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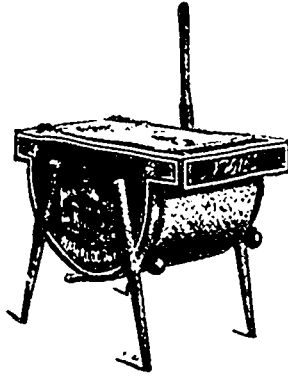
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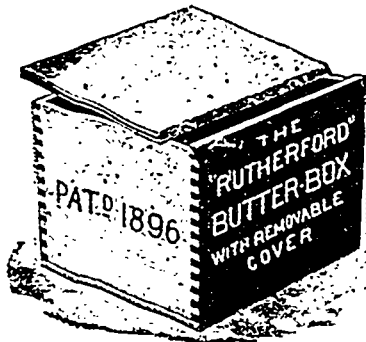
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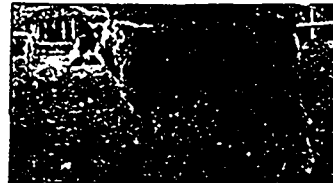
DR. WM. SAUNDERS.

...LEADING TOPICS FOR THE WEEK...

The Dominion Appropriation for Agriculture. The Poultry Industry of Canada. Where do Milk Fats Come From? Selling Stockers in the West. Advantages of Underdraining the Soil. Bacteria and Dairying. Feeding Grain to Lambs. Feeding Grain to Breeding Ewes. Advantages of Early Setting Out. Rearing and Feeding Young Pigs. Market Review and Forecast, etc.

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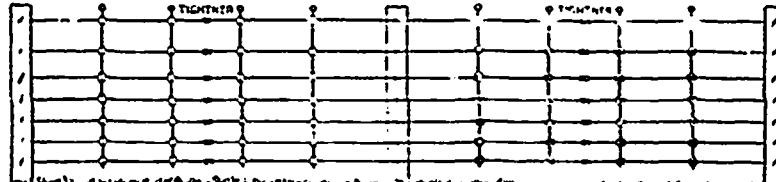


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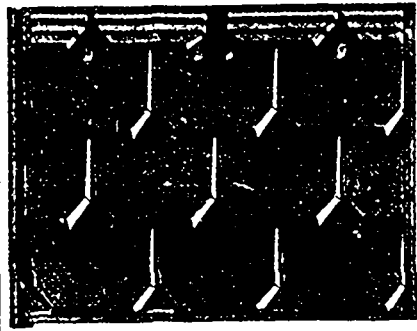


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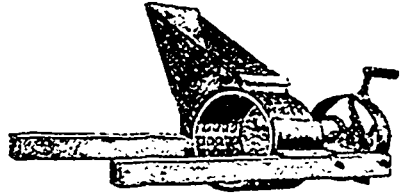
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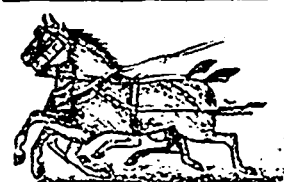
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Lambs; also some good
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Breeder and Importer



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One mile north of Clarendon, on C.P.R.

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Berkshire Sows ready to breed. Boars fit for service. Twenty Plymouth Rock Cockerels, choice.
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OXFORD SHEEP
BRONZE TURKEYS
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Shorthorn Heifers by Statesman, and Berkshires by Baron Lee. Eight weeks old. Also one Baron Lee boar, ten months old.
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A. J. Watson, Castlederg, Ont.

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JAS. P. PHIN, The Grange, Hespeler, Ont., breeding and importing Shropshire Sheep a specialty.

TNO. A. MCGILLIVRAY, O.C. Jerseyville Farm, Uxbridge, Ont., Breeder and Importer of Dorset Horned Sheep, Jersey Cattle, and Tamworth Pigs.

WM. E. WRIGHT, Glanworth, Ont. Breeder of Shropshire Sheep, Chester White Swine, White and Bronze Turkeys.

SWINE.

Large English Berkshires.

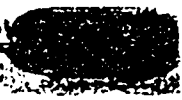
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Choice young boars and sows of fall litters from sires and dams of the best families of imported stock. Orders booked for spring pigs, not akin.
Correspondence invited.
J. J. FERGUSON, Smith's Falls, Ont.



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My herd won 206 prizes, 11 diplomas, and 5 medals since 1888. Choice stock of all ages for sale.
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except a few imported yearling ewes.
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1898 RAM LAMBS
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ONLY ONE BREED KEPT
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Chester Whites and Berkshires.

For a boar or sow of any age, that is right in quality, right in breeding, right in price, and guaranteed to be all right. Address,
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Breeders and Importers of Dorset Horn Sheep and Chester White Swine
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J. H. CHALK, Colton, Ont.

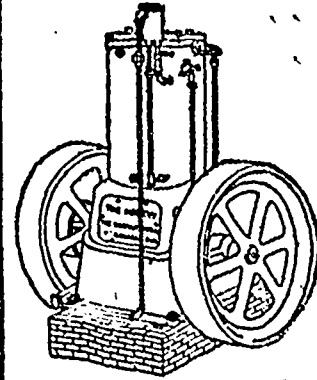
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FARMING

VOL. XV.

APRIL 5TH, 1898.

No. 31.

FARMING

AN ILLUSTRATED WEEKLY JOURNAL DEVOTED TO FARMING AND THE FARMER'S INTERESTS

Published every Tuesday by

THE BRYANT PRESS,

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TOPICS FOR THE WEEK

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Hoar's Dairyman.....	1.00	1.75
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Agricultural News and Comments.

For several years at some of the leading horse shows in the United States there has been considerable dissatisfaction over the judging. *The Rider and Driver* suggests that the exhibitors be allowed to select the judges, and believing the scheme to be practicable has opened its columns to public opinion on the matter by taking a vote of its readers. There may be something in the suggestion and it might be a good way to relieve the management of exhibitions from responsibility in selecting judges.

A special bill has been introduced into the British House of Commons having for its object the regulation of conditions under which dogs can be kept. This law especially regulates the keeping of dogs in towns and cities and gives power to the authorities to seize all dogs not wearing collars. It also provides for the registration of dogs and for forcing the keeping of dogs under control. This should prove a wholesome law. If the law governing the keeping of the same kind of animals in Canada were made more strict there would not be so many sheep "worryings" reported.

Farmers in Great Britain are looking for better prices for their meats this year than last. In 1897 the numerous strikes caused depression but it is hoped that no such contingencies will arise this year. During March the best quality of English beef was bringing 6½ d. per pound. Mutton holds its price better than beef all the year round, but that commodity as well as beef is always more or less affected by slaughtered stock.

Germany has 402 beet-sugar factories; Austria-Hungary, 205; France, 348; Belgium, 111; Holland, 31; Russia, 239; and Sweden, 61. It will thus be seen that in many other countries besides Germany the making of beet sugar is an important

industry. Recently Belgium sent out invitations to the other powers of Europe inviting them to a conference on the subject of the sugar bounties. This conference seems to be hanging fire and may not accomplish anything.

Considerable interest is being taken in the Western States in the growing of Kaffir corn. It was introduced from Africa in the early 80's, and is specially adapted for districts where drouth prevails. The roots are long, reaching to a depth of 18 to 20 inches, and the plant seems to have the power of sustaining itself through long dry spells by a kind of suspended animation, stopping growth during such seasons and beginning again when rains come. It is valuable as a forage plant, and is now known to be valuable as a human food. Kaffir corn meal makes delicious gems and delightful pancakes.

It is generally believed that the domesticated horse has existed from time immemorial—that is the earliest time of which we have any record. Assyrian sculptures, some of which are estimated to date from 4200 B.C., contain more representations of caparisoned horses than even men. Still it is a long time after this before we have any examples of favorite horses. The famous horse, Bucephalus, is as historically real as his master, Alexander the Great. This is the first authentic example of a favorite horse on record. Others are mentioned but they are somewhat legendary.

Pound Butter Prints for the British Market.

The Rural World, of London, England, draws attention, in a recent issue, to the report of the Secretary of Agriculture for the United States, which points out that there are indications that with some effort printed butter and small packages for family trade might be successfully introduced into London. Commenting on this, it says:

"This is a point worth the attention of our Canadian friends. There is no question that our consumers buy, as a rule, in small quantities, and that they would naturally prefer to buy a 1 lb. or ½ lb. roll or print than a 1-lb. or ½-lb. piece of butter dumped down on a piece of paper from a tub or barrel. We should, of course, prefer that the British public should supply this butter to our consumers; but, if anybody outside our shores is to do so, then we prefer our own kith and kin to the agriculturists of the States."

There can be no doubt that there is an opening for a trade with Great Britain in butter put up in prints of a size suitable for the family trade. The United States is evidently giving some attention to the matter, and why should not Canada? We would certainly get the preference over our American neighbors, as the above extract shows. The preference for this trade to be supplied by Canada rather than the United States should touch a responsive chord here. Though we do not go very much on sentiment in trade matters, still it is pleasing to note the growing desire on the part of our kin across the sea to be supplied with food products by the colonies, and especially by our own fair land. Truly Canada's opportunities for improving her trade with the Mother Country were never so great as they are now. If we do not make the best use of them it will be our own fault.

The Dominion Appropriation for Agriculture.

In the estimates brought down by the Hon. Mr. Fielding at Ottawa last week, we notice that the appropriation for Arts, Agriculture and Statistics is reduced from \$357,200.00 for 1897-98, to

\$332,000.00 for 1898-99, a decrease of over \$25,000.00. As the three items are lumped together, we are not prepared to state definitely how much this reduction affects the direct estimate for agriculture. It may be taken for granted, however, that the appropriations for arts and statistics do not vary much from year to year and consequently that the reduction is made largely in the estimates for agriculture.

If this be true, the reduction is to be regretted. Canada's great agricultural resources are just beginning to be recognized abroad and any retrenchment of expenditure that would tend to hinder developing them to the greatest extent possible would be very unfortunate at this stage in our history. What we need for the next ten years is a vigorous and progressive agricultural policy. Agriculture has many and varied branches, and not one of them should be allowed to retrograde in order to save the country a few thousand dollars. The opportunities for developing our export trade in food products with Great Britain were never greater than they are to-day, and it is the duty of the government to take advantage of these opportunities and make the most of them for the Canadian farmer.

There should be no retrenchment in the way of providing adequate cold storage facilities both on board the cars and boat for conveying all perishable food products from the producer to the consumer in Great Britain. Arrangements should be made so that all such products can be sent forward quickly and by the shortest route possible. The very existence of our butter, dressed meat, fruit, and egg industries, depends, upon these being maintained in as efficient a state as possible. Then there should be no retrenchment in the way of educating our farmers to produce not only the kinds and quality of food products required for the British markets but as to the style and size of package in which such products should be sent. There is absolutely no use in endeavoring to develop our export trade in food products unless the producer understands the needs of the markets and the kinds and qualities of products suitable for this trade.

It may be said that the education and training of our agriculturists is a duty that devolves upon the Provincial Government, and we believe that to a very large extent this principle holds good, and should be adopted as far as possible. But the Dominion Government has taken upon itself to do a certain amount of this work, and to this end has established the experimental farm system. The present government, however, may feel that it is not responsible for the acts of its predecessors, and that it is not its duty to pursue an aggressive policy in this particular line. The fact remains, nevertheless, that the experimental farm system is still in existence, and has a record for good, substantial, helpful work in many of its branches, and on the whole has been of great benefit to the agriculturists of the Dominion.

But those who understand the situation thoroughly will agree that there is room for better work in some of its departments. The live stock interests in connection with the experimental farms have never received the attention their importance in the country demands. The stockmen are looking for something being done in their interests, and whether it be a live stock commissioner or a professor of animal husbandry, it is about time that some effort were being made to place the live stock interests at the experimental farms on a proper footing. Then, the beekeepers have asked that the apiary department be placed on a better basis, and in fact, at their last annual convention, passed a resolution recommending a

competent person for the position. Then again, it does seem to be a kind of an anomaly to have a great system of experimental farms existing for the benefit of the farmers of the Dominion without having an agricultural department and a competent and practical agriculturist to look after it. In all three departments, and perhaps in others, there is room for advancement and progress, and the people would uphold the government in increasing, if need be, the expenditure in order to place them on a proper footing.

There is also another side to this whole agricultural question that must not be lost sight of for a moment. The United States at the present time are making a big push to develop their export trade in food products. They have as Secretary of Agriculture a practical agriculturist who is leaving no stone unturned in the way of opening up our markets for American farm products. He has sent agents to nearly every country of Europe where there is a possibility of developing trade to find out and report upon the conditions necessary to establish a market for farm products. Secretary Wilson is indeed a hustler, and almost every day we read of some new feature adopted, or some new steps taken toward securing markets for American products, and our Government or Minister of Agriculture will have to get on a similar hustle, or Canada will go behind in the race for supremacy in the European markets.

Considering every phase of the agricultural problem then, it does seem to be a somewhat suicidal policy to reduce the appropriation for agriculture at this juncture, when there are so many ways in which extra expenditures could be made to advantage. We believe that any expenditure along such lines, as we have indicated, and which have for their object the development of our agricultural resources, and the building up of the trade with the Mother Country, will commend itself to the good judgment and common sense of the people, no matter how large it may appear. It is always better to adopt a vigorous and a progressive policy, especially when the development of the resources of a country is concerned, than to carry on an inactive, unprogressive one for the sake of economy in public expenditure.

The Poultry Industry of Canada

By THOMAS A. DUFF, Toronto, Ont.

(Continued from last week.)

TABLE USE.

For the production of poultry for table use only, I advocate the crossing of pure breeds—a first cross. The condition and tastes of the market where you sell will have much to do with the selection of the varieties to be used. In some markets the demand is for a fowl with a white skin, while in others a yellow skin is wanted. One very important thing to be borne in mind in crossing is to never cross a white-skinned variety with a yellow-skinned variety, but always use a male of the same color of skin as have the females upon which the cross is made. In advocating the crossing of fowls for table use, I may be accused of attempting to injure those who breed fancy fowl, but I submit I am doing the opposite, because two pure-bred varieties must be purchased instead of one.

Why do I advocate the crossing of two pure breeds? For the excellent reason that experiments and observation have proven to my satisfaction that cross-bred fowl mature more rapidly and are ready for the market a month earlier than pure breeds. They have a better constitution and are more vigorous.

The finest lot of dressed poultry I ever saw was to be seen neatly and attractively arranged on tables at the stand of Messrs. G. H. Waller & Son, purveyors of meat, 13 and 15 St. Lawrence market, Toronto. They were bred, fed and dressed by a young man who resides in the county of Peel, and were a credit to his skill as producer, to Messrs. Waller & Son, as vendors and to the province. They were well fattened and neatly and attractively dressed. The heads were

left on, as were the feathers on the upper part of the neck and points of the wings. I spent over an hour in looking at this display. There were in all forty-one pair, made up of pure bred barred Plymouth Rocks, golden and silver Wyandottes, and first crosses of an Indian Game upon the above mentioned breeds. Mr. Waller was kind enough to weigh some of the specimens for me. The heaviest pair weighed sixteen pounds, the lightest eleven and three quarters, and in almost every case the cross-breeds outweighed the pure-breeds, and presented a much better appearance, having much more flesh upon their breasts. The price paid was eleven cents per pound. The entire display was purchased for the Queen's Hotel, Toronto.

Very few dealers understand thoroughly the proper manner of killing, cleaning and shipping poultry, in order to place it upon the market in the most presentable form. A much higher price is always obtainable for a fowl which is neatly and cleanly dressed, and it is much more readily sold than one that presents a dirty or bruised appearance.

All poultry should be thoroughly fattened and kept from feed for at least twenty-four hours previous to killing, as poultry treated in this way will keep longer and present a better appearance in the market. One mode of killing is to hang the fowl up by the legs, take the head in the left hand, open the beak, and with a sharp-pointed, narrow-bladed knife, make an incision at the back of the roof, which divides the vertebrae and causes immediate death. If the bird does not bleed thoroughly, give a cross cut to sever the jugular vein. Poultry must be thoroughly bled, or it will present a reddish appearance. Pick at once, while warm. With a little care the skin does not become torn and ragged, as it does when scalded. Poultry killed and dressed in this way is of better flavor, and will keep longer, than when scalded, and bring a better price in the market. The blood should be washed from the mouth and the head; then hang in a cool place, as all poultry should be thoroughly cooled before packing. I prefer boxes for packing that will hold about 200 pounds; place a layer of clean rye straw in the bottom of the box, then commence packing by bending the head under the fowl, and then lay it in the corner with head against the end of the box, with back up, and continue in this way until layer is filled. Cover each layer with paper before putting the straw on. The paper keeps the dust from settling on the poultry, and adds much to its appearance. Pack as tightly as possible, filling straw well in the sides of the box, and fill the box full, so that the lid has to be pressed on tightly, then the contents cannot move, for if they should become misplaced the skin would be liable to become disfigured. Never sell a bird with its head off, because the public desire to see that the bird was in a healthy state before being killed.

Where Do Milk-Fats Come From?

Last year from April 12th to July 30th the New York Agricultural Experimental Station, of Geneva, N. Y., carried on an elaborate series of experiments treating of the above subject, and has recently issued a popular bulletin in regard to it. The facts brought out by these experiments are so directly opposed to the generally approved theories regarding the formation of fats in milk that they are worthy of particular mention.

There is a common belief that the fat in an animal's body or in the milk comes directly from the food eaten. Chemical tests, however, and microscopic examinations prove that the animal fats are quite different from each other and from the fats in corn, linseed meal and clover hay; yet from a ration containing only these foods the hog will form lard; the steer, tallow; and the cow, butter. This theory of direct transfer of fats was held for a long time even by scientists but is now abandoned by them. Some have held that the milk and body fats are formed by simple chemical transformations of the various food fats; others, that the

carbohydrates, which contain no chemical elements not found in the fats, are chiefly concerned in their formation; and others that the nitrogenous compounds of the food, the proteids, are broken up to form fats, the nitrogen, which protein contains and fat does not, being excreted in the urine. The problem, however, is too complex to be explained by the mere transfer of fat particles, and the solution is not at all easy.

Little as is known about body fats, even less has been known about the sources of milk fat. The experiments along this line have been so short, or the balances in favor of one source or another have been so small, that it has been impossible to say whether the milk fat has come entirely from the fat in the food or in the body of the cow herself, from the carbohydrates in the food, from the protein in the food, or from the breaking down of the protein tissue of the udder.

Considering all these results inconclusive, the New York station decided to carry on an experiment on a more extended scale. In this experiment it was planned to secure the following conditions: (1) Foods nearly free of fats were to be used, so that if milk fat was produced in usual quantity, a large amount must come from the cow's body or from the carbohydrates and protein of the food; (2) the experiment to be continued so long that any large draft upon the fat in the cow's body would show in her condition; (3) the protein in the ration to be varied from a quantity below to one above the actual needs of the animal, in order to discover, if possible, just how little protein metabolism (change by physiological processes) is necessary to maintain a given production of milk fat; (4) such data to be recorded as would enable the experimenter to determine at any time just how much had been gained or lost in weight and how much fat or protein had been consumed by the cow, and how much used by her in formation of body weight and milk, or voided in excreta.

For the first two weeks the cow was given foods containing the normal amounts of fats to determine her behavior under natural conditions. For the next eight days she was fed a ration of the extracted foods similar in amount to that first fed, 10 pounds hay, 6 pounds corn-meal, 5 pounds ground oats, and 1 pound wheat gluten. For the next week one-half pound more daily of wheat gluten was given. Then the gluten was decreased and the corn-meal increased at the rate of one-fourth pound daily, until at the end of five days no gluten was fed, and the corn-meal had been raised to seven and one-half pounds. This was continued for eight days, at the end of which time the amount of each ingredient of the ration was diminished one-third. This was thought to be less than the animal's needs and was continued for twenty days. Then for three days one-fourth pound gluten was added daily, and finally the original ration of extracted foods was fed for thirty-six days.

The cow seemed to keep in perfect health throughout the experiment. There was also a gradual and quite uniform increase in weight, and an apparent laying on of fat throughout the experiment, except during the twenty days of scant feeding when there was no special change. To judge by all outward signs the cow was fatter at the end of the experiment than when the feeding began.

The milk secreted while feeding the extracted foods was similar in composition to that produced from the normal foods. There was a drop in the percentage of milk solids for a few days following the change to the fat-poor foods, but in a very short time the milk became as rich as before. During the ninety-five days 62.9 pounds of milk fat was produced, while the food contained only 5.7 pounds of digestible fat, so that 57.2 pounds of milk fat could not have come from food fats. It was shown in the experiment that this surplus fat could not have come from fat already stored in the cow's body. The cow was lean when the experiment began and apparently gained fat steadily.

In the fifty-nine days during which records of the income and outgo of both fat and nitrogen were kept, 38.8 pounds of fat was found in the milk and it was shown that the protein in the food

would not be sufficient to produce this fat. The highest figures given by any investigator allow 51.4 pounds of fat from 100 pounds of protein; so to form this 38.8 pounds of fat the metabolism of at least 75 pounds of protein would be required. In the urine, however, there was found only nitrogen enough to account for the decomposition of 33.3 pounds of protein or the formation of 17.1 pounds of fat, leaving 21.7 pounds of fat unaccounted for. In this fifty-nine days the digested food fat was only 3.3 pounds and the cow's weight increased 33 pounds without flesh formation as revealed by the disappearance of nitrogen. The fat then could not have been formed from the fat in the food, fat in the body or protein in the food, singly or all united; so part, at least, must have been formed from the carbohydrates of the food.

It is generally held that, to maintain the best results in milk flow, more than two pounds of digestible protein should be fed the cow in connection with a sufficient supply (12½ pounds) of carbohydrates. But the results of this experiment indicate that protein takes no necessary part in providing raw material for the secretion of milk fat. Then why is it necessary? The bulletin throws out the suggestion that its effect is stimulative—that protein excites and assists metabolic changes in other materials rather than enters into them itself. In all the varying changes of the rations fed during this long period, the composition of the milk remained very uniform.

Selling Stockers in the West.

A Word of Warning.

The number of stockers now being shipped out of the province of Manitoba to the United States is becoming alarming indeed. A deputation from the Winnipeg Board of Trade recently waited upon the Hon. Thos. Greenway, Minister of Agriculture for Manitoba, and asked that some action be taken by the Government to prevent the depletion of the Manitoba herds in this way. Mr. Greenway, in response to this appeal, issued a circular, calling attention to the fact that the stock interests of the country were likely to become seriously crippled for some years to come, both along dairy lines and the export of beef cattle, if the shipment of calves, yearlings, and two-year-olds were continued too far. The circular suggests that farmers' clubs, institutes, and other societies meet and talk over the effect these shipments will have and be guided accordingly.

The great scarcity of young cattle throughout the Western States is felt more keenly this season than last, and the American farmers are determined to have them at any cost. Last year a great number of stockers from all parts of Canada went to fill up the fattening stables and ranges of the Western States. The same thing is likely to be repeated again this year. Where is the stock to come from? Where will it come from in 1899 and where in 1900?

The mistake the feeders of the Western States have made is in trusting to buying stockers instead of raising them. Somewhat similar conditions exist in the ranges. But the stockmen now recognize their mistake and are after breeding stock as well as stockers. It is estimated that it will take three, four, or more years to stock up the Western country. The buyers are paying good prices for stockers, and are paying the cash, which goes a long way in making quick sales. It is reported that as high as \$15 apiece has been paid for fair-sized calves. The farmer thinks there is money in letting the calves go at this figure. Many of them believe that there is more money in \$12 for a yearling than in \$25 for a three-year-old, and as they can see no guarantee of better prices in the future, the cattle are sold.

The culling out of stockers made last year was a good thing in many ways, as it got rid of our surplus stock to good advantage, but we would advise farmers to be very careful about doing much culling this year. The demand for young stock will not cease with this year but will continue for another, and perhaps for several years. There-

fore let our farmers profit by the mistakes which our neighbors have made, and not sell the breeding stock, but keep all the best heifers and sell the culls only. Breed the ones you intend to keep to the very best bull obtainable.

The farmers of Canada will sacrifice their own best interests if they sell too closely their young breeding stock at the present time. It will be a case of killing the goose that lays the golden egg.

More Model Farms Wanted.

A deputation recently waited upon the Hon. Mr. Fisher and asked that a model farm be established near Fort William and within view of both lines of railway, so that travellers might see it in passing. The first cost would be \$10,000, and the annual cost thereafter about \$1,000. It was pointed out that the Wabigoon Pioneer Farm of the Ontario Government at Dryden had in two years attracted 500 people to an altogether unknown region. In reply to the deputation Mr. Fisher said he had requests for model farms from no less than eleven constituencies, and must be very careful as to the making of promises. He was, however, somewhat impressed with the arguments advanced. No doubt it would be an inducement to settlers to locate in the district around Fort William if a model or pioneer farm were located there to show what could be done in developing its agricultural resources, but we are somewhat inclined to think that the Government could spend \$10,000 to better advantage. The pioneer farm at Dryden has, without doubt, served to attract numbers of settlers to new Ontario who would not have gone there otherwise, and as the district around Fort William does not vary much from the district around Dryden in regard to condition for carrying on agriculture, another model farm does not appear to be necessary.

Dr. Wm. Saunders.

One of the things we regretted very much when FARMING was changed from a monthly to a weekly publication was that we were not able to carry out our pre-arranged plan of issuing a special edition illustrating the Dominion Experimental Farm System. It was not due to any lack of appreciation of the good work that the farms are doing but that other considerations influenced us in making a change in our plans. It is, therefore, with added pleasure that we present the readers of FARMING this week with a splendid likeness of the able Director of the Experimental Farms, Dr. Wm. Saunders, and the accompanying short sketch of his life and work.

Dr. Saunders was born in Crediton, Devonshire, England, in 1836, and came to Canada with his father's family in 1848, when they settled in London, Ontario. From early boyhood days he has been closely associated with scientific pursuits, which accounts for the fund of practical and wide knowledge of scientific subjects which he possesses. He became a chemist, and conducted a successful business for many years in London, paying special attention to the scientific aspects of his calling. He afterwards became closely associated with every movement for the advancement of his chosen profession. In 1871 he assisted in the organization of the Ontario College of Pharmacy, and was for many years a member of the council of the college. In 1873 he was elected president of the American Pharmaceutical Association. Several of his papers written for this association were republished in English journals and translated and published in Germany. In 1882 he was appointed Dominion public analyst for the western division of Ontario. On the organization of the medical faculty of the Western University of London in 1882 Dr. Saunders was appointed to the chair of materia medica, and on his retirement in 1886, to accept his present position, he was made an Emeritus Professor by the Faculty.

Dr. Saunders began the study of Canadian botany and entomology when quite young and made it one of the special features of his early training. He has contributed many valuable papers on these

subjects and was editor of *The Canadian Entomologist* for many years. He has given special attention to fruit culture, and operated a farm near London for the purpose of experimenting along this particular line. In 1883 he published a volume on "Insects Injurious to Fruits," a work which has had a wide circulation and is still in demand as a guide to American fruit growers.

When the Royal Society of Canada was organized in 1881, Dr. Saunders was selected as one of the original twenty Fellows which formed the biological section of that body. He has long been a Fellow of the American Association for the Advancement of Science and has been an active member of the American Forestry Association since its organization. In 1880 he was selected as one of thirteen by the Ontario Government as a special commission to enquire into the condition of Agriculture in the Province. In 1885 he was requested to undertake the preparation of a fruit display at the Indian and Colonial Exhibition, and was successful in making a display of Canadian fruits which was a revelation to the visiting public at that exposition.

In 1886 when the Experimental Farms were established, Dr. Saunders was appointed Director. Previously he had been commissioned by the Hon. John Carling, then Minister of Agriculture, to visit the American Experimental Stations and to make enquiries regarding experimental work in agriculture in Europe and elsewhere. A report was presented embodying the result of his enquiries by which the government was guided in establishing the Experimental Farm system. Since that time Dr. Saunders' work is well known to every farmer in the Dominion, and it is not necessary for us to elaborate upon it here. Suffice it to say that under his able management the Experimental Farms have become a great educational factor in the agricultural progress of the country, and have done much to help the farmers in every section of the Dominion, and to induce them to adopt better methods of farming. The mass of valuable information distributed each year cannot help but be of immense value to the agriculturists of the Dominion.

NOTES AND IDEAS.

Since the Germans prohibited the importation of fruit from the United States there has been some little stir in England in regard to the matter. The whole question is being carefully investigated by the Agricultural Department of the British House of Commons, and the interests of the fruit-growers will be protected.

Indications point toward a large crop of wheat next season. If so it will be difficult to maintain prices for wheat up to their present standard. The wheat situation is every day developing more and more in favor of the consumer, and unless a war or some other unforeseen event takes place, the holders of large stocks of wheat are likely to lose heavily.

There is a growing sentiment in the United States in favor of the Canadian banking system. One of the features which commends itself most strongly is the system of branches which the Canadian banks have, extending from Nova Scotia to British Columbia. This gives the farmers and others in comparatively isolated quarters banking facilities vastly superior to those of the farmers similarly situated in the United States.

The producer of food products in England seems to be in continual hot water. Recently it has been reported by some scientific men that frozen imported meat had equal nutritive qualities to that which is home fed. This report has aroused the producer of home fed meat, who has relied upon the extra nutritive qualities of the home product over that imported from foreign countries, for the sale of his products. If this lever is taken away from him his chances of competing with foreign meat becomes all the harder.

ADVANTAGES OF UNDERDRAINING THE SOIL.

By A. T. WIANCKO, B.S.A., Sparrow Lake, Ont.

In order to secure the largest possible crop yield that our soil is capable of giving us we should see that it contains a sufficiency of moisture for all plant requirements, but no stagnant or surplus water should be allowed to remain in the soil above a reasonable depth for the development of plant roots. Ordinary field and garden crops cannot grow and thrive in soil that is saturated or filled with water.

By drainage we mean the removal of the surplus water from the soil, either by natural or artificial means. A properly drained soil is one that is moist but not saturated with water. Loose, sandy, or gravelly soils, and those with an open or coarse subsoil, are said to be naturally drained. All heavier soils, and those lying in low places, require artificial means to remove their surplus water, and hence should be underdrained.

Soil is composed of exceedingly small particles of various shapes, which touch each other, leaving various sized small spaces between. By the law of physics, known as surface tension, each particle is covered by a film, or thin layer of water, which it holds to itself over its entire surface. The remaining space is filled with air. Where there is an excess of water the air is excluded—the water taking its place. This should not be, as a soil without air cannot sustain plant life. Where an outlet is provided all surplus water will pass off by gravitation, leaving only the amount held by the particles of the soil, which will not pass off as drainage, but remain to supply the needs of plant growth. The amount of moisture that can be held by surface tension will depend upon the fineness of the soil particles—a fine clay soil will hold more than a coarse sand. The food which plants take through their roots must be in solution, and the water held by surface tension is sufficient for this purpose. All the water in excess of this is unnecessary and injurious, and should be removed by underdrainage.

Many otherwise excellent agricultural lands are unproductive or do not produce all that might be expected, because they contain too much water. Whether this excess of water comes directly from the rainfall or from soaking of adjoining lands, it must be removed by artificial drainage before such lands can be productive to their full capacity. Undoubtedly there are many soils that are not absolutely in need of underdraining, but unless these are of a very open texture they would, nevertheless, benefit in many ways by being so treated.

The main advantage of underdraining lies, of course, in the removal of all surplus water that may find its way into the soil. Aside from this a great many advantages are derived from the fact that in removing the water it is first passed down through the soil. Rainwater, being of a higher temperature than the soil, thus imparts its warmth to the soil, which is no small consideration in hastening the germination of seeds and making all plant growth more rapid. In a well drained soil the frost comes out earlier in the spring, and the land dries up much more rapidly and is fit for cultivation

much earlier, thus lengthening the season of growth, which is an important point in our northern climate. Underdrained lands are often too wet for planting until the proper time for such planting is past. We can thus see that good drainage may in many cases make a difference of several weeks time. In order that growth may proceed rapidly the soil must be warm. A wet soil is always cold, as its natural warmth goes towards evaporating the excessive water. In passing the water through the soil the surface is left entire; the fine, rich particles are not washed away as is the case where the water flows over the surface. Water in passing through the soil carries down with it, and incorporates more closely with the soil, any fertilizing material that may be deposited on its surface, thereby bringing it within easier reach of the roots. Rainwater in falling through the air carries down with it considerable of fertilizing material which the soil filters out and retains, leaving the water to flow off clear. Water in percolating through the soil makes it more open and porous. This is especially advantageous in heavy clays, so that plants can penetrate to a greater depth and spread through a greater extent, thus providing themselves with better facilities for gathering food and moisture.

In periods of drought the danger of insufficient moisture is materially lessened as the power of the soil to absorb rain and dew is increased through better capillary movement, thus spreading through the soil what moisture may be available. If water is flowing through the drains from a better watered section it may be drawn out by capillary attraction where needed. This process of capillary attraction is well illustrated in the passage of oil through the wick of a lamp. We can see, too, that in periods of drought water may thus be drawn toward the surface from a considerable depth. A soil that is usually water-soaked, when it does dry out will bake and crack open, and dry out much more thoroughly; while a well underdrained soil can never bake, and under similar circumstances will always be found moist because, being porous, there is a continuous supply of moisture coming up from underneath to replace that which is being evaporated by the heat of the sun.

It is very interesting and often surprising to notice the increased crop yield derived from a field after it is well underdrained. In many cases the yield will be doubled, and the expense of underdraining more than repaid by the increase in the crop of a single season.

In conclusion I would say to those contemplating underdrainage, that it is of the utmost importance that the drains be well laid out and the whole of the work carefully and thoroughly done, for on this alone will depend the durability and future utility of the drains. A man who has not himself had sufficient experience would do well to employ a careful and experienced workman to superintend the job, or else consult a good book on the subject.

The hog will turn money faster for the farmer than any other animal, and, perhaps, than any other thing he can put his hand to.

BACTERIA AND DAIRYING.

Part of an address by Dr. CONNELL at the Butter and Cheese Convention, London, Ont., Jan., 1898.

There are classes of bacteria which find in milk and milk products their natural habitat, and which bring about many changes, which we are accustomed to look upon as natural, such as acid production, souring, curdling and the like. But besides this class of changes we will at times find certain others which we do not so look upon as natural (though in reality as natural as the first set), such as bad flavors, bitterness, curdling without souring, the coloration of milk or cheese and such like. Now the vast majority of such changes are brought about by bacteria, and though usually the souring organisms get in and obtain the upper hand, yet in the case of the changes which we look on as unnatural, we but have some other species getting the upper hand and outmultiplying the others. If we could keep milk free from micro-organisms we could keep it sweet indefinitely. But we cannot obtain such milk in the ordinary process of milking, for bacteria are found in the milk ducts of the udder, on the teats and udder, the sides of the cow, the milker's hands and in stable dust. It is fortunate that the bacteria which bring about the desirable changes in milk, butter and cheese are widespread and are, in the great majority of cases, able to bring about the desired changes. They live in milk and milk products and will naturally be found in greatest numbers near their food. I have been told that in our Northwest, when a dairy is started in a new section, the milk often keeps sweet from three days to a week in weather that would here cause milk to sour inside of 24 hours; later on, however, their milk sours just as rapidly as ours. With the great multiplication of dairies there has been a corresponding increase in the numbers and distribution of the bacteria that live in milk. But with the increase in the number of dairies it has become, if anything, more difficult to produce a uniform grade of butter and cheese. For with the increase of the desirable forms of bacteria there has been an increase of undesirable forms as well. These forms have their opportunities, growth and multiplication in the whey tank and gutters in the drains, in uncleansed milk cans and milk utensils, in uncleansed floors and in what we call filth everywhere. Undesirable bacteria which are so apt to be found in offensive whey tanks and in uncleansed gutters may obtain entry to the factory and seed the milk in two ways. First by coming in contact with the dairy utensils either directly or in the form of dust by drying up and blowing about, or secondly, by being taken home in the milk cans in the whey or skim milk, and if these are not thoroughly cleansed then the bacteria left behind multiply in the fresh milk placed in the cans. One patron can in this way seed the entire supply. Often both methods are at work. In a factory in Leeds county the cheese were found to show some ten days after being made very numerous reddish spots. I was asked to look into the matter and found that the gutters leading from the factory were filled with a slimy reddish growth, a vast culture mass of bacteria. The edges

of the growth faded off into the surrounding dust to be blown about. I found nothing in the milk sent to the factory to account for the coloration, but here in the gutter was cause enough. The factories and gutters were carefully and repeatedly cleansed with the result that the spots entirely disappeared. I should have said that I recovered from the spots and the cheese and the slimy growth in the gutters, identical bacilli, which I think proved the gutter to have been the cause of infection.

Now to illustrate infection through whey tanks, I will cite you a case occurring in Glengarry county last summer. Here they had slimy or stringy whey, and Mr. Ruddick was asked to look into the matter. The trouble was intermittent in character, appearing for a few days and then disappearing for a week. He sent me samples of the cheese, of the slimy whey and of the whey in the storage tank. I found in all more particularly in the wheys vast numbers of a large bacillus which I have since proved capable of producing both slimy milk and whey. Of course I have not here excluded infection directly from stables, etc., but I think the fact of the intermittent character of the trouble is an important factor in believing the whey tank a great agent in keeping the trouble alive.

Another source of contamination and a most marked one in so far as my experience with the milk furnished the Kingston Dairy School this past two years is concerned, is by a certain series of micro-organisms always found in the offal of animals and hence in stable and road dust, etc. These micro-organisms are known as the colon group of bacilli. The most common means of contamination is by particles of manure falling directly into the milk pail from the udder or sides of the cow. These particles are often large enough to be visible as can readily be seen by examining the milk cans. Besides this direct means of infection with this group of gas-forming bacteria, stable dust and road dust, both of which are loaded with minute particles of excreta, are sources of contamination. Direct infection plays the most important part in winter dairying, while dust is the most acute agent in the summer months. Now I have time and again proved the relationships between the varieties of colon bacilli and pin hole floating curds and many foul smelling milks. One of the best marked cases I have seen occurred in February last at the Kingston Dairy School. The curd for a few days was very foul, and on examining the milk samples, one particularly foul sample was found. This patron's milk was made up separately and gave a floating, foul curd. I readily separated from the milk the various curds and the cheese a colon bacilli in vast numbers and on introducing these into fresh milk we could get a floating curd with the typical odor. Another feature about this cheese made from this patron's milk was that the cheese did not cure. I have found other organisms than the colon varieties in cases of bad flavored cheese. In several cases these bacteria belong to the micro-organisms of putrefaction.

This leads me to speak of another matter, viz.: The effect of the temper-

ature at which curing is carried on upon the bacteria which are in the curd. Believing as I do that bacteria are the acute agents in the curing of cheese, as well as in the production of most flavors, temperature has then an important bearing on the flavoring of cheese. The curing of cheese goes on well at temperatures ranging from 65 to 70 degrees, and, indeed, very often at higher temperatures. But when we have higher temperatures the gas forming organisms and filth organisms present can outmultiply the lactic and other groups, getting the upper hand and preventing proper curing.

This certainly happened in the case I have cited as occurring in the Dairy School last winter. In consequence of this higher temperature and the pre dominance of the filth organisms we may find variable conditions such as gassy cheese—heaving and cracking—foul flavors, softened areas or a poorly cured cheese. High temperature then forces the growth of filth organisms to a greater extent than it does the other bacteria in cheese and thus they obtain the upper hand in many cases with bad consequences. Cure cheese then at a temperature below 77 degrees anyway.

PURE WATER FOR FARMERS AND DAIRYMEN.

An address by FRANK T. SHUTT, M.A., chemist of the Dominion Experimental Farms, at the Convention of Butter and Cheese Association of Western Ontario, at London, Ontario.

Your directors, in inviting me to this convention, have asked me to address you this afternoon on the subject of a pure water supply for the farmer and dairyman, and I am very pleased to avail myself of the opportunity to speak to you on what appears to me, from an experience of many years, as a matter of great and, indeed, vital importance.

We have, as an agricultural people, been paying considerable attention of late years to improving our methods of farming, with the endeavor to make our business more profitable. We have, I may say, acquired a considerable amount of knowledge concerning these principles which underlie and teach us what good farming is—the manuring and tillage of land, the composition and relative values of feeding stuffs, the requirements of plants and animals. We have not, however, as yet awakened to a realization of the importance to ourselves, our farm animals and for use in the dairy, of using water free from pollution.

Now, I am by no means an alarmist. I speak only of that I know. The analyses of hundreds of samples of well waters from Canadian farm homesteads convince me that the evil of contaminated water is a lamentably common and widespread one. Not that I am making any wholesale condemnation of farm wells, but this I do say, that over fifty per cent. of the samples sent to our laboratories for examination have been pronounced as dangerous or suspicious.

Let me at the outset say that there is no necessity for this state of affairs. The natural waters of Canada as found in lake and stream and spring are of the purest. They are unsurpassed in the world for quality and wholesomeness. We have ample data on this point. How then does it come about that such a large number of wells in

rural parts are seriously polluted? What is the nature of the contamination?

Briefly, it follows from the altogether too common practice of sinking the well, looking only to convenience, in the neighborhood of some source of pollution, as, for instance, in the barn yard, in the stable, or one or other of the farm buildings, or it may be situated dangerously near the pig pen or the privy. Near the back door where the household slops are thrown out is another favorite place, and I may add we scarcely ever find any precautionary measures, such as a drainage system to prevent this back-door slop water from soaking into the ground.

What is the result of all this? It is that a large proportion of liquid manure, excrementitious and waste matter finds its way into the well. Indeed, I have repeatedly found the well to be acting as a cesspit, and its water really to be a liquid fertilizer, so charged with manurial matter. This, then, is the form of pollution we have to guard against.

We may now enquire as to the danger that exists in drinking water charged with this polluting matter. First, there can be no doubt but what water containing drainage from the barnyard or privy acts as a direct poison upon the system.

The action may be slow, it may be, and usually is, insidious, unnoticeable, but there is no doubt in the minds of sanitarians who have studied this question but that such matter is the frequent cause of diarrhoea and indigestion, of sick-headache, and a general lowering of the vigor and tone of the system—making its victim susceptible to "catch" any disease there may be about. In other words, it may, and frequently does, undermine the constitution. But, further, water so contaminated offers all the most favorable conditions for the development of disease germs once they gain an entrance to the well—and they frequently do gain an entrance by the drainage of the privy containing the dejecta of patients suffering from infectious diseases. This is the way, the most common way at least, in which typhoid fever spreads. I could cite any number of authenticated cases where the spread of typhoid has been directly traced to such a polluted water supply. I am firmly of the belief that in this healthy climate of ours many a life has been sacrificed by the use of polluted water. I might say a great deal more regarding the evil effects upon health of impure water, but I do not wish to unduly dwell upon this phase of the question. Be assured, however, and I say it with all emphasis, that many an outbreak of fever in the country parts, in villages and upon farms, and much impaired health is directly due to the use of bad water. Sooner or later the result comes, it is inevitable. We may not recognize the cause, for it may not come upon us suddenly, but examination shows only too conclusively where the trouble has originated.

Now, what is bad for man is bad for beast, and especially so for dairy cows.

Pure, wholesome milk can only be obtained from animals in good health. Is there anyone who can gainsay the statement that good health and impure water do not go together? Whatever affects the system of cows must affect the milk, for milk is from the blood, and the blood is largely from the water the cow drinks. Lack of thrift in animals is, I believe, often a common result of an impure water supply. It is no use in this connection urging the argument that the cows like the water. Cows should not be allowed, as they often are, to drink of the pools of black, stagnant water that have gathered from the manure pile.

Another word in this connection. I have more than once been able to trace an off flavor in cheese soon after making, to bad water. Whether this has been through the cow or by washing the cans with polluted water I am not always prepared to say, but this I will say, and say most emphatically, that impure water should not on any account be allowed in the making of cheese or butter, nor in the cleansing of dairy utensils. It is no use preaching and practising what is commonly termed cleanliness so long as the water contains pernicious and polluting material. Last summer I was able to

trace the cause at factories of bad flavored cheese directly to impure water in three instances, and no doubt there were other factories having trouble in this respect that did not apply to me for help.

In conclusion I would give some advice, based on a large knowledge of the subject.

1. Do not judge of the quality of a water by its appearance only. Many a clear, brilliant, sparkling water has been found to be reeking in filth. Of course, any water that is offensive either to taste, smell or sight should not be used.

2. Tests of a popular character, such as one often sees accounts of in the newspapers, are valueless. All farmers and dairymen who have reason to suspect their water supply should place themselves in communication with the Chemical Department of the Experimental Farms at Ottawa.

3. Never sink a well in the barnyard or under a farm building containing animals. See that the well is at a safe distance from all possible source of contamination.

4. Keep surface water out by lining the well to the ground water line with brick or stone work, laid in cement.

5. Protect the well by a top project-



THE VILLAGE BLACKSMITH.

By H. W. LONGFELLOW.

Under a spreading chestnut tree
The village smithy stands;
The smith, a mighty man is he,
With large and sinewy hands;
And the muscles of his brawny arms
Are strong as iron bands.

His hair is crisp, and black, and long,
His face is like the tan;
His brow is wet with honest sweat,
He earns what'er he can,
And looks the whole world in the face,
For he owes not any man.

Week in, week out, from morn till night,
You can hear his bellows blow;
You can hear him swing his heavy sledge,
With measured beat and slow,
Like a sexton ringing the village bell
When the evening sun is low.

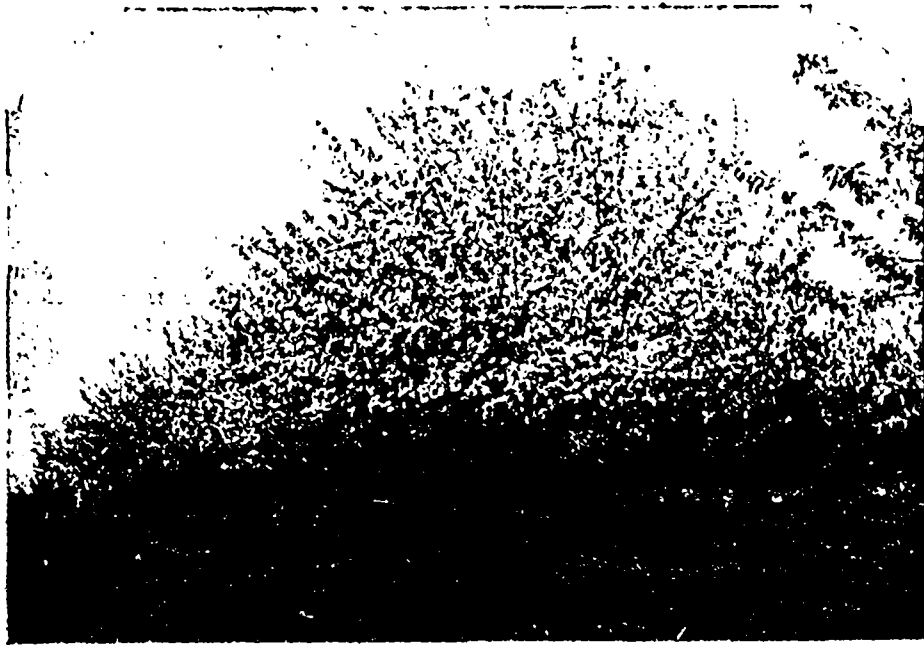
And children coming home from school
Look in at the open door;
They love to see the flaming forge,
And hear the bellows roar,
And catch the burning sparks that fly
Like chaff from the threshing-floor.

He goes on Sunday to the church
And sits among the boys;
He hears the parson pray and preach,
He hears his daughter's voice
Singing in the village choir,
And it makes his heart rejoice.

It sounds to him like her mother's voice,
Singing in Paradise;
He needs must think of her once more,
How in the grave she lies;
And with his hard, rough hand he wipes
A tear out of his eyes.

Toiling—rejoicing—sorrowing,
Onward through life he goes;
Each morning sees some task begun,
Each evening sees it close;
Something attempted, something done,
Has earned a night's repose.

Thanks, thanks to thee, my worthy friend,
For the lesson thou hast taught;
Thus at the flaming forge of life
Our fortunes must be wrought;
Thus on its sounding anvil shaped
Each burning deed and thought.



A Canadian Apple Orchard Tree In Bloom.

View of the Apple Orchard of Mr. A. M. Smith, St. Catharines, Ont., proprietor of the Dominion Nurseries.

ing somewhat above the level of the ground.

6. Thoroughly examine and clean out the well from time to time, frogs, mice, etc., frequently find therein a watery grave.

7. Don't throw garbage, household slops and the like near the well, the proper place for such is the compost heap.

8. Keep the barnyard clean, and in this connection I cannot do better than emphasize the value of air-dried muck as an absorbent.

9. Don't use the well as cold storage for milk, meat, etc. An accident would contaminate the water. Every farmer producing milk should have an ice house and proper accommodation in which to keep the dairy products cool.

10. Never wash the dairy utensils at the well, for such a practice is sure to pollute the water.

WHY ORCHARDS ARE FAILING.

By CHARLES W. BURNETT, Ohio State University

Experience is one of the most potent factors in our development. It brings facts and causes to our view better than possibly anything else. This point is well illustrated in my mind by an illustration of practical value. An orchard on my father's farm, and not an old orchard either, seemed to be failing, and produced but little merchantable fruit. There was something wrong. This failure or partial failure was not due to insects or lack of care in the usual sense. It never occurred to us that perhaps there was a lacking of fertility in the soil. At the same time, we were growing wheat, adding manure and even commercial fertilizers to get a maximum crop. We had used every method in the development of the field crops, but perfectly neglected the orchard. Not intentionally either, but because we thought that it was not necessary, and that an orchard had an easy time of it anyway.

But soon after I went to college, I studied plant growth, chemistry, etc. My eyes were soon opened. I soon realized that the depletion of the land by the fruit trees is more serious than by annual crops, from this fact: plant

foods are locked up for many years in the trunks and branches of the trees, while a large part of the fertilizing elements in the common crops is returned to the soil each year. Besides, the fruit taken off removes plant food that is seldom if ever returned.

It has been estimated that an acre of apples during the bearing season will remove about 49 lbs. of nitrogen, 38 lbs. of phosphoric acid, and 72 lbs. of potash, the value of which would be \$12, at the average prices paid for fertilizing material furnishing these ingredients on the market. Is it any wonder, then, that orchards are failing? Taking from the soil that amount of plant food each year, it is only natural that the time soon comes when one gets but a partial crop. In ten years the amount of plant food removed from the soil will amount to \$120. Now, for the orchard land to be kept in perfect bearing condition these fertilizing elements must be returned in some form.

We know the value of clover, cow peas, vetches, crimson clover, etc., in adding nitrogen to the soil. Fruit trees require humus. Plow up the orchard and sow clover, then keep the orchard clean and clear of weeds and insects. Humus is added, and at the same time an abundance of nitrogen is supplied to the soil for the use of the trees. It remains then only to use phosphoric acid and potash, which can be readily obtained in the form of acid phosphate and muriate of potash; an average dose of these would be about 300 lbs. of the former, and 200 lbs. of the latter. It would be better to apply the potash and phosphate before the clover is sown, as they will assist in making a full crop of clover, which means the absorption of larger quantities of nitrogen, and the whole mass turned under will improve both the physical and chemical condition of the soil.

COMPOSITE MILK TESTING.

By L. A. ZUPPELT, Instructor in Milk Testing, Kingston Dairy School.

That the present system of pooling milk for cheese factories is unjust few will dispute, and a growing demand is manifest throughout the country for some other and better way of determin-

ing the value of milk than by its weight alone. That the Babcock test forms the basis of the true value of milk, whether we use the fat alone or make allowance for the other constituents, I think all are agreed. One reason, and to my mind the main one, why this system is not more generally adopted is, not so much a question of its correctness, but to the want of confidence on the part of the patrons in the ability of the cheesemaker to properly conduct the test.

The object of this paper is, therefore, not so much to discuss the relative values of the different systems, but rather to give some information as to the best way to conduct the test commonly known as the "composite test."

The person who is to conduct the test must make up his mind to be accurate. It will never do to take anything for granted, or to guess at results. He must conduct his work in such a way that when it is completed he can say with certainty that it is correct. A glass jar holding from 8 to 16 ozs., with a large neck, should be provided for each patron, properly labelled with the name or number so as to be easily distinguished. In order to preserve the samples, add from 5 to 10 grs of bichromate of potash to each jar the first morning. This amount will be quite sufficient to preserve them for one or two weeks. Great care should be observed in taking the samples of milk from the weigh can, and to see that the milk is well stirred up and a fair representative sample taken each morning. The best utensil to use is, I think, a small dipper which holds about one ounce, having a handle sufficiently long to reach to the bottom of the can. Some prefer using what is called a "milk thief," but for all practical purposes the small dipper will be found to be quite as accurate and much more convenient. Each morning, after adding a fresh sample of milk, the jar should be gently shaken by a rotary motion, to wash down any cream which may adhere to the sides. Avoid churning them up and down, as this causes a separation of the fat and makes it very difficult to obtain correct results. After the milk is all received for the morning, place the jars in as cool a place as the factory affords. In testing, shake each jar separately before taking the sample with the pipette, and if the cream has become hard or slightly churned, place them in a warm water bath until the cream becomes liquefied, but after the samples are placed in the Babcock bottles they should be cooled again, otherwise the acid will burn the fat and destroy the test. Be sure you get the cream and milk well mixed before sampling for the Babcock; otherwise the result will not be correct. Use about the same amount of acid as in testing ordinary milk, but the bottles require to be shaken a little longer, and also to be revolved in the machine at least five minutes before adding the hot water. If the test is made every one or two weeks, credit the patrons with

the number of pounds of milk sent for that time, with the percentage of fat found in each. Then it is a very simple matter to calculate the number of pounds of fat contained in each patron's milk, and this amount forms the basis of payment.

The advantages of this system are many. A very marked improvement will take place in the quality of the milk sent to the factory. It will do away with any desire which some may have for tampering with the milk in the hope of increasing their revenue. The effect on the cheesemaker will also be beneficial, as the factorymen will insist on having intelligent men who can not only carry on the test with accuracy, but manufacture the milk received into a first-class article. The day is fast approaching when any and everybody will not be allowed to hold an important position where a slight mistake or a neglect of duty will mean a loss of hundreds of dollars to the farmers. The cheesemakers of the future must be men, educated for their calling; men who have brains and are able to keep abreast of the age in which they live.

THE FARMER AND THE EXPERIMENT STATION.

By F. C. SZARAS, Director Nova Scotia School of Horticulture.

There seems to be a wrong conception, on the part of many farmers, as to what constitutes the legitimate work of the experiment station. Not long since the writer heard a prominent fruit grower criticizing the management of the Central Experimental Farm, because the methods used there were not such as, in his opinion, would prove profitable to the ordinary farmer. And this same kind of criticism is often heard, and that too from men who ought to understand better the object of experimental work. It is not supposed that experiment station officers will follow the old ruts in farm and orchard practices, those which have been found profitable to the ordinary farmer, nor is it desirable that they should. Indeed the stations are created for the express purpose of doing just the reverse, of testing new grains and fruits and of planning new rotations and new methods of tillage; then by careful investigations, carried on for a series of years, of determining the value of these to the general farmer.

And the stations are of value to the farmer because they do what he himself is prevented from doing both by lack of means and in many cases by lack of training. The station officer is, or should be, a trained specialist, who brings to his work a knowledge of what has been accomplished in his chosen field and of the methods by which this was attained. He is therefore better able to plan further investigations, to take observations and to draw conclusions from the results. And his investigations are the more likely to be properly carried out and his results the more likely to be conclusive, because he is not hampered in his work by the question of whether the yield from his land will pay in dollars and cents.

Of course every farmer can and must experiment for himself in certain lines. He must study his own soil and adapt the general principles laid down by the station officers to his individual

conditions. This is peculiarly true in the matter of varieties, especially of some fruits. Take the strawberry as an example. It is greatly affected by the kind of soil on which it is grown, and a variety which does well on one farm may be a complete failure on the very next farm. Under these circumstances each man must determine for himself whether a given variety will be a success with him or not. But on the other hand, in such matters as spraying, the materials to use and the best method of application, the work of the experimenter is conclusive for all growers. And it is in such fields that the station may be most useful to farmers, for such work requires much time, expensive apparatus, and careful observation, if the result is to be conclusive.

Let us suppose, for illustration, that it is desired to determine the distance at which corn should be planted in the row, to be most profitable. The investigator lays out a number of plots and plants the corn by hand at exact distances, and after a number of years he determines that one foot apart in the row, we will suppose, is most profitable. Now, the farmer, in taking advantage of this result, is not supposed to follow the methods of the investigator, which may have been costly, probably were, but with the tools at his command he secures, as nearly as possible, the distance advised by the investigator.

This is merely an illustration, yet the principle involved will hold good in all cases. The experimenter first determines, by the most careful and exact methods, what system is best, and the farmer must then attain as nearly as possible to this ideal.

EXPERIMENTS IN SHEEP FEEDING AT THE O.A.C., GUELPH.

By G. E. DAY, Agriculturist.

In a comparison of red clover hay with first crop alfalfa and third crop alfalfa, the third crop alfalfa gave better results than either of the other two kinds of hay, while the first crop alfalfa and red clover gave practically the same results.

In a comparison of corn with peas, the corn gave the most rapid and economical gains. The corn and peas were mixed with an equal weight of oats. The peas and oats gave an average weekly gain of 2.10 lbs., and required 5.14 lbs. meal for a pound of gain. The corn and oats gave an average weekly gain of 2.29 lbs., and required 4.72 lbs. of meal for a pound of gain.

This is only a single experiment, however, and requires further investigation.

ADVANTAGES OF EARLY SETTING-OUT.

THE CONDITION OF THE BROOD CHAMBER IN EARLY SPRING.

Those who are known as our most advanced and progressive beekeepers (and many of the more conservative) have advocated leaving the brood chamber of the hive undisturbed during the cold and changeable weather of spring, even to leaving untouched the sealed quilts sewn on the hives to prevent as far as possible the escape of the warm air.

With great reluctance we decided, during the past spring, to make a series of extensive experiments as to the effect certain conditions would have upon the amount of brood reared in the hive. The first bees were set out on the eleventh of March, and the remainder at varying intervals during the next three weeks. The results from the various settings out showed a very marked difference—so much of a difference, in fact, that in almost every case, after examining the brood chamber, we could tell the date of setting out. Upon examination of the colonies when first placed on their summer stands, brood was found in only one or two hives, and these showed indications of imperfect wintering. The inspection at that time went to show that in healthy cellar wintering there is no brood rearing. The day the bees were set out they had an exciting and cleansing fly, after which the queen began to deposit eggs, and kept this up for a day or two, unless followed by weather suitable for flying. During the past spring, owing either to continuous low temperature or wet weather, the bees were confined for as long as a week at a time. The different stages of brood in the hive, upon inspection, gave in-

dication just when the bees were ready to fly, the stimulus from flight, aided probably by the increased temperature, having a marked effect. Some colonies were fed diluted honey by means of a feeder above the brood chamber; the results were very beneficial, and the brood chamber under this condition was enlarged by the bees. Great care, however, should be taken not to overestimate the value of one season's work.

The spring of 1897 was exceptional; the weather was too wet and cold to allow the bees to fly, and yet not cold enough to make it likely that the brood would chill in the hive. Another season, with more frequent opportunities to fly and greater extremes of temperature, with feeding added, there might be the danger of enlarging the brood chamber to such an extent that, during cold days and nights, a portion of the brood might chill, to the great injury of the colony.—*Agricultural College Report, 1897.*

Of the different colored paints red-lead wears the best under the exposure of the weather, and will suit farm implements the best. Other colors can be used for other work.

REARING AND FEEDING YOUNG PIGS.

A large share of the success of rearing young pigs consists in giving attention to little matters that are too often neglected. In the first place it is a good plan to have some one attending every sow that farrows. There is considerable difference of opinion on this point, but there can be no doubt that many pigs can be saved by an attendant, especially in cold weather.

Then the number of pigs left on a sow, the season of the year at which she farrows, and her age are all factors in the success of the young litter that are too often not taken into consideration. Most sows will bring up a much larger litter in the summer than in winter with less strain on themselves. A sow that can raise eleven pigs successfully in the summer should have only about nine in the winter. Then in regard to the age of the sow, a young yearling sow should not be allowed to rear more than about eight in the summer, while an older sow could raise eleven or more if she had raised her last litter successfully. A young sow should not be allowed to raise as many as a matured one.

Something also depends on the ob-



Group of Prize Winning Ayrshire Cattle.

The property of A. Terrill, Wooler, Ont. The cow to the left is Wooler Lass,—838—, now fourteen years old, while the one to the right is her daughter Maggie, 1116. Both are rich deep milkers and also have been very successful in the show rings. The bull is Dominion Lad—1802—sire, Dominion Chief—1214—; dam Amy—1861—, by Earl of Fife—584—. He won first prize at Toronto in 1895, and second in 1896. At local shows he has been very successful in capturing red tickets. He has proved a good stock getter.

ject for which the pigs are being fed. If for prize animals then the number left on a sow should be less than for ordinary feeding purposes. About eight for a matured sow would be a good number. The pigs will be stronger and much better.

The last two weeks before farrowing the sow's feed should be of good quality and not too bulky. After farrowing her feed should be light for a day or two. A slop of middlings and skim-milk makes a good food for her. Increase her food gradually and give a little oilcake or linseed meal once or twice a week. As soon as the young pigs are about three weeks old they will begin to eat a little. It is a good plan then to have a pig creep for them similar to a lamb creep. In this put shallow vessels with milk, ground feed or soaked wheat to induce them to eat. Keep them well supplied and keep pushing them along. Nothing will increase the flow of the sow's milk so well as a liberal supply of bran. When the young pigs are about six weeks old it is time to think of weaning them, but this should be determined by the way they are eating and growing rather than by their age. Weaning should be done gradually. Reduce the feed of the sow, and feed the little fellows extra. After a week or so take away two of the best pigs, then later another two and so on, leaving the poorer ones a little longer. The sow can thus be dried up without any injury to her udder.

Get the young pigs on a nice piece of clover as soon as possible. There is nothing equal to it for growing pigs in the summer and making profitable pork.

FEEDING GRAIN TO LAMBS.

Teach the young lambs to eat grain as early as possible. The lambs are inquisitive little fellows, and a shepherd can soon teach them to lick meal. The best way to give lambs their meal is in what is called a lamb creep. The lamb creep is a small enclosure opening off the pen in which the lambs are running. The opening into it is only large enough to admit the lambs. Place a trough in it and keep it supplied with meal for the lambs to eat. The best feed for the lambs is a mixture of oats, bran, and linseed meal, equal parts of each by weight. Corn is too fattening for young lambs, and does not provide sufficient growing material. The lambs can use large quantities of bran without any injury. The oats may be fed whole; if ground the lambs will leave some of the hulls.

Sheep are very particular about their feed. They want the best. They will leave food that has been nosed over by other animals. So a little patience will have to be exercised in getting the lambs to eat. Remove any meal they have left and give a fresh supply. Keep everything clean and sweet for them. If the lambs are still in the sheds feed them meal night and morning when the sheep are fed. After all the chores are done see if the lambs have eaten up their grain; if they have, give them some more. By the time they are eight weeks old they will eat one-fifth of a pound a day. At ten weeks old they will consume one-quarter pound a day, and at twelve

weeks a good lamb can get away with half a pound of grain.

When the lambs go out to pasture make a creep in the pasture field and continue the supply of grain regularly, gradually increasing it. The result will be that the lamb will pass through weaning time much better and ultimately be ready for market weeks earlier than lambs that have had no grain. If they are held until those that have had no extra grain are ready they will be fully a quarter heavier, and worth that much more.

FEEDING GRAIN TO BREEDING EWES.

If the ewes have dropped their lambs before the grass has advanced far enough to be pastured, they will require liberal feeding so as to encourage as liberal a flow of milk as possible. They should have as much succulent food as they will eat and from a pound to a pound and a half of bran and about two pounds of hay each per day. A heavy flow of milk can only be maintained by good feeding while the ewes are in the sheds.

When the ewes go out to pasture, and this should be as early as possible, the grain ration should be continued until the soft, early grass has given place to a more substantial one. When this condition of grass is reached, the experiments of Professor J. A. Craig at the Wisconsin Experiment Station go to show that it does not pay to feed grain to the ewes with the idea of assisting them to do better for their lambs. The experiments, which were repeated three years in succession, show conclusively that it does not pay, and that though the ewe may lose a little in weight she can easily pick that up again after the lambs are weaned if she has good pasture. Of course, with thoroughbred stock it might be a breeder to feed a little grain to hold his ewes in a little better condition, but that is all that would be gained.

CHEAP EGGS.

HOW TO PRESERVE THEM.

Eggs are now bringing less than ten cents in country places; what to do with them is the question. Many farmers eat them, because they say they are so cheap they are not worth taking to the store to trade with. Many thrifty city housewives lay in a large store of eggs at this season and preserve them for future use when eggs are bringing a high price. Many farmers' wives might take a lesson from them, and preserve twenty-five or fifty dozen eggs for winter use. The eggs laid during the winter could then be sold at a much higher price.

Experiments have been made in Germany, by Director Strauch, of the Agricultural School in Neisse, with various methods for keeping eggs fresh. At the beginning of July twenty fresh eggs were treated by each method and examined at the end of February. The following is a summary of the experiments and the results:—

Kept in brine: All unfit for use. Not decayed, but unpalatable from being saturated with salt.

	Per cent. spoiled.
Wrapped in paper	80
Kept in a solution of salicylic acid and glycerine	80
Rubbed with salt	79
Packed in bran	79
Coated with paraffin	79
Painted with a solution of salicylic acid and glycerine	70
Immersed in boiling water 15 seconds	53
Treated with a solution of alum	50
Kept in a solution of salicylic acid	50
Coated with soluble glass	49
Coated with collodion	49
Coated with varnish	49
Rubbed with bacon	39
Packed in wood ashes	29
Treated with boric acid and soluble glass	29
Treated with potassium permanganate	20
Coated with vaseline and kept in lime water	All good
Kept in soluble glass	All very good

The most useful of them all is the one given second to the last in the list. It is, however, unnecessary to coat them with vaseline.

The following receipts for making pickle for preserving eggs have been extensively tried and can be recommended. The eggs, however, must be perfectly fresh, and let down into the pickle with a dish when they will settle to the bottom. Packed in this way, if in a cold place, the eggs will keep fresh for months:

1. To a pailful of water add $\frac{1}{2}$ lb. of slacked lime and $\frac{1}{2}$ lb. of salt. Make up enough to cover the eggs in whatever vessel is used.

2. Add three-quarters of a pound of nitre to half a barrel made up of half a pound of slacked lime to a pailful of water. The nitre is used instead of the salt.

3. Pack the eggs in a barrel, and cover them with a good lime wash well stirred and strained. The eggs require washing when taken out of this pickle.

If the lime pickle is too strong it is apt to harden the white of the eggs, and sometimes to give the eggs a limy taste. To prevent this some advocate rubbing the eggs with lard before putting them in the pickle.

4. Another method recommended by some is to take a dozen or so at a time, and dip them five seconds in boiling water containing about five pounds of common brown sugar per gallon of water. The eggs are then placed on trays to dry. The hot water causes the formation of a thin skin of hard albumen next to the inner surface of the shell, while the sugar effectually closes the pores of the latter. When cold, the eggs are packed in a mixture of one part charcoal and two parts bran.

As a packing material for transportation, a mixture of eight parts of bran with one of powdered quicklime is of great value.

GIVE THE BOYS SOME LAMBS.

It is a good plan to give the boys on the farm a direct interest in the stock. There is nothing that will bind the boys to the farm as thoroughly as owning something of their very own. Where a lamb has to be raised by hand let one of the boys have it for his own if he will care for it. If so fortunate as not to have to raise any by hand, let the boys have one each out of the flock for themselves and teach them how they should be cared for, and thus interest them in the work of the farm.

Let the boys realize that the lamb is their own, not simply called so. When the lambs are sold give them the price of the lamb. Don't let it be "Bob's lamb but dad's mutton." That

is a sure way to drive the boys off the farm. If the lambs are kept in the flock give the boys the increase and the wool. They can thus be taught early lessons of industry that will benefit them all their days. The farms want young capable feeders; train the boys to be intelligent feeders and good stockmen.

The same line of work may be extended to other interests on the farm. Take the boys into partnership and interest them in your work.

CONDITION OF CATTLE IN THE STATES ON THE PACIFIC SLOPE.

The last report from the states of Oregon, Idaho, Wyoming, Utah, Nevada, Colorado, New Mexico, Arizona and California, show that the condition of the cattle is none too favorable. Throughout these states the stock-raisers are anxiously watching the weather. California is suffering from a prolonged dry spell and thousands of cattle are starving. The cattle are quarantined for Texas fever, with but a very scanty hay ration to carry them through the storms of April, and cold weather will pile their bones against the wire fences. In Colorado the snowfall has not been up to the average and there will be a very serious shortage in crops unless heavy spring rains fall over a very large area. Down in Arizona it has also been dry with much wind, which has done much harm to the ranges. A great many of the cattle are not in as strong flesh as usual, but there are fewer of them to handle and pastures and water may hold out. Utah has been more fortunate and the cattle should come out in good flesh next fall.

Prices for stockers out there are high. Texas stockmen are asking \$20 apiece for yearlings and getting it. The buyers, however, are not the northern men, who usually purchase most of the stock, but men from Kansas, Nevada, and Colorado. The northern men will not have anything like a full quota to market in 1898, less in 1899, and very few in 1900.

It is reported that on the whole the cattle are not in average condition, which is supposed to be due to the lack of moisture over a great section of the west. This foreshadows an unfavorable summer season with hot winds in the corn belt. The only thing that will prevent this is a general soaking rain lasting for several days. It is almost too late to expect such a rain now. On the other hand there is a decreased number of animals to handle, and less pasture and water will suffice, so that what cattle there are on hand may come out in good condition in the fall. It is estimated that the shortage of cattle in these states will amount to 30 per cent. of an average crop.

FERTILE versus INFERTILE EGGS.

Much has been written and said about the advantages of having infertile eggs for sale. The chief reason for advocating infertile eggs is their better keeping qualities. The keeping quality of infertile as against fertile eggs was tested by Mr. L. G. Jarvis, at the Ontario Agricultural College during the season of 1897. The results were in favor of the infertile

eggs. The question as to whether the hens will lay more eggs with a cock running with them than without will be the next question to settle. But it certainly will pay farmers to keep the cock birds away from the hens after all the eggs for hatching purposes are obtained.

Mr. Jarvis reports as follows: This season an experiment was made to test the keeping qualities of eggs laid by hens with which no male bird was permitted to run, and eggs laid by hens which were accompanied by the male. Further experiments along this line will be conducted at greater length during 1898, and also to determine what is the difference, if any, in the number of eggs laid by a pen of fowls mated with a male, and a pen of an equal number of birds of the same breed and ages not so mated.

On the 15th of July, 1897, four dozen fertile eggs and three dozen infertile eggs were placed in the egg closet used by the department (the construction of which was fully explained in my report of 1896), and subjected to a temperature varying from fifty to sixty degrees. These eggs were merely laid on their sides in bran and not turned. On examining some of the eggs a month after they were placed in the drawers, no perceptible difference could be discerned; and this was practically the case when the second trial was made on September 15th. At the test which took place on October 15th, however, it was noticeable that the whites of the fertile eggs were somewhat more watery than those of the infertile eggs, but not much difference could be found in the yolks. At the test made on November 15th, the result obtained at the October breaking was made more manifest, the whites of the fertile eggs being quite watery, while those of the infertile were to all appearance as good as in a newly laid egg. During the meeting of the Experimental Union, which was held in December, several thoughts were suggested by the speakers in regard to this important question; and on the 12th December, the remainder of eggs under experiment were broken by myself in the presence of Mr. Thomas Duff, of Toronto, and two of the students. The result was that the whites of the fertile eggs were like water, and in some cases the yolks were broken, while in the cases where the yolks did not break they were found to be very much spotted and discolored, and gave every evidence of going bad. These fertile eggs were totally unfit for table use, and of even a very poor quality for culinary purposes. We then broke the remainder of the infertile eggs and in every case the whites were found to be all right, and the yolks were standing up exactly as in a newly laid egg, and without showing the slightest tendency towards decay. These eggs were of as good a quality as any that could be bought in the stores for family use; but, of course, they could not be called fresh. The above would certainly go to show that infertile eggs are much to be preferred to fertile eggs; but, as I said before, further and more extensive experiments will be conducted during 1898. In the conclusion of this experiment, a striking feature was the fact that of the fertile eggs, the small, white shelled eggs were in a much worse condition and showed greater

loss from evaporation than did the large white or the brown shelled eggs. I am satisfied that brown shelled eggs or large white shelled eggs will keep much longer and lose less from evaporation than the small, white eggs. Experiments along this line will also be conducted in 1898.

Publishers' Desk.

Cheese Factory and Creamery Supplies.—Butter and cheese factory outfits are supplied by the Plessisville Foundry, Plessisville, Que. If in need of anything in this line write them for information.

Thrashing Machines.—The Waterloo Manufacturing Co., Limited, of Waterloo, Ont., are the makers of a high grade of thrashing machines and supplies, as well as sweep and tread horse power for all purposes. Write them for their catalogue.

Important to Dairymen.—When in need of a reliable cream separator or other dairymen supplies dairymen should not forget to apply for information to R. A. Lister & Co., 15 St. Maurice street, Montreal. Their advertisement points out some of the favorable qualities of the Melotte Separator; but more definite information may be obtained by writing to the firm.

Amalgamation of the Ayrshire Herdbooks.

The committee appointed at the last annual meeting of the Dominion Ayrshire Breeders' Association to meet a similar committee from the Quebec Association met this committee in Ottawa on the 14th of March. The following basis of amalgamation was agreed upon: Each association is to be represented by seven directors, who shall hold office for two years. The directors elect their own president and vice-president. The name of the association is to be The Canadian Ayrshire Breeders' Association. It was decided to issue a new herdbook, to be called the Canadian Ayrshire Herdbook. Vol. 9 will be the number of the first issue. This will do away with any conflict of numbers of the different volumes. It was also decided to cheapen the cost of publication by using an abbreviated pedigree, giving only the sex, color, age, sire, grandsire, dam, and granddam. Fuller pedigrees will be printed on payment of 25c. extra. Animals will be numbered consecutively, and numbers of foundation stock in either the Quebec or Ontario herdbooks will also be given. This will make the old herdbooks of both associations of great value. The standard of the new book will be as before. Animals must trace to stock imported from Great Britain on both sides. After January 1st, 1899, imported animals must be registered in the Scotch Herdbook. The annual membership fee remains at \$2. The registration fees are to remain the same, but a penalty fee is added if animals are not registered within a given time. The new book is to be edited in Toronto, where the registry is to be kept. An assistant will be appointed for Quebec. All pedigrees that were allowed into the different books by arbitration that cannot be clearly traced to imported stock will be suspended until a committee

has investigated each case. The committee consists of R. Ness, D. Drummond, and H. Wade.

The present directors continue during 1898. The Quebec president, R. Ness, becomes the new president, and the Ontario president the new vice-president. The annual meetings alternate between Montreal and Toronto. The meeting will be held in Montreal in Feb., 1899. The unprinted pedigrees of the Ontario book will be printed in the first part of the new volume, and in the same manner as before in order to avoid confusion, and the sixth volume of the Quebec book now being printed will also be accepted as part of the series.

The Quebec delegates did not have power to effect an amalgamation, so they reported the proposed terms to a special meeting of the Quebec Association. They were accepted, and a committee appointed to effect an amalgamation, which was done at a subsequent meeting of the committees held in Montreal on the 25th of March.

At this meeting it was decided to use the Stay There Aluminum Ear Tag. A tag with a number corresponding to the certificate number will be supplied with each pedigree, and must be placed in the ear of the animal. Exhibition associations are to be requested to pass resolutions insisting that these tags be in the ears of all cattle exhibited of this breed.

FOURTH ANNUAL
Canadian Horse Show
 To be held in conjunction with the
Military Tournament
 of the Toronto Garrison
 IN THE
Armouries, Toronto, Canada
 Wednesday, Thursday, Friday, Saturday,
 May 4th, 5th, 6th and 7th, 1898.
 Prize Lists can be obtained from the Secretary.
 ENTRIES CLOSE on Wednesday, April 20, 1898,
 and should be addressed to Henry Wade, Secy.,
 Parliament Buildings, Toronto

Millers' TICK DESTROYER

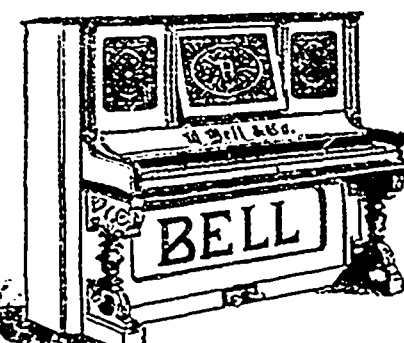


Effectually Destroys Ticks, Scabs, and all Vermin

Makes the skin clean and healthy, and imparts a silky softness and lustre to the wool.

HUGH MILLER & CO.
 Toronto, Ont.

The Unparalleled Reputation of




The BELL PIANOS and ORGANS

Is accepted without dispute by all other makers

ORGANS from \$40 upwards
 PIANOS from \$250 upwards

Only the best materials used. All others are rejected.
 On Reasonable Terms from all Agents
 Manufacturers: GUELPH, Ont.

THE BELL ORGAN & PIANO CO., LIMITED



"Alpha" DeLaval Separators

Capacity from 175 to 2,500 lbs. per hour.

Retail Prices from \$65 to \$500 each.

The closest skimmer and best machine on the market. Gives perfect satisfaction wherever used. Send for Catalogue and full particulars.

Canadian Dairy Supply Company,
 or to
 The Ballantyne Dairy Supply Co.
 Stratford, Ont. 327 Commissioners St.
 T. A. McLean & Co., Charlottetown, P.E.I.
 T. L. Walworth, Vancouver, B.C. **MONTREAL, CAN.**

FREE SEEDS.

In making up our selection of Seed Premiums we have endeavoured to include in it some of the best varieties obtainable from the collective products of Ontario's leading seedsmen. The selection has been made with a due regard to the special requirements of our readers and to the production of the best results.

From the stock of Messrs. **JOHN S. PEARCE & Co., of London,** the leading seedsmen of Western Ontario, we made the following selection:—

COLLECTION A.

- 10 Packets Vegetables. Price, 50c.
- | | |
|---------------|------------------|
| 1 Packet Beet | 1 Packet Parsnip |
| 1 " Carrot | 1 " Cabbage |
| 1 " Cucumber | 1 " Radish |
| 1 " Lettuce | 1 " Squash |
| 1 " Onion | 1 " Tomato |
- Given for one new yearly subscriber at \$1.

COLLECTION B.

- 10 Packets Flowers. Price, 50c.
- | | |
|---------------------------|----------------|
| 1 Packet Phlox Drummondii | 1 Packet Pansy |
| 1 " Stocks | 1 " Nasturtium |
| 1 " Petunia | 1 " Dianthus |
| 1 " Portulacca | 1 " Balsam |
| 1 " Mignonette | 1 " Aster |
- Given for one new yearly subscriber at \$1.

COLLECTION C.

- 20 Packets Vegetables and Flowers. Price, \$1.00.
- | | |
|-----------------|-----------------|
| 1 Packet Aster | 1 Packet Squash |
| 1 " Pansy | 1 " Watermelon |
| 1 " Stocks | 1 " Musk Melon |
| 1 " Balsam | 1 " Lettuce |
| 1 " Phlox | 1 " Celery |
| 1 " Sweet Peas | 1 " Carrot |
| 1 " Cauliflower | 1 " Beet |
| 1 " Cucumber | 1 " Radish |
| 1 " Onion | 1 " Tomato |
| 1 " Cabbage | 1 " Vine Peach |
- Given for two new yearly subscribers at \$1 each.

COLLECTION D.

- 20 Packets Vegetables. Price, \$1
- | | |
|----------------|-----------------|
| 1 Packet Beet | 1 Packet Carrot |
| 1 " Parsnip | 1 " Cabbage |
| 1 " Cucumber | 1 " Lettuce |
| 1 " Musk Melon | 1 " Watermelon |
| 1 " Onion | 1 " Onion |
| 1 " Radish | 1 " Squash |
| 1 " Tomato | 1 " Vine Peach |
| 1 " Parsley | 1 " S. Savory |
| 1 " Sage | 1 " Thyme |
- Given for two new yearly subscribers at \$1 each

For reliability and a thorough knowledge of the requirements of the trade **WILLIAM RENNIE,** of Toronto, is justly considered one of the foremost in his business. At our request he has chosen the following Twelve Varieties of Garden and Flower Seeds as a

SPECIAL SEED OFFER

- For one New Yearly Subscription at \$1.
- | | |
|--------------------------------------|------|
| Pkcs. Beet, Early Intermediate | 5c. |
| " Cabbage, First and Best | 10c. |
| " Carrot, Half Long, Scarlet | 10c. |
| " Cucumber, Long Green | 5c. |
| " Lettuce, Selected Nonpareil | 5c. |
| " Onion, Yellow Globe Danvers | 5c. |
| " Parsnip, Intermediate, Half Long | 10c. |
| " Radish, Olive Gem | 5c. |
| " Squash, Hubbard | 5c. |
| " Asters, New Giant Flowering, Mixed | 10c. |
| " Sweet Peas, Selected, Finest Mixed | 10c. |
| " Wild Garden Flower, Mixed | 5c. |
- 55c.

Seed Grains

Barley

For one new yearly subscriber at \$1, and 18 cents added to pay for bag, we will give one bushel of Mandscheurl Barley.

Oats

For one new yearly subscriber at \$1, and 18 cents added to pay for bag, we will give one bushel of Siberian White Oats.

These varieties are among the best in the market, and from reports gathered from reliable sources have headed the lists, both in yield and quality.

The remainder of our premium list is unavoidably crowded out. For a complete list see our next issue.

FARMING

41-46 Richmond St. W., Toronto

The Ontario Agricultural Gazette

The Official Bulletin of the Dominion Cattle, Sheep, and Swine Breeders' Associations, and of the Farmers' Institute System of the Province of Ontario.

THE DOMINION CATTLE, SHEEP, AND SWINE BREEDERS' ASSOCIATIONS.

Annual Membership Fees:—Cattle Breeders', \$1; Sheep Breeders', \$1; Swine Breeders', \$1.

BENEFITS OF MEMBERSHIP.

Each member receives a free copy of each publication issued by the Association to which he belongs, during the year in which he is a member. In the case of the Swine Breeders' Association this includes a copy of the Swine Record.

A member of the Swine Breeders' Association is allowed to register pigs at 50c. per head; non-members are charged \$1.00 per head.

A member of the Swine Breeders' Association is allowed to register sheep at 50c. per head, while non-members are charged \$1.00.

The name and address of each member, and the stock he has for sale, are published once a month. Over 20,000 copies of this directory are issued monthly. Copies are sent to each Agricultural College and each Experiment Station in Canada and the United States, also to prominent breeders and probable buyers resident in Canada, the United States and elsewhere.

A member of an Association will only be allowed to advertise stock corresponding to the Association to which he belongs; that is, to advertise cattle he must be a member of the Dominion Cattle Breeders' Association, to advertise sheep, he must be a member of the Dominion Sheep Breeders' Association, and to advertise swine he must be a member of the Dominion Swine Breeders' Association.

The list of cattle, sheep, and swine for sale will be published in the third issue of each month. Members having stock for sale, in order that they may be included in the Gazette, are required to notify the undersigned by letter on or before the 15th of each month, of the number, breed, age, and sex of the animals. Should a member fail to do this his name will not appear in that issue. The data will be published in the most condensed form.

F. W. Hodson, Secretary.
Parliament Buildings Toronto, Ont.

YORKSHIRES FOR SALE.

The following list of Yorkshire swine was, by accident, omitted from the last list published:

J. E. Brethour, Burford, Ont., has for sale one stock boar; twenty-five sows, four to six months; 100 spring pigs.

We try very hard not to make mistakes but they do occur sometimes in spite of the greatest care.

Members are urgently requested to notify the Secretary immediately whenever they notice an error; we will then do all in our power to put matters right.

The car load of stock advertised to leave for the West on April 1st, started at Guelph on March 30th, and was at Brampton on March 31st, and Myrtle on April 1st.

Another car will leave about the middle of April. The following gentlemen have spoken for space:

Henry Arkell, Arkell—six sheep.
Walter Nichol, Plattsville—one heifer.

R. G. Steacy, Brockville—two heifers.
Geo. Green, Fairview—one pig for W. Kitson, Burnbank.

S. Coxworth, Whitby—two pigs.
D. Fraser & Sons, Emerson, Man. one bull from H. & W. Smith, Hay; and one from Jacob Shibley, Harrow-smith.

Mrs. Joan G. Field, Winnipeg—one bull.

There is still space in this car for a few more animals; space can be procured by corresponding with F. W. Hodson, Parliament Buildings, Toronto.

Farmers' Institute Department.

Reports concerning the work of the Farmers' Institutes in Ontario will be published weekly under this head; also papers prepared for this department by Institute workers. Secretaries and officers having announcements to make are invited to send full particulars to the Superintendent.

SECURING A CATCH OF CLOVER.

By ADAM BEATTY.

Great care should be taken that clean seed be secured. If absolutely clean seed can not be had, get some as nearly clean as can be found. I have three patches of wild morning glory or bind-weed on my place that undoubtedly sprang from seed sown along with grass seed which I expect it will take me years to get rid of.

Weeds grown from seed sown with grain may be checked the first fall and perhaps killed while the plant is young and weak, but weeds which have sprung from seed sown along with grass seed get at least two seasons' growth before they can be checked. The amount of clover seed to sow will depend a good deal on the nature of the soil. On damp, light soils perhaps five or six lbs. per acre is sufficient, but on the average loam possibly seven or eight lbs. would not be too much. Clover should be sown as early in the spring as possible. If seeded with fall wheat, it is better sown before the frost is out of the ground, so that it may get the advantage of the first growing weather. A month's start is very important, I might almost say, all-important, to young clover. We all know how damp the ground is on the surface during the early spring months, the very time when clover needs it there. When its roots are six inches to a foot or more in length the clover is quite indifferent to surface moisture.

When clover is to be sown with spring grain, then the field to be seeded down should be sown first, if possible. Clover seed needs a fine seed bed. Such small seed has no chance amongst clods. Land worked up fine will stay moist a much longer time than if left in a rough, lumpy condition. I would like to emphasize this point. Make the ground fine. The clover plant is like every other plant in the world in one respect at least—it must have moisture. From the time the seed is in the ground to the end of its existence it never ceases to need moisture. It is very important to give clover a good start. The first ten days or two weeks is generally the testing time as to what the catch is to be. The clover sometimes dies off later on, but generally speaking, if it comes up well we may be tolerably certain of a good catch. Why is this? I think it is because the conditions favorable to the seed sprouting and coming up will continue to be favorable to its after growth. If we prepare the soil with that sole end in view, other conditions being favorable, we may safely assume we have done our part towards securing a good catch. The seed should be covered. It is not enough to throw the seed on the

ground. It should be worked into the ground. A seed lying exposed to the sun and wind will stand a poor chance in a time of drouth. It is better also to cover it as soon after the ground is first worked up as possible. Thin sowing of the grain with which clover is seeded is a help towards securing a good catch. I noticed in a late number of *Farmers' Advocate* a correspondent speaks of such a crop as a nurse crop. The latter is in no sense a nurse or help to young clover. It would grow much better if sown alone. In fact, if the soil were very badly worn out, I am inclined to think it would be profitable to adopt that plan. The ground should be harrowed smooth after being plowed in the fall, and the seed sown towards the end of March on the frozen ground. I am persuaded this is the surest way to obtain a good catch of clover on worn out land. If any one doubts this let him examine a crop of fall wheat that has been winter killed in spots, and he will find the clover and weeds will be thick and rank where the wheat is thin, and where the wheat is very thick and heavy the clover will be correspondingly weak and puny. If you were to ask the ladies why they prefer a south window in which to set their house plants they would very quickly tell you the plants need the sun. They will live in a north window, but they won't grow and thrive and bloom unless placed where they can get the sunshine. A thick, heavy crop of grain not only shades the clover from the sun, but it robs it of much needed nutriment and moisture, especially in a dry spell. In the struggle for existence the stronger prevails, the weaker goes to the wall.

Lastly and chiefly, the ground should have a plentiful supply of humus or vegetable matter in order to insure a good catch every time. Occasionally we have springs so favorable for growth that a good catch is almost a matter of course in every field where seed has been thrown; but these are exceptional seasons and we need not expect them often. We must prepare our land for the most unfavorable seasons in order to be safe. If we could get the land back to the condition it was in when the woods were first cut away, we need have no fear then. It has been said of new land, "Just tickle it with a hoe and it will laugh itself into a crop." New land is easier to plow than land that has been cropped for some time, easier to cultivate, a single stroke with the harrow is as effective on it as two doubles on old land, and then the growth that is in it, anything from a clover to a pumpkin will start from the word go and get there every time. I think the main point is to supply an abundance of humus to the soil. How can we get back this condition? I think the simplest way would be to seed down often. Instead of cropping a field with grain for five or ten years, then seeding down, and for fear of not getting a good catch again, keeping the field in hay for five or ten years more, we should seed down with clover or timothy every three or four years, and plow under a field of clover and timothy sod every three or four years or

often. Then we would soon see the land becoming mellow, friable, and easily worked; soon there would be no difficulty in getting a fine mould on top. Clover would then catch without any difficulty and go straight ahead.

PROF. DEAN AT PETERBORO.

Prof. H. H. Dean, of the Ontario Agricultural College, Guelph, addressed a dairy meeting at the Central Smith factory, near Peterboro, last week on the butter fat system of paying for milk for cheesemaking. The interest in this system seems to be reviving in some sections. There is no reason, whatever, why all milk supplied either for cheese or buttermaking purposes should not be paid for according to quality. The patrons of the above factory will in future pay for milk according to its quality as shown by the Babcock test, and by adding two per cent. to the fat readings.

Prof. Dean reports that the dairymen seem to realize fully the cheese situation, and in many sections are anxious to adopt some method by which it would not be necessary to begin making cheese till well on in May. The difficulty which presents itself is that many factories have not as yet put in plant for making butter, and therefore are not in a position to utilize the milk of the patrons to advantage till the cows are on the grass. Unless the patrons are willing in such cases to keep the milk at home, the factories are compelled to open up much earlier than they would otherwise do.

THE EFFECT SPRAYING HAS ON BEES.

EDITOR OF FARMING:

SIR,—In your issue of March 22nd I read R. F. Holtermann's article under the above heading, and which is very good. But he omitted to state that an Act of Parliament has been passed which prevents fruit trees being sprayed while in bloom, and I think this a good opportunity to let farmers and others know of this being the case; also that some experts claim that young bees dying in the combs before being hatched will cause foul brood to start. Again, spraying after the bloom is nearly all off or faded is better, because the egg is laid at this time by the moth miller which develops into the apple-worm.

Hope you can afford space for the above in FARMING, I remain, a friend to honey bees,

JAMES R. BRIAMBY.

Black Bank, Ont.

TO KEEP HEWS FROM SETTING.

Mrs. Joseph Yuill puts them in a covered box with slats across the bottom and raises the box up from the ground so that there is a current of air underneath the bird.

Mr. W. R. Graham has another plan, which is endorsed by Mr. T. A. Duff. He says: We have three different houses. I usually hold a couple of male birds over from season to season and keep them by themselves. I move the hen to another house, and if she still persists in setting, I put her in with a male bird.

Keep a good rasp in the horse stable. It is very handy for keeping the horse's hoofs in good shape.

The "Toronto"
Incubators and Brooders

ARE THEY

BEST MANUFACTURED

We have won three out of four First Prizes at Toronto Exhibition during 1895 and 1896.

SEND FOR CIRCULAR AND PRICE LIST

Address the Manufacturer—

T. A. WILLITTS,

514 Dundas Street, - TORONTO, CAN.

Awarded Two First Prizes at Toronto Industrial, 1896.



Silver and Bronze Medals

These are the Highest Awards.

Also Silver Medal, 1895.

Farmers' Binder Twine and Agricultural Implement Mfg. Co., Limited.

We think it necessary to immediately advise you to refute the treacherous and damnable reports that are being put out and circulated against this co-operative movement of farmers by our enemies. Some are stating that this mill is closed down,

others that we are pleading with the Government to re-instate the duty on binder twine; others that raw material has tremendously advanced, and that the present moment is the correct time to buy twine requirements for the harvest of 1898; while still others are claiming that the great American combine will absorb this enterprise, as it will be impossible for us to manufacture twine on a free trade basis. We have simply to say, in answer to all these diabolical statements, that there is not a single word of truth in them; the mill is being run three hundred days in the year to its utmost capacity; that we have requested the Government not to reinstate the duty on twine; and that we are manufacturing pure Manila 650 feet long, known as our Sampson brand. It and our splendid Red Star are superior to anything that has ever yet been placed on the Canadian market. As in the past, we will again shortly set the price on binder twine for the coming harvest at a fraction above actual cost of production, and all we ask, after five years of honest and determined endeavor in the interest of the agriculturists of this country to hold this Company as an independent concern, is that they, the farmers, give us their continued loyal support. Order our twine early from our appointed agents, listen to no statements made by the enemy, and remain truly loyal in not purchasing one single pound of American or other twine in opposition to us until they inform themselves positively that every ball of this Company's twine is exhausted. Small samples and prices will be sent you in the near future, or can be had on application.

We ask you, as an intelligent man, to plead with your people to realize the importance of this company getting their undivided individual support, and to understand what our being driven from existence through indifference or scepticism on their part would mean to them in the future. The Salt Act would simply be repeated.

Faithfully yours,
JOSEPH STRATFORD,
General Manager,
Brantford.

S.C.W. LEGHORNS Ultra strain, Extra large birds, Prolific layers of large eggs. 300 hens in 1897 averaged 16 1/2 doz. each. Also B. P. Rocks (E. H. Thompson's strain). Incubator **R. C. ALLAN, Cobourg, Ont.**

Seed Peas and Potatoes—Prussian Blue Peas (some bugs) 75c. a bushel. Great Divide Potatoe .50c. a Peck. Empire State 4 R. 5c of Erin Potatoe, 75c. per Bag of 90 pou ds. These varieties stand well up to the top at the O.A.C., Guelph. **JAMES HOWMAN, Guelph, Ont.**

INCUBATORS Self Regulating. Catalogue free. **G. S. SINGER, Cardington, Ohio.**

Glenhyrst Poultry Yards

EGGS FOR SALE

White Wyandottes, White Plymouth Rocks, Cornish Indian Game, Black Minorcas, Red Pyle Game, Red Game, Houdans, Black Langshans, White Langshans Barred Plymouth Rocks, Silver Gray Dorkins, Silver Laced Wyandottes. \$1.00 a setting, made up of any variety. Also Poultry Supplies.

LOTE DORSET SHEEP, TAMWORTH PIGS, SHETLAND PONIES, all ages.
G. K. STRATFORD & BROS., Brantford, Ont.

OSHAWA POULTRY YARDS

S. L. Wyandottes, Red Caps, Golden Poland, and Rose Comb Black Minorcas. All high class stock.
EGGS, \$1.00 per Thirteen.

W. H. KIRBY, - Oshawa, Ont.

FOR SALE

50 BARRED Plymouth Rock Hens; also a few Silver Wyandotte and S. C. White Leghorn Cockerels. Prices to suit the farmers. Eggs from E. P. Rocks and Silver Wyandottes, \$1 per 13. Pekin Ducks, \$1 per 11. **W. R. GRAHAM, Bayside Poultry Farm, Belleville, Ont.**

BARRED ROCKS

Choice Prize-winning Stock Setting (\$13 eggs) \$2 00. Two settings at one time \$3.50. You need vigorous stock and new blood.
R. F. HOLTERMANN, BRANTFORD, ONT.

EGGS FROM WINNERS

Mated to produce winners in Light Brahmas, Buff Cochins, Houdans, Red Caps, Black Spanish, S. L. Wyandottes. \$1.50 per 13. Barred Rocks, Brown and White Leghorns, \$2 per 13. Mammoth Pekin Ducks, \$1 per 11. Can also spare some high-class exhibition Game Eggs, \$2 per 13. Our stock won 268 prizes the past season. Satisfaction guaranteed. Address:

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Jersey Cattle, Duroc-Jersey and Chester Swine; Collie Dogs and Mammoth Bronze Turkeys; Choice Cows and Heifers fresh calved or soon due. Also young helters and bulls. D. J. Sears due in March and April. Hardworn Collier of both sexes and H. E. Turkey Eggs in season. Prices low.

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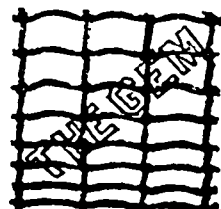
Largest herd of choice-bred Herefords in Canada. Winners of both the first and second herd prizes at Toronto, Montreal, and Ottawa, 1895, 1896, and 1897; also silver medals same years for best bull and best female. This herd is of the "up-to-date-beef kind," combining early maturity and quality.

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Orders booked for Spring Pigs. Pairs not a kin
Farm 2 1/2 miles from G.T.R. station.
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Ayrshire Cattle. Berkshire and Tamworth Pigs.
FOR SALE—Two young bulls fit for service, and five bull calves (calved in February).
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One mile from Ottawa.)

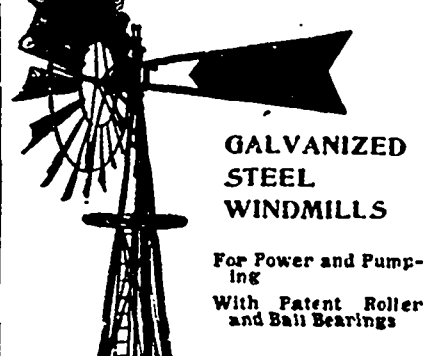
A J.C.C. JERSEYS of the richest breeding. Our herd is noted for large butter records; can always supply animals of both sexes and ages. Whole herd rich in St. Lambert blood. Bulls ready for service, and several cows direct granddaughters of Stoke Pogis the 3rd. Prices to meet the times.
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will weave your fence of any kind of wire. 10 to 50 rods per day. Price saved in one day's work. Hard Coiled Wire of extra quality for sale. Agents wanted. Write for particulars
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On the C.P.R. and G.T.R. Railways.
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Ayrshires, imported and homebred herd headed by imported Tam Glen Bull, No. 1310 D. A. H. B. Jerseys all of the celebrated St. Lambert family; herd headed by Ligar Fagle of St. Anne's 18704 A.I.C.C. Berkshire Pigs. Young stock of all the above breeds for sale.
Post Office, Telegraph Office, and Railway Station, North Nation Mills, P. Q., on the C.P.R.
JOS. W. BARNETT, Manager.
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MARKET REVIEW AND FORECAST.

Office of FARMING,
44 and 46 Richmond street W., Toronto.
April 4th, 1898.

In Canada perhaps more than in any other country a fresh impetus is always given to trade at the opening of navigation.

Wheat. As the season advances the wheat farmer foretold some months ago in some quarters gets farther and farther away.

The wheat situation on the whole shows a somewhat easier tendency, and with the exception of Chicago and the West, where prices are bolstered up several cents above the ruling market figures owing to the Leiter deal.

Barley and Oats. Barley is dull and unchanged. No. 2 grade is nominal at 49c., while feed barley is worth about 33c. for car lots, west.

Peas and Corn. Peas are one cent lower. The market is steady at 55c. for cars north and west, and 56c. east.

Buckwheat and Rye. Only small quantities of buckwheat are offering, and the market is firm at 37c. for cars west.

Bran and Shorts. The season of greatest demand for mill products will soon be over. Last week the city millers raised the price of bran to \$15 per ton delivered, and shorts to \$16.

Timothy and Clover Seed. Red clover seed is quoted at \$3 to \$3.40; alsiike at \$3.25 to \$4; and timothy seed at \$1.25 to \$1.35.

Potatoes. Potatoes are dull and easier. 55c. is about

all they are worth by the car on the tracks. Out of store they bring 63c. to 65c. At Montreal they are worth 55c. to 60c. per bag by the car lot.

Poultry. Poultry is very quiet, the offerings small with a good demand. Turkeys bring 12 1/2c and chickens 55c. to 65c.

Eggs. The supply of eggs continues very liberal, and prices declined to 9 1/2c. The cold snap will send prices up a few cents but at time of going to press they were still 9 1/2c.

Maple Syrup. Maple syrup is in good demand at 65c. for wine gallons and 90c. for imperials. At Montreal the receipts of maple syrup have been large.

Cheese. There is not very much change in the cheese situation, though cable reports show a slightly steadier feeling since the auction sales of a week ago.

Butter. The butter market still continues good on this side, though latest cable reports from England show a decline of 2 shillings per cwt. (112 lbs.) owing to increased supplies from Denmark.

Dairy farmers' butter is gradually being supplanted by creamery. At Toronto dairy is bringing from 18c. to 18 1/2c. and from 17 1/2c. to 18c. in tubs at Montreal.

Cattle. The supply of cattle on Tuesday's market was not very large and prices were firm, but Friday's market was an exceedingly large one and values dropped a little.

Butchers' Cattle.—There was a good trade done last week in choice stock for the Easter market. For choice animals 4c. to 4 1/4c. and even 4 1/2c. can be obtained, but the more ordinary ones go at \$3.75 to \$3.90 per cwt.

Stocks and Feeders.—Considerable demand from Buffalo was experienced again last week and prices ran from \$3.25 to \$3.60 per cwt. for light stockers, and \$3.60 to \$3.65 for good feeders.

Milk cows and calves.—Offerings are light. Prices run from \$25 to \$42. Calves bring from \$2 to \$9, according to quality.

Sheep. Butchers' sheep and sheep for export continue steady at 3c. to 3 1/2c. Bucks bring 3c. The English market is about 4c. better. Yearlings bring from \$5.25 to \$5.75 per cwt. Spring lambs bring from \$3.50 to \$5.

Hogs. The offerings are heavy. Prices did not decline on Tuesday's market from those previously reported. On Friday, however, there were 7,000 hogs on the market and prices declined 15c. The best price for choice bacon hogs is \$4.70 to \$4.75. Light hogs \$4.50, and thick, fat hogs \$4.30 to \$4.35.

Hay. The hay market is very quiet at \$8 to \$8.50 per ton on the tracks. At Montreal it is \$10.50 to \$11 for No. 1 on the tracks. Hay still goes forward to England, and there is more inquiry for choice clover hay.

Woodstock Steel Windmills

FOR POWER AND PUMPING

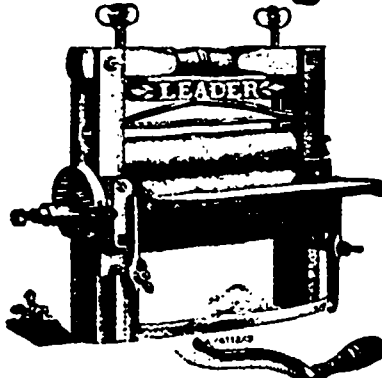
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WITH GRAPHITE BEARINGS They Run with Oil.

Steel Towers, Pumps, Tanks, Saw Tables and Watering Troughs, etc.

WOODSTOCK WINDMOTOR CO., Limited. Woodstock, Ont.

Clothes Wringers



BUY THE BEST. SAVE TIME and MONEY The NEW LEADER WRINGER is unequalled, and the quick clamping device and internal gear are not found in any other wringer.

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Our Premium List.—Owing to the large increase in the number of our advertisements we have been compelled to hold over an exceptionally attractive list of seasonable and useful premiums.

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by myself from carefully selected cabbages, onions, carrots, beets, etc. (on the principle that like begets like) yet sold as cheap as seed raised from trash.

GREGORY'S SEEDS As promising novelties I catalogue for 1898 the Earliest Potato, (64 bushels measured acre), new cabbage, cucumber, beet, etc.

Cheese Factory and Creamery Supplies

The "MONTREUIL" Card Cutter.



THE PLESSISVILLE FOUNDRY PLESSISVILLE, QUE.

Fruit

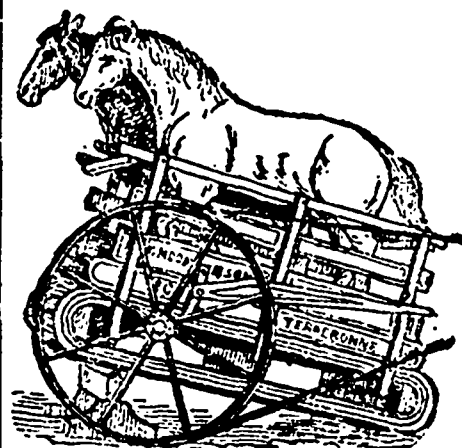
Trees and Vines become hardier, and their products better colored and better flavored when liberally treated with fertilizers containing at least 10% actual

Potash.

FREE An illustrated book which tells what Potash is, and how it should be used, is sent free to all applicants. Send your address.

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NO FIRE NO EXPLOSION NO DANGER

Always ready. Stop instantly and when you wish.

It is not so hard on horses in our opinion as the sweep power.

We will guarantee to develop as much power with two horses on our tread power as can be developed on any sweep power with four horses, or no sale.

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FEED GRINDERS FEED CUTTERS THRESHERS HAY PRESSES CIRCULAR SAW MACHINES, etc.

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Cheese Factory and Creamery Supplies

The Best in the Market

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Butter and Cheese Factory Outfits a Specialty.

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Patent Safe Lock Shingles.



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Cut showing Top and Bottom Lock.



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Cut showing side Lock.

Our Patent Safe Lock Shingles are so constructed that they lock or fasten on all four sides, making perfect joints, absolutely proof against the weather.

Buildings covered with our roofing look pretty, are fire and lightning proof, and will last a lifetime.

Samples and Prices sent free upon application.

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Limited

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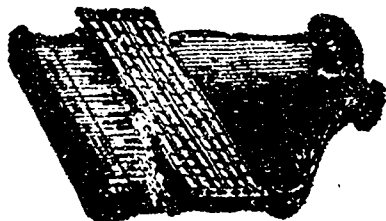
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APOLLO HARPS
AT A REDUCTION OF **25 Per Cent.**

We have also a few **SAMPLE HARPS** which we shall sell at a sacrifice of 40 per cent. Such Bargains rarely come to the lovers of High Grade Music.

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FLEMING'S LUMP JAW CURE.

Is sold under a positive guarantee to cure, or money is refunded



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DEAR SIR,
In regard to our experience with your Lump Jaw Cure, we used it on seven lumps last season. It worked all right. Some of the lumps had broken and run several times before using it.

Yours truly,
FLEMING & SHORT.

PRICE, \$2.00, sent by mail
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THE ALEXANDRA

Hand and Power—Capacity, 160 to 2,200 lbs.
\$50 to \$350

THE MELOTTE

Hand Style only—Capacity, 330 to 850 lbs.
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Up-to-date Farm Machinery and Supplies

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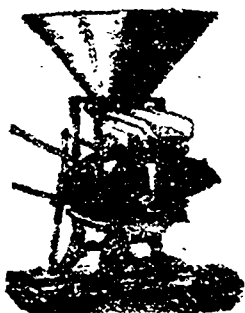
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Our Little Champion Grinder
run by horse power, especially for farmers' use.

Our Large-Sized Grinders
for mills, grind twenty to sixty bushels per hour as fast as desired.
Always Guaranteed.

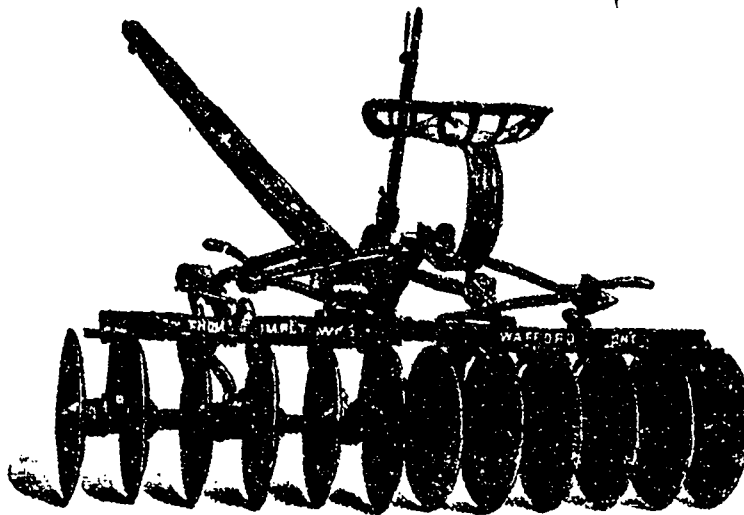
Elevator and bagger added when desired. A drive or screen protects the plates from sticks and stones. Prices List uncharged.
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We also furnish an improved Corn and Cob Crusher.
Send for circular. Information cheerfully given.



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Sole Manufacturers **JOLIETTE, P.Q., CANADA.**

The Vessot Sub-B: "Lance Plow" is the best.

There are other Disc Harrows



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The Champion

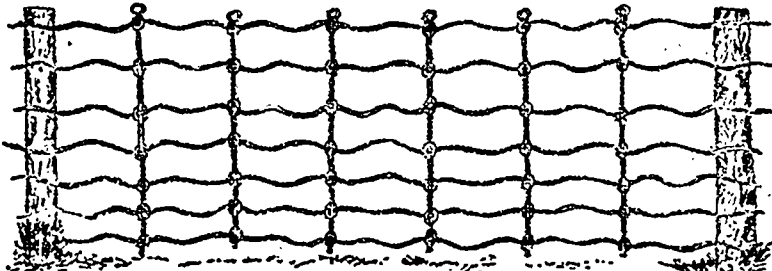
Its superiority at sight. An eye-opener as to what goes to make a perfect working harrow. To introduce this Harrow where its merits are not already known and no agent already appointed, write direct to us, and we will name you a price that will introduce and make you the owner of the best Disc Harrow in Canada, and once in the field it becomes a favorite. Money refunded if not satisfactory. Also get our price on Land Rollers, Plows, and Corn Scufflers. We are the patentees of the Blower Elevator Feed and Ensilage Cutter. Patented in Canada and United States of America.

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The Farmer supplies the world with food

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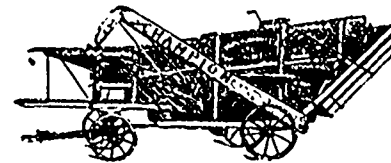
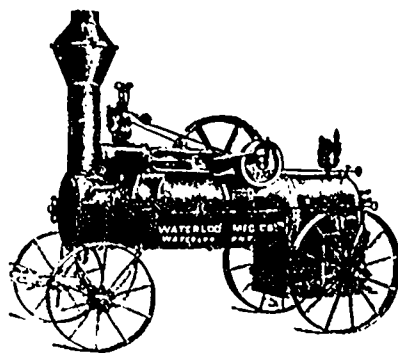
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The superiority of these machines is acknowledged in all parts of the universe.

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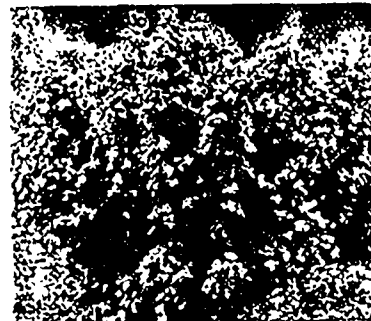
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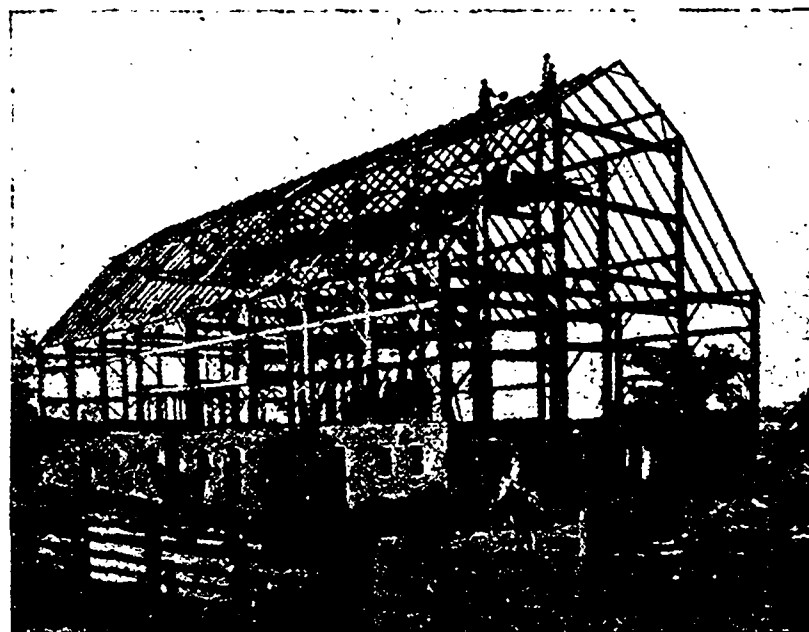
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