Feed Cutter	69
Watson's Root Pulper	69
Wilkinson's Feed Cutter	61

FEED GRINDERS.

Brandon	6
Challenge	69
Cyclone	9-29
Daisy	9
Diamond	64
Fleury's	21
Goold, Stapley & Muir	19
Manitoba	37
Maple Leaf	44
Ontario	48
Scientific	69
Stover Ideal	15-11
Thoms	49
Vessot	33
Victor	69
Watson's Ideal	69

GARDEN IMPLEMENTS, INCUBATORS AND POULTRY SUPPLIES.

Chatham Incubator	27
Cyphers' Incubator	60
Fountain Air Sprayer	53
Iron Age (Garden Implts)	19-53 and 61
Maxwell	64
Planet Jr. Garden Tools	41-55

GASOLINE ENGINES.

Brandon	6
Caters	7
Fairbanks	10
Fuller & Johnson	61
Gade	9
Gas Traction	26½
Geiser	9
Hart-Parr (Traction)	18-30
Ideal	44
International	33
International (Traction)	33
Ivel (Traction)	62a
Joy McVicker (Traction)	A
Manitoba	37
Master Workman	69
Ohio	9
"Oil Pull" (Rumely) (Traction)	57
Stickney	48
Stover	18-14
Sylvester	63
Waterous	68
Waterloo Boy	51

GRAIN CLEANERS, FANNING MILLS AND PICKLERS.

Acme Pickler	6-21
Beeman Pickler	4
Chatham Fanning Mill	27
Fosston Fanning Mill	21-31
Helgeson's Smut Machine	31
Hero Fanning Mill	32
Hero Pickler	32
Jumbo Grain Cleaner	4
Superior Fanning Mill	29
Webber Grain Cleaner	11
Wonder Fanning Mill	19

HARVESTING MACHINES.

Champion	33
Deering	33
Frost and Wood	19
Massey-Harris	39
Massey-Harris Corn Harvester	39
McCormick	33

HAY LOADERS, HAY PRESSES, HAY TOOLS, MOWERS, RAKES, SWEEP RAKES, HAY STACKERS, ETC.

Bradley Hay Press	43
Buffalo Hay Press	51
Canton Hay Press	33
Champion Hay Rake	33
Champion Mower	33
Champion Side Delivery Rake	25
Dain Hay Loader and Stacker	21
Dain Hay Press	21
Dain Side Delivery Rake	21
Deere Hay Loader	21
Deering Hay Stacker	33
Deering Sweep and Hay Rake	33
Deering Mower	33
Frost & Wood Mower	19
Frost & Wood Champion Hay Tedder	19
Frost & Wood Champion Hay Loader	19
International Hay Stacker	33
International Sweep Rake	33
International Hay Press	33
Jenkins' Sweep Rake	11
Keystone Hay Loader	33
Keystone Side Delivery Rake	33
Louden Hay Tools	34
Massey-Harris Mower	39
Massey-Harris Sweep Rake	39
Massey-Harris Hay Tedder and Loader	39
Massey-Harris Side Delivery Rake	39
McCormick Hay Stacker	33
McCormick Mower	33
McCormick Sweep and Hay Rake	33
Rock Island Hay Loader	62
Success Hay Loader	11
Tiger Steel Rake	19

HORSE POWERS AND JACKS, SAWMILLS, WOOD SAWS AND TREAD POWERS.

Brandon Wood Saws	6
Caters Wood Saws and Jacks	7
Cockshutt Horse Powers	19
Enterprise Saw Mills	18
Fairbank's Wood Saws	10
Fleury's Horse Powers and Jacks	21
Fleury's Wood Saws and Tread Powers	21
Gaar-Scott Saw Mills	26
Geiser Saw Mills and Horse Powers	9
Goold, Shapley & Muir Wood Saws	19
Horse Powers, Tread Powers, Bevel Jacks	78

LAND ROLLERS AND PULVERIZERS.

Canton Land Roller	33
Canton Packer	33
Campbell Sub-Surface Packer	33
Cockshutt Land Roller	19
Cockshutt Pulverizer	19
Wilkinson Land Roller	61
Dale Land Roller	63
Deere Land Roller	21
Fleury's Pulverizer	21
Fulton Sub Surface Packer	62
Hamilton Pulverizer	27½
Hilborn Land Roller	64
Hilborn Pulverizer	64
Moline Paralizer Pulverizer	11
Verity Land Roller	39
Verity Pulverizer	39
Watson's Flexible Pulverizer	69
Watson's Land Roller	69

MANURE SPREADERS.

Clover-Leaf	33
Corn King	33
Great Western	61
Hawkeye	61
Mandt	11
Massey-Harris	39
National	11
Success	21

GANG PLOWS, ETC.

Canton	33
Case, J. I.	29
Case, J. I. Engine Gang	29
Canton Mogul Engine Gang	33
Cockshutt	19
Cockshutt Engine Gang	19
Deere	21
Deere Engine Gang	21
Emerson	64
Emerson Engine Gang	61
Geiser Engine Gang	9
Grand Detour	69
Maw Hancock Disc	61
Moline	11
Moline Engine Gang	11
New Eclipse	61
Paris	49
Railroad Grading and Rooter Plows	58
Rock Island	60
Verity	39
Wilkinson	21

PORTABLE GRAIN ELEVATORS.

Acme	51
Carberry	15
Cyclone	21
Gopher	29
North Star	29
Taggart	9
Wizard	29

POTATO AND BEET MACHINERY.

Aspinwall Potato Planters and Sprayers	19
Aspinwall Sorters and Cutters	19
Canton Potato Diggers and Beet Tools	33
Deere Potato Diggers and Beet Tools	21
Dowden Potato Harvester	21
Egan Potato Sprayer	43
Evans Potato Planter	2
Eureka Potato Planter	21
Hallock Potato Digger	43
Hoover Potato Digger	19
Iron Age Potato Planter	61
Iron Age Potato Digger and Sprayer	61-55
Moline Knocker Potato Digger	11
Splittstoser Sprayer	21

RIDING ATTACHMENTS, HARROW CARTS, WHEELBARROWS AND HAND CARTS.

Cockshutt Wheelbarrow	19
Cockshutt Harrow Cart	19
Deere Harrow Cart	21
Eclipse High Harrow Cart	29
Emerson Harrow Cart	64
Fleury's Wheelbarrow	21
Fuler & Johnson Harrow Cart	61
Kramer Rotary Harrow, Man. 21, Alta. & Sask	64
Naylor Harrow Attachment	29
Paris Wheelbarrow	49
P. & O. Harrow Cart	33
P. & O. Hand Cart	33
Racine Rotary Harrow	29
Success Harrow Cart	11
Verity Wheelbarrow	39
Watson's Wheelbarrow	69
Wilkinson	61

ROAD SCRAPERS AND ROAD MACHINES

Cockshutt Scrapers	19
Good Roads Machinery	68
Indiana Road Machines	64
Russell Elevating Grader	32
Standard Reversible Grader	21
Toronto Pressed Steel Scrapers	61
Sawyer & Massey Reversible Grader	58

SEEDING MACHINES.

Cockshutt	19
Deering	33
Frost & Wood Champion	19
Hoosier	2
Imperial	50
Kentucky	2
Massey-Harris	39
McCormick	33
Monitor	11
Superior	2
Sylvester	63
Tiger	61
Van Brunt	21

THRESHING MACHINERY, SELF-FEEDERS, WIND STACKERS AND ATTACHMENTS.

Advance	1
American-Abell	1
Aultman & Taylor	33
Avery	28
Belle City Thresher	33
Bell, Robt	5
Brandon Feeder	8
Brandon Cornell Engine	6
Buffalo Pitts	33
Cascaden	34
Case, J. I.	17
Dakota Weigher (ask any Thresher Co.)	
Fosston Wind Stacker	31
Gaar-Scott	26
Geiser	9
Goodison	33-68
Hawkeye Feeder	18-51
Hartley Weigher	46-58-67
Minneapolis	1
Monarch Feeder	31
Nichols & Shepard	46
Northwest	47
Parsons' Feeder	18-51
Peoria Weigher	
Perfection Weigher (ask any Thresher Co.)	
Port Huron	A-12
Reeves	54
Rich Feeder	68
Rumely	57
Ruth Feeder	18-51
Sawyer & Massey	58
Sylvester Auto-Thresher	63
Waterloo	67
Waterous	68
Whiteford Justice Measure	65
White, Geo. & Sons	70
Whitewings Feeder	51

THRESHERS' SUPPLIES.

Bailey Supply	3
Canadian Fairbanks	10
Canadian Rubber	13
Crane & Ordway	20
Desmond Stephan	31
H. T. Helgeson	31
Threshers' Supplies carried in Western Canada by all the Thresher Companies.	
Madison-Kipp Lubricators	61
Manzel Oil Pumps	20
Ohio Injector Co.—Ask any Thresher Co	
Parsons Hawkeye Mfg. Co.	51
Penberthy Injectors and Brass Goods Handled by all Leading Jobbers and Thresher Companies.	
Durham Rubber	23
John Stevens	62
Adams' Wagons and Sleighs	19
Winnipeg Rubber	71

WAGONS AND SLEIGHS.

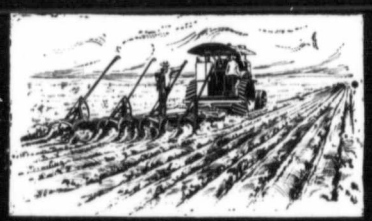
Adams Farm Trucks	19
Anderson Metal Wheel Trucks	64
Avery Wagons and Grain Tanks	28
Bain Wagons and Sleighs	39
Canadian Crescent Wagon	11
Chatham Wagon	27-64
Cockshutt Metal Wheel Trucks	19
Columbus Wagon	73
Davenport Wagon	21
Electric Steel Wheel Trucks	29
Fish Bros. (Racine) Wagons	64
Genuine T. G. Mandt Wagon	11
Grand Detour	69
Gray Light Farm Sleigh	27
Hamilton Wagon	33
Hamburg American Wagon	64-69
Metal Wheel Trucks	21
Milborn Wagon	43
New Deal Wagons and Sleighs	21
New Deal Farm Trucks	21
New Moline Wagon	21
Northern Chief Metal Wheel Trucks	21
Old Dominion Wagons and Sleighs	33
Petrolia Wagons and Sleighs	73
Rushford Wagon	61
Stone and Gravel Spreading Wagon	58
T. G. Mandt Sleighs	11
Weber Wagon	33
Wilkinson Wagons and Sleighs	61
Winona Wagon	61
Woodstock Wagons and Sleighs	19

WELL DRILLING MACHINERY.

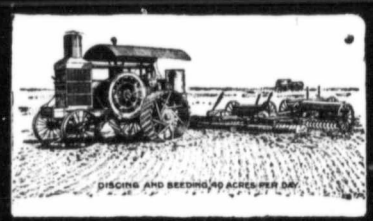
Austin	9
Brandon	6
Kelly & Tannyhill	48
Sparta	10
Standard	48

WINDMILLS, TANKS AND PUMPS.

Caters Pumps	7
Caters Star Windmill	7
Canadian Air Motor	48
Chicago Aermotor	29-7
Florence Pump	44
Gould, Shapley & Muir—Windmill Pumps	19
Hayes Pumps	35
London Pumps	34
Manitoba Pumps and Windmills	—
Manitoba Tanks	37
Myers Pumps	
Ontario Pumps	48
Reiberry Pumps	56



Does It Pay To Own



A Modern Farm Horse?

HART-PARR GAS TRACTOR

ASK THE MAN WHO OWNS ONE

R. J. Cole, Yellow Grass, Sask.:—"In my opinion it pays very well on a farm of a section or more. We spring plowed and got into crop 160 acres that we could not have seeded otherwise; and now have our fall plowing all done, which we could not have done with horse power."

Harold McNally, Regina, Sask.:—"During the summer we broke 1120 acres of heavy clay land at $4.00 per acre and plowed 360 acres at $3.00. Total $5560. Cost of Kerosene, Gasoline, lubricating oil, grease, labor and repairs, $3129. Net earnings $2431."

Fairfield Bros., Gardena, N.D.:—"We can cheerfully say that we are more than satisfied with our investment. We tried to make arrangements with some steam plowing outfit last spring to break 600 acres of turtle-back ground. No one would attempt it, as they claimed the ground was too rough, and no machinery could stand such punishment. We bought one of your gas tractors, and had the work completed in 60 days."

A. Minard, Fannystelle, Man.:—"I think it has paid me well, for the ground was so dry and hard last fall that I could not do anything with my horses."

Geo. O. Goulett, Oriska, N.D.:—"I have broken 500 acres of prairie, cut 500 acres of flax, and plowed 1000 acres of stubble ground this past season, and think that is showing well enough. I intend to buy another one in the spring."

J. T. & Ed. Worrall, Thorne, N.D.:—"We broke about 400 acres of new land, pulling six 14 in. plows; and plowed 600 acres of stubble, pulling eight 14 in. plows. Our average consumption of Kerosene was 50 gallons per day. Our repairs only cost us 55 cents. Our land is quite heavy and rolling."

Swerdfeger Bros., Bowville, Alta.:—"We have been threshing now for five weeks, and have not been laid up a half hour with engine troubles. We also broke 1360 acres in the spring, pulling seven 14 in. breaker bottoms 3½ to 4 inches deep, and much of the land was rocky and heavy gumbo. Our cost for repairs doing this breaking was $1.35."

Milnes & Noble, Claresholm, Alta.:—"We have broken 1000 acres with one engine, summer fallowed about the same with the other, double disced and seeded 2000 acres to fall wheat with the two, and will soon complete another 1000 acres of discing and harrowing for spring wheat. We will then fall plow one section with the two to complete the season's work."

Bowser & Patterson, Nanton, Alta., in 1909 season broke 957 acres of tough heavy sod, on stony ground, plowed 409 acres of stubble with packer and harrow behind plows, double disced and harrowed 541 acres, threshed 77,241 bushels of grain, and are now running a large roller feed mill with this engine.

J. T. Henning, Welling, Alta., in 1909 broke 530 acres sod, did 485 acres stubble plowing, double disced 1000 acres, and threshed 115,000 bushels of grain. A pretty fair record for one season's work.

H. Morrison, Drummond, Mont.:—"It pays to own a Hart-Parr Tractor for different reasons. 1st. One can plow, harrow, seed, and do much other work where great power is necessary for one-third what it would cost to do the same work with horses. 2nd. One can do his farm work at the right time. 3rd. When you are through with your work, you can run your engine into the shed and your feed bill stops."

Frank Webster, Straw, Mont.:—"I bought my engine in the spring of 1908, and that year did $5200 worth of work at a total cost of $1611, besides breaking and seeding 500 acres from which I harvested 13,000 bushels of wheat this year. I pulled into a neighbor's field last June on Monday noon, and left at dark Saturday, and he gave me his check for $1015 for my work that week."

J. R. Smith, Beach, N.D., in the 1909 season, with two Hart-Parr Tractors, broke and crushed 3,000 acres, disced and seeded 2,000 acres to flax, harvested the flax, pulling five binders behind each engine, threshed it with one engine and hauled it to the elevator with the other. He raised 32,000 bushels of flax which he sold for $48,000. His total operating expenses on this 2,000 acre crop were $11,085.

WHAT IT HAS DONE FOR OTHERS IT WILL DO FOR YOU—Remember that the daily feed of this *Modern Farm Horse* is *Kerosene* — and the cheapest grade of kerosene at that. You can buy low-grade kerosene anywhere for 5 to 8c per gallon less than gasoline. One gallon of kerosene produces even more power than a gallon of gasoline. Just consider the daily saving. Remember also that expenses stop when the engine stops. ——— *DON'T DELAY LONGER — WRITE US TO-DAY.*

HART-PARR CO.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MAN.


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Russia, Odessa
Saskatchewan, Regina.
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