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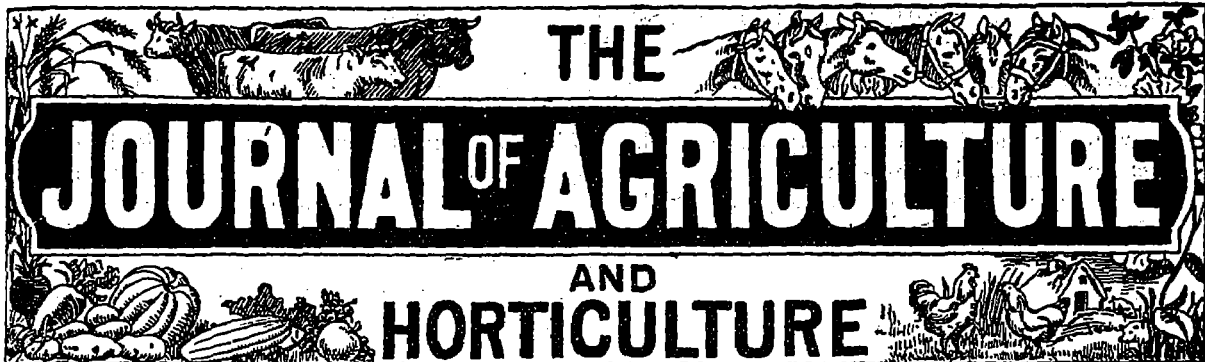
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# THE JOURNAL OF AGRICULTURE AND HORTICULTURE

VOL. 2. No. 22

This Journal replaces the former "Journal of Agriculture," and is delivered free to all members of Farmers' Clubs.

MAY 15, 1899

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## Journal of Agriculture and Horticulture

THE JOURNAL OF AGRICULTURE AND HORTICULTURE is the official organ of the Council of Agriculture of the Province of Quebec. It is issued bi-monthly and is designed to include not only in name, but in fact, anything concerned with Agriculture and Stock-Raising, Horticulture etc. All matters relating to the reading columns of the Journal must be addressed to Arthur R. Jester Esq., Editor of the JOURNAL OF AGRICULTURE AND HORTICULTURE, 4 Lincoln Avenue, Montreal. For RATES of advertisements, etc., address the Publishers

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## Notes by the Way.

**Lime.**—Farmers are complaining of the high prices charged for lime, and, in our opinion, with considerable reason. In another part of this number, p. 526, it will be found that the experimenters Messrs. Roy and St Pierre had to pay \$1.80 to \$1.35 a barrel for that 'mendment, and carriage, probably, besides, making the cost per bushel, about 45 cents. Now, as on heavy land, 120 bushels is a very moderate dressing for an acre, the cost of such a dose, viz. \$54.00, must be utterly out of the question for any of our farmers to afford. And why lime should be such a price here, when in the neighborhood of London, Eng., it can be bought for 12 cents a bushel, it would puzzle any one to say.

**Benefits of lime.**—Carbonate of lime is a wonderful mechanical improver of heavy land. It preserves the particles of clay in a separated coagulated condition, thereby making heavy soils friable and pervious to water. It enables clay to exercise its absorbent power on various salts, which would otherwise escape its action. It also promotes the decomposition of vegetable matter, and the formation of nitrates in the soil.

**Burnt-lime** is the substance usually employed on the farm, except in certain localities within easy reach of marl-beds. In Norfolk, Eng., the use of marl in heavy doses, in the early part of the century, completely altered the character of the land, converting farms that used to produce 20 to 25 bushels of rye to the acre into rich land yielding from 32 to 40 bushels of wheat an acre; the rent paid on many of the farms was raised from 5s. to 35s., i. e., from \$1.25 to \$8.75 on the

improved soils; and this is by no means a statement taken from "current report," but was told the writer by one of the well known family of the Overmans, extensive tenants on the estate of the Earl of Leicester, who were actually paying the high rents above mentioned at the time—1856.

*Chalk.*—In the Southern and South-Eastern counties of England, as well as in East-Anglia, in fact, wherever the chalk crops out near the surface, that form of lime is used on the fallows, in the autumn, at the rate of from 20 to 25 one-horse loads an acre. A very little frost is required to make the chalk "run," as it is called, and it has a marvellous effect on all soils; light land it makes "sweeter," heavy land it makes more easily workable.

As a general rule, lime, in any form, may be considered more as a *cooking* agent, than as an actual plant-food. Though some marls contain a notable percentage of phosphoric acid, the beneficial action of lime is due to the chemical actions which it performs in the soil, for, except in the very poorest of soils, there is almost invariably enough lime present in all decently farmed land to supply plants with all that is needed by them for their growth and maturation. It is, as we said just now, its work in promoting the decomposition of vegetable matter and in aiding the formation of nitrates in the soil that renders lime so valuable to the farmer.

As for the application of lime, we object to the ploughing of it under. We prefer the old Scotch plan of slaking it, spreading it on the ploughed land, and then harrowing it in; and that, for the reason that lime sinks quite fast enough out of reach without being buried in the first instance.

*Root-crops.*—We were happy to observe, last summer, a very general increase in the tendency to devote a larger proportion of land to the growth of root-crops. Our scope of observation did not extend over a very large area, being principally confined to the neighbourhood of Montreal, St. Anne de Bellevue, etc.; but, though our travels were limited, we saw enough to convince us that, whether owing to the labours of the Provincial Department of Agriculture, to the exertions of the lecturers in its employment, or to the influence of the Farmer's Clubs and the Agricultural Associations in general, a very great improvement is taking

place in the farming of the outlying portions of the Island of Montreal. True, we saw a good deal of bad farming, of very bad farming indeed; but, upon the whole, the example of the Drummonds and the Buchanans, on the one side, of the Dawes and the Refords on the other, is, at last, exercising a very great influence on the whole district.

But, though we warmly congratulate our neighbours on the improvement visible on their farms, we must confess that, in some points, they are not so far advanced as they might be in the cultivation of the root-crop: we mean, in the singling of the plants. Indeed, the whole process and cost of root-growing are, as a rule, greatly overrated. Of course, we cannot expect our people, whether farmers or laborers, to do the work as quickly and as neatly as the men in the old country do it, for where the Canadian singles one acre, the Scot or the Englishman, probably singles at least a dozen, and in this, as in other things, practice really does make perfect. The contrast is indeed very great, according to some; for whereas one writer says that a first-rate man with the hoe takes 6 days, of 12 hours each, to single an acre of mangels, Mr. Stephens, in his "Book of the Farm" states that "women in his employment often single half a Scotch acre in a day!" (1) No wonder, then, that the cost of working the sugar-beet crop proved so costly as to daunt the pluck of some of our farmers, \$14.00 to \$16.00 an acre being the expense of only one part of the process.

As we have said before, if the regular price paid for singling turnips, swedes, and mangels in Kent, the dearest waged county in England, is \$1.80 an acre, surely it can be done here for \$3.00; even Mr. James Drummond, living, as our readers know, within a mile of Montreal, only pays \$3.50 an acre for the work, high though the wages there are. Mr. Séraphin Guèvremont, of Sorel, pays for singling mangels, \$3.00, for swedes, \$2.40, and for the "going over again," a dollar.

### HOED-CROPS AND THEIR PLACE IN AGRICULTURE.

BY THE EDITOR.

Many of the correspondents of the American Agricultural papers assert, that cultivation can be substituted for manure. This is a reverting to the

(1) The Scotch acre is 6 roods in superficies. Ed.

ideas of Jethro Tull, an old English agriculturist, whose methods were abandoned a hundred years ago.

Nobody denies that if the land be stirred frequently, a great quantity of fertilising matter will be set free and will be ready to fulfil its function as the purveyor of food to the plants we cultivate; but as to what the American writers say, we do not agree with them. Though we believe that a field well ploughed and well cultivated will produce during several years more abundant crops than a field whose cultivation after sowing has been neglected, we maintain that the fertilising elements of such a field would be much more rapidly exhausted than those of the latter; we maintain that a field ploughed and sown, with a slight dressing of dung and no other cultivation, will produce more abundant crops than a field, however good the cultivation after sowing may have been, but to which no manure has been given; but, to make the said field yield the most prolific crops possible, we maintain that it must unite the three desired qualities, that is, that it must have been well ploughed, well cultivated, and well manured.

Now there are two modes of insuring the perfect cultivation of the soil: the summer-fallow, and the growing of hoed-crops. The summer-fallow is almost unknown here; but, in England, the heavy-land farmers, especially when their farms are distant from large towns, are *obliged* to allow their lands to lie fallow every 5 to 6 years. Let me say, in passing, that the English heavy-land is incredibly heavy: four horses—and big horses, too—can with difficulty break up  $\frac{1}{2}$  of an acre—nearly an *arpent* a day. To make a good fallow, the field must be ploughed, harrowed, rolled, grubbed, tormented in every way, and all this during a whole summer, so that the field which has borne a crop of wheat remains entirely unproductive for a whole year. Fallows are a great expense to English farmers, but where root-crops cannot be grown they must be made.

Fortunately for us, there are hardly any farms in the province of Quebec where roots and the other hoed-crops cannot be produced. The principal aim in cultivating them is to make the land yield an abundant provision for the stock, and, at the same time, to prepare the soil for the crops of grain, grass, and leguminous plants which are to succeed the hoed-crops in the intended rotation. And this is the reason why the rotation should

always begin with the member containing plants sown in rows, or, as we call them, fallow-crops.

The following is the method of treating heavy-land:

The last crop, as was said just now, was a grain-crop, the last of the rotation, and if there be any couch-grass (*Chiendent*), or any other root-weed, it must be cradicated. In England, this is the most important of all our operations. Directly the grain is carried, and sometimes even while the shocks are in the field, the grubber, or cultivator, is sent along and across the piece, the harrow and roller pulverise the grubbed surface, and the horse-rake collects the grass and root weeds into rows: this rubbish is burnt, or, preferably, carted to the corner of the field, to form the bottom of the future mixen. *Even in England*, the sun is sometimes very powerful in August and the early part of September, and we have often seen the couch-grass and other weeds so completely dried up after their exposure for a couple of days to the air at that season, that all danger of their growing anew was dissipated.

Towards the end of October, the fall-ploughing is given. Where the land has been well farmed and is not in bad condition, the furrow may be made as deep as the horses can draw the plough. As a rule, we would not bring up from the bottom-soil too much at once—say two inches. Still we must not forget the enormous pulverising effect of the frost in this climate. The descent of some of the particles of former manurings into the subsoil may have mitigated its crudities, so as to render it less hostile to the penetration of the rootlets of the future crop, especially if the heavy dunging, which we must give the land if we intend to raise a paying crop of mangels or other roots, be considered.

If we were to lay down anything so dangerous as an absolute rule, as to ploughing, we should say: always plough deeply in autumn for a root-crop, but never go below the former furrow when ploughing for a grain or a leguminous crop.

On heavy-land, not subject to spring-floods, the easiest way of growing mangels and swedes is to turn the dung down in autumn, with a ploughing done after the deep fall-furrow, and to sow in spring *on the flat*. When sowing in this way, we have only to grub, harrow, and roll, until the annual weeds are destroyed, and then sow the seed, in rows of about 24 inches apart, with the Matthews or Planet Jr. seed-barrow. We recom-

mend those who practise this plan on heavy-land, not to make their ridges too wide; 12 feet will be sufficient, and will allow of four rows of mangels or swedes per ridge, the two outside rows being a foot from the furrow, so that the crop will be in rows two feet apart from one side of the field to the other.

The hoed-crops are

- Potatoes.
- Indian corn or maize.
- Cabbages.
- Swedes.
- Carrots.
- Parsnips.
- Haricots.

We will not weary you by describing the different modes of growing the two first crops above named—potatoes and maize.—But, we may say in passing, that the chief fault we observe in the cultivation of potatoes in this province is, that they are earthed up too high, in fact, very much too high. Plant the sets deeply—say, 4 inches—, and only earth up once, adding a very little earth to the covering of the tubers.

As to maize, to sow it broadcast is, in our opinion, to lose all chance of cultivating it after it has grown beyond the harrows, and this takes broadcasted maize altogether out of the category of hoed crops.

The Abbé Chartier, at one of the meetings of the D. Ass. expressed his ideas on the cultivation of corn, and we are very much surprised to see, in one of the agricultural papers of the States, that this gentleman had spoken in favour of sowing this grain broadcast! He said just the opposite, for we remember his words perfectly:

“We never sow broadcast. Some who have done so have had splendid crops, but let them beware! Sooner or later they are sure to be caught in a cold spell in June, in spite of every precaution as regards previous cultivation; the grass will overtake the corn, and their crop will be a failure. Forno assistance can be given to broadcasted maize.”

We need not say we are of the Abbé's opinion.

#### THE PREPARATION OF THE LAND FOR HOED CROPS.

The more deeply the soil is worked, the better will be the crop. This does not mean that in a clay-land you are to bring up a lot of raw soil in the spring, for this would become a source of trouble in ploughing, in grubbing, in harrowing and rolling, all through the summer. It would

hinder one from sowing at the proper season to insure a good crop. The principal aim of the root-grower should be, to work the land to a proper depth, and he should never stop until he has succeeded in doing this to at least 10 inches deep. The deep furrow should invariably be executed before winter.

#### SPRING PREPARATION.

The following is the usual manner of sowing root crops, the land being, here, seldom sufficiently cleaned in the fall, and a sufficient quantity of manure being difficult to obtain at that season. The land may be cross-ploughed or grubbed. We would rather harrow it along and across, and grub it afterwards. If the land is in good order, you need only the harrows to fit it for being drilled up. If cross-ploughed, the depth should be the same as that of the autumn-furrow, only the plough will go more steadily if it goes half-an-inch deeper—more would be dangerous. This furrow will bring to the surface all the root-weeds that escaped the autumn-cleaning, and they can be got together to be disposed of as you please.

#### PREPARATION OF THE SEED.

We always steep the seeds of mangels, carrots, and parsnips, and we do it thus: we tie the seed up in a bag, let it steep about 40 hours, hang the bag up to drip, keep it in a warm place till the white germ just shows itself, then dry it up with sand, charcoal in powder, &c., and it is ready for sowing. Six pounds of carrots and mangel-seed, three pounds of swede-seed, and eight pounds of parsnip-seed, are the quantities required per acre. (1)

#### MANURES FOR MANGEL AND SWEDES.

The mangel requires, specially, nitrogen, the swede, phosphoric acid. An addition of 120 lbs. of sulphate of ammonia for mangels, and of 200 lbs. of superphosphate of lime for swedes, to the ordinary dunging, will be found profitable. The sulphate of ammonia is to be found at a reasonable price at Mr. Vasey's, Hochelaga Ammonia Works, and the superphosphate at Mr. Nichol's Albert Mines, Capelton. To give the ammonia to swedes or the phosphoric acid to mangels is wasteful, that is, when you have enough dung to give a moderate dose of it to every acre sown: the case is different when one is obliged to use artificial manures alone.

(1) 2½ lbs. of turnip-seed; ¼ less per arpent.

The land is now ready for drilling. There is nothing gained by making the drills wide. Our distance is 24 inches; this leaves plenty of room for the horse-hoe, and for the entrance of abundant supplies of light and air to the growing plant. Numbers of acres of land are, comparatively, lost by drilling up at 36 inches for roots and even for Early-rose potatoes; by this error, a third of the ground is left unoccupied.

As soon as the drills are completed, the dung is to be carefully spread, and we will take the liberty of saying that this operation is conducted far from economically by many of our best farmers. It takes more time and labour to spread a heap of dung over five rows, than over three rows. The farmer should drive the horse in the middle of the first *three* drills, and drag out enough dung into the drill in which the horse is walking without stopping him for a moment. Another man divides the dung among the *three* drills, and this, it is evident, can be done with much more care, and in much less time per acre, than if it were attempted to dung five or more drills at once.

(To be continued.)

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## The Farm.

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### CENTRAL EXPERIMENTAL FARM.

Ottawa, May 9th 1899.

Dear MR. JENNER FUST,

Enclosed herewith I am sending you a short article for your columns treating of the importance of thorough culture. It has always seemed to me getting the cart before the horse to make an outlay for soluble plant food before the soil is in the best condition possible—that is, that its nature will admit. I hope to send a sequel pointing out the physical and chemical benefits from the various mechanical operations, plowing, harrowing, etc.

Yours faithfully,

FRANK T. SHUTT.

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### THE IMPORTANCE OF SOIL CULTURE

(No. 1.)

By Frank T. Shutt, M.A., Chemist, Dominion  
*Experimental Farms.*

OTTAWA, May 9th., 1899

During the past two months the greater part of the correspondence received by me from Quebec

farmers has had reference to the use of commercial fertilizers. In many instances the queries—which generally take some such form as, what fertilizers, and how much per acre, should be used for wheat, oats, corn, roots, &c.?—have been accompanied by a sample of the soil, with a brief history of its manuring and cropping for a few years past. Before drawing the lessons which it is my intention to impress to-day upon all such who would have similar questions to ask, I wish to give expression to one or two thoughts brought home to me by this comparatively new phase of intelligent activity on the part of our farmers, fruit growers, and dairymen in the province of Quebec.

The first is, that there has been a wide-spread awakening lately—that is, within the last year or two—to the necessity of furnishing the crops with food, if profitable returns are to be expected. Many of the lands in the older townships have, undoubtedly, had their natural or native fertility reduced below the paying point by successive cropping, carried on without due regard to rotation and without any adequate return of plant food. Thus, the realization of the truth that our farm crops feed upon certain materials or elements in the soil has been forced home in a very emphatic, practical way. But, nevertheless, I am led to believe that this conviction regarding the necessity of supplying more plant food is in a large measure due to the dissemination of literature upon the principles of agriculture by our Governments and the press. This, then, is an encouraging fact, since it shows that not only are our people a reading people, but that they are ready and willing to learn and improve their methods and their soil, and to avail themselves of the assistance offered them by the Government through its officers.

The second impression is, that the knowledge generally respecting the nature and composition of the plant food supplied by fertilizers is very hazy. For instance, the term “phosphate” is used by many to include all kinds of fertilizers, whether they contain phosphoric acid or all three of the essential elements of fertility. We are endeavouring, of course, to make the matter clear to our correspondents, and we hope shortly to issue a Bulletin which will give in detail information on this important subject, so that farmers can understand not only the special requirements of the different crops, but also learn that nitrate of soda derives its agricultural value from the presence of available nitrogen only, that muriate of potash

furnished potash only, and so on. In the meantime, we would impress upon our readers the importance of differentiating between all those useful materials now upon the market for fertilizing purposes. Where a soil requires a complete fertilizer; that is, one containing nitrogen, potash, and phosphoric acid, it is hopeless to expect the most profitable result, say, for instance, from an application of Thomas slag only, a material which contains phosphoric acid only.

However, this is all by the way. What I wished to say chiefly is, that in the larger number of instances I reply to my correspondents somewhat as follows, that "in all probability it will not be found economical in the present condition of the land, to apply commercial fertilizers," not because the soil is already so rich, but "from the fact that it is in such a poor mechanical condition or tilth." Thus, we consider it next to waste of money to apply soluble chemical fertilizers to stiff, plastic, impervious clays until such are under-drained, limed, and frequently improved by an application of some organic manure. Again, there are many light, sandy and gravelly soils which especially stand in need of humus, in order to make them retentive, before they can hold the more soluble chemical manures to advantage.

Now, this must not be understood as decrying the merits or value of chemical fertilizers, but as emphasizing the necessity of paying attention to the great importance of tilth, as brought about by good cultural methods, and the application of organic manure, such as barnyard manure or the turning under of clover. The profits to be obtained from fertilizers is to be looked for particularly on soils of medium fertility, soils in good heart, warm, permeable to air and retentive of moisture, rather than from very poor soils. There must be a comfortable, a mellow seed-bed, freedom for root extension, plenty, without excess, of moisture, before crops can utilize to the fullest extent the food furnished by chemical fertilizers.

To this end, we would advise (1) the thorough draining of heavy clays. This, no doubt, is expensive, but it will repay the outlay incurred. (2) Somewhat deeper ploughing than is now commonly practised, in order to increase the depth of surface soil and afford the roots more soil in which to forage. (3) Occasional subsoiling in those soils apt to form a hard pan. Subsoiling, it should be remembered, is not turning up the subsoil so that it is mixed with the surface soil,

but simply a loosening of the layer immediately beneath the surface soil. (4) The growth of more clover, so that the soil may be enriched cheaply in humus and nitrogen. (5) The occasional liming of soils, both heavy and light, in conjunction with the application of manures. (6) Thorough "fining" of the soil by harrowing and rolling. These are means that the farmer can take, and in most cases should take before making a large outlay for fertilizers. In short, if the soil is deep, mellow, warm, retentive of moisture and permeable to air, the profit from the so called artificial fertilising may be confidently looked for, but until such a condition is obtained our opinion is that results from the latter will often be looked for in vain.

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### SPRING.

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*To the Editor of the JOURNAL OF AGRICULTURE :*

Dear Sir. The winter is past, and the spring, although very late, is with us. The ice went out of the river one month later than last year, but the season will not be a month later; I should say about 3 weeks.

The order of the day, during the past week, has been making things tidy; burning the refuse round the doors, getting off double windows, putting up blinds and cleaning house, how the women do bustle to get house cleaning done! At first, one would say they make a greater confusion, and every thing in a state of chaos; but out of it come order and cleanliness, and now it is May, it is May, and all things are gay. During the past winter, we had very little snow until March, nevertheless we had enough to harbor the mice, and they have been busy, girdling apple trees and other choice fruit. A fellow feels like uttering a cuss-word, when he sees so many trees damaged, the work and pains he has been to, attending to them and gently pruning to form them to the desired shape, and so to see all his pains go for nought. One reason, perhaps, why so many have been caught, it is quite a few years since the mice have done any damage, so many were off their guard as it were; the only remedy is to put in new trees where they have completely circled the trees; where only partially done, some grafting was tied round with a piece of stout cotton. It is an old saying, but a very true one, "prevention is better than cure"; had there been pieces of tarred

paper tied around them in the fall, this would have prevented it. Another remedy has also been advised: tramping the snow firmly round the trees several times during the winter, especially on days when the snow is somewhat soft. There is now no use crying over spilt milk. There has been rather more pruning done this year than usual; people are beginning to see it pays better to grow food than wood. In 1896, everybody had a good crop of apples and the careless (and shall we say lazy ones?) said they had just as good a crop of apples as those who pruned well and sprayed also, but the past two years have convinced them somewhat of their error.

In April, last year, most of the grain was sown in that month; but this year, very little has been done. This week will be a busy one in some localities, as the sacred writer said: "In the sweat of thy face shalt thou eat bread" is very applicable to those who till the soil, whether in growing grain or fruit, so at this season you must be up and at it with zeal. I cannot just tell you in this letter what kind and amounts of grain will be sown. Everyone sows oats, while some few have again sown wheat. Most of the ploughing was done last fall, so that the seeding will be done quickly; grass is looking well. I was afraid that, during the winter, with the fields so bare of snow, the grass and pasture lands would be winter-killed; but I have yet to hear of any damage being done in that way. Cows generally are coming out of winter quarters in good condition. There is plenty of clover-hay, and no price for it, so the cows have been better cared for than usual. The prospects for cheese are bright, although in Ontario they are making a large quantity of fodder-cheese: too much, in fact, for the future price of that article. Butter has been lowering in price lately, as the quantities arriving have been quite liberal; the price through the winter has been quite remunerative: 20 to 21 cts. per lb. I would just say here, before closing: do not forget some green-fodder for the milch-cows for July and August: it will be a good investment. Of course, clover makes an excellent fodder, but at present writing cannot say whether we shall have much clover this year or not.

PETER MACFARLANE.

Châteauguay, May 1st, 1899.

## GROWING POTATOES

Little care is generally given of the majority of our farms to the growing of the potatoes. Many details, carefully observed in the case of other crops, are judged unnecessary for this one, and owing to this lack of care the yield of this precious tuber has, in many places, considerably decreased. The chief causes of this diminution are to be found in an improper rotation by which the soil becomes exhausted of the particular plant food needed by the potatoes;—in insufficient manuring—and often in the lack of vitality in varieties which have been grown for many years without being regenerated by seeding. Yet, even when all these conditions are fulfilled, there are other causes which exercise a great influence over the yield of the crops, often enough to make the difference between a paying crop and unprofitable one. The treatment to which the sets are submitted before planting, the depth and the manner in which they are planted, have an important bearing upon the success of the crop. The methods in use differ widely, and to determine the safest to follow is by no means an easy task. Yet, by a series of long continued and carefully conducted experiments, carried on at the Experimental Station of the Ontario Agricultural College, the value of certain methods has been proved in a conclusive manner. A few of the most important of these results will perhaps be read with interest.

At the head of the list of the late varieties of potatoes tested for 7 years, we find the "Empire State" closely followed by the "American Wonder." Among the early varieties, the "Stray Beauty," the "Burpee's Extra Early" the "Early Dominion" and "Early Ohio" stand first, both for yield and early maturity.

It is still the custom on many of our farms to cut the potatoes reserved for planting at the most convenient time, generally when rainy weather prevents outdoor work. These sets are usually planted only a few days later. Experiments conducted not only at the Station but also in co-operation on many farms of Ontario have proved that potatoes planted immediately after they are cut give without exception the best results.

Is there any advantage in sprinkling cut potatoes with plaster or lime before planting? A test conducted on this subject for 7 years has given conclusive results in favor of the plaster. The yield of potatoes treated with it was 23 bushels per acre





greater than that of tubers which had not received any treatment. In the case of sets treated with lime the yield was of 14 bushels lower than when plaster had been used.

The size of sets and the number of eyes contained in each have also to be considered. In a series of experiments, the increase in yield was found to be in direct proportion to the size of the set. Sets weighing  $\frac{1}{4}$  of an oz. gave 44 bushels per acre and pieces of 2 oz. weight gave 177 bushels. The increase is also constant, though not so marked with the number of eyes: sets provided with 5 eyes yielding 20 more bushels per acre than pieces in which but 2 eyes had been left.

The exposure of potatoes to air and light before cutting and planting has also a marked effect upon their subsequent growth. In a very interesting experiment extending over a period of 5 years, 5 lots, each containing the same number and the same weight of tubers remained under different conditions for 3 weeks before planting. Some were left in a dark cellar, others were exposed in a green house—on the barn floor—and some out of doors. The exposure on the barn floor gave the best results: 221 bushels per acre. The lowest yield was given by the potatoes left out of doors, 101 bushels.

The yield was also considerably affected by the depth of planting. In a dry season, the largest crop was obtained from a depth of 5 inches; in a rainy one, 3 in. gave the best results. But as an average, a depth of 4 in. was found to be the most satisfactory.

In treating for potato beetles, 3 remedies were tested. Paris Green and water, Paris Green and plaster, and a compound known as "Potato bug finish." Of these, the first proved to be the most effectual in destroying the beetles; the yield of tubers treated with it being 20 bushels larger than when the other methods of applying Paris Green had been used. CHAS. MORTUREUX.

#### A LAST WORD ON APPLYING MANURES.

L. H. READ.

Although there may be some cases where the land is very level and where circumstances are such that the only way to manure may be during the winter, such instances in my opinion are very rare. My experience has covered many different states. I have known of many cases where large coats of manure plowed under in a careless manner were,

during dry seasons, a detriment to the crop, but when the work was properly done I never knew of any harm coming from the practice. The main reason why manure should be put into the soil and thoroughly mixed with it, is that it adds all the humus directly to the land.

In reply to W. J. Bradt, I would say that the principle applies as well to sandy or gravelly soils as to clay, and in fact my last six years' experience has been with the light, stony soils of central Wisconsin, and I would venture to say that there is a loss of 20 per cent of the value of eight out of every ten loads of manure ever spread upon frozen ground, unless the land be an absolute dead level. The best farmers keep their manure either in manure cellars under their barns or in sheds built especially for the purpose of protecting this most valuable of farm products. If for any reason it is impossible to spread manure in the spring, keep it under cover and apply in the fall, plowing under when damp, if possible, as the decomposition will commence at once. The surface of soil begins to thaw out first, and if covered with manure, and thawing weather commences with rains, the manure may thaw out and half its value be washed away before the land becomes thawed enough to absorb the dissolved fertility. Hoard.

#### TOP-DRESSING.

The price of wheat offers poor encouragement for top-dressing, but it must be remembered that the cost of artificials is almost proportionally lower than in the period of high prices. Of top-dressings nitrate of soda is one of the most remunerative, as it is safe to tell, and greatly assists the yield of both corn and straw. Additions of phosphates are often beneficial but problematical. A better plan is to apply phosphates liberally to root crops, and to reserve the nitrate, or sulphate of ammonia as the case may be, for direct application to the corn. The question arises frequently as to where to apply top-dressings. It is not advisable to top-dress a vigorous plant of wheat or oats if the ground is known to be able to force the crop. A good plant on weak land derives the most benefit from such an application. That nitrate of soda pulls the ground there can be no doubt, but it is not therefore undesirable. There are arrears of produce in the land, for during the last few dry summers the soil has not been overtaxed, and it wants pulling.

Besides, pulling a field is not pulling a farm. If nitrate of soda helps the yield of straw, it helps the manure heaps, and these can be returned to the land with advantage. All top-dressings should be employed with judgment, and in combination with a good head of stock, and no damage will then follow.

Nitrate of soda is well applied to cabbages, mangel, and occasionally to swedes. It promotes the growth of clover and ryegrass, as is well known in Scotland, where the newly-cut clover ground is manured with such a top-dressing. For cabbages it is the best fertilizer, and for mangel it is as good as dung. Nitrate of soda is a first-rate manure for corn, so that its uses are great and varied.

#### APPLICATION.

For efficient application a manure distributor is almost essential. Such an implement costs about £14, but it will last for a great many years. It is difficult to distribute nitrate by hand without putting on double the proper quantity on one place and missing others entirely. The consequence is blighty and over-grown straw where the nitrate fell in excess, and a patchy condition of crop generally. The top-dressing should be fine and well mixed, and be applied dry, and the distributor should be protected from rain and put away clean when done with.

#### SULPHATE OF AMMONIA.

A good deal of attention was drawn to the advantages of this substance over nitrate of soda last spring. It is considered to produce a better effect on the quality of the crops to which it is applied, but on this point some reserve is necessary.

Ordinary field experiments are seldom to be trusted. They depend too much on the special character of the soil of each plot, and of the season, and are too liable to contradict each other. The crop growing on contiguous patches of land always varies in quantity and quality, irrespective of any difference in treatment, and no one can say how much of the difference may be due to the soil and how much to the fertiliser. It is my own opinion that, after all, the safest guide is the verdict of general experience, and this has been given in favour of nitrate of soda and its companion manure sulphate of ammonia. These two may always be trusted to show an effect, and there is never any doubt as to where they have been applied. Either deepens the colour of the herbage, and increases

the size and vigour of the foliage. You might write your name with either on corn and read it in a fortnight.

Besides these two it would be difficult to name another so active and so certain. Nitrate of soda has its weak points, but they are not efficiency. Cake feeding will produce similar effects, and of the two methods I prefer the last as more permanent and less exhausting.

JOHN WRIGHTSON.

#### ECHOES FROM THE FARMER'S CLUBS.

*Ste Hélène Club, Kamouraska.—Experiment-field.—Effects of lime on grain-crops.—Report of M. Pierre Roy.*—The experiment-field comprised about (a great want of accuracy) an arpent of black land divided into two plots. On one plot, was ploughed in 4 inches deep, during the fall of 1897, on an oat-stubble, two barrels of lime mixed with black mould. The lime cost \$1.30 a barrel. The land was worked in spring with the spring-tooth harrow, and well ditched at the same time as the ploughing was done. Low-lying land, near a small stream. Preceding rotation: after meadow, an oat crop, which was very short in the straw, and the yield in grain trifling. This year, 1898, the experiment-field was again sown with oats. (About as bad farming as can well be conceived. Ed. J. of A.).

*Results:* The limed plot, straw longer, ears better grained, grain heavier, yield 19½ bushels.

(Signed) PIERRE ROY.

*Report of Mr. Joseph St Pierre.*—Soil, sandy loam. Mixed 3 loads of black earth with 3 barrels of lime; worked it in with a spring-tooth harrow, last fall, 1897, on a wheat-stubble. The lime cost \$1.35 a barrel. Ploughed the field in the spring of '98 from 4 to 5 inches deep.

The land, on a slight slope, was dried by ditches and water furrows. Rotation: 4 years in meadow, and last year wheat, all without manure. This year, the experiment-field, about an arpent in superficies, was divided into two equal plots and sown to wheat. The limed plot yielded 6 bushels, 53 lbs.; the unlimed plot, 4 bushels, 47 pounds. In the limed plot, the straw was the longer by 3 or 4 inches, the ears longer, the grain bigger, and the stems stouter.

(Signed) JOSEPH ST PIERRE.

*Extract from the report of M. Gabriel Bérubé, Judge of the competition.*—Of the two competitors, M. St. Pierre seems to have succeeded the better. Tried on soils relatively poor, the lime developed its influence in a truly remarkable manner, and proved that by using it in a judicious and careful way, a great improvement in our farms may be effected.

(Signed) G. BÉRUBÉ.

(Notes by the Editor of the French edition of the Journal).—With these reports, M. A. Thiboutot, the Secretary of the Club, writes us word that farmers are complaining dreadfully about the cost of lime : it is too dear to allow them to use it with any profit.

The price, \$1.30 and \$1.35, is evidently excessive. But if farmers would combine to get it in larger quantities, they would be able to lower the price considerably. Besides, the advantage of liming land is by no means to be appreciated by the yield of the crops of the first season, for the benefits of liming are of long duration. It is from the excess of the yield of crops during several years that the economy of liming land must be determined.

*St. Roch l'Achigan, L'Assomption.*—*Experiment-field.*—*Wheat-crops with chemical manures.*—Two competitors. The field of M. Siméon Labrèche, jun. : An arpent of wheat, after potatoes manured the previous year ; on  $\frac{1}{2}$  an arpent, he added 100 lbs. of superphosphate, Capelton No. 1, on which plot the wheat ripened 5 or 6 days before the comparison-plot, and its yield was 13 bushels, while the other only gave 8 bushels.

M. Gareau's field : Sowed an arpent of wheat on a meadow ploughed the previous autumn, but not manured. Before sowing, he spread on half an arpent, 125 lbs. of No. 1 superphosphate, 80 lbs. of Victor, and 20 lbs. of nitrate of soda. This wheat was ripe, and therefore harvested, before the visit of the Judges.

M. Siméon Labrèche, jun., won the first prize in this competition.

*Tobacco-growing with chemical manures alone.*—Four competitors : 1st prize, M. Joseph Gareau ; 2nd, M. George Forest ; 3rd, M. Siméon Labrèche ; 4th, M. Amédée Laramée.

Each of the competitors dressed the drills with "Victor" before planting. From the first, this

tobacco grew more rapidly than other tobacco where farmyard dung was used, and ripened earlier ; but the plants on the dunged land, slowly as they grew at first, ended by becoming finer, and larger. The cold weather of the spring of '98, and the drought of the early summer, may have prevented the "Victor" from producing its best effects.

(Signed) J. J. GAREAU,  
Secretary of the Club

*Note de la Rédaction.*—It would be interesting to find out what difference there was between the two crops of tobacco, when both were properly dried and fermented, as regards its quality, ease of combustion, and the more or less harsh or perfumed smell, etc.

*Coaticooke Club, Stanstead.*—*Experiment-field*—*Grain-crops with chemical manures.*—*Report of M. Léon Trudeau.*—An arpent of meadow, ploughed May 26th, 1898, divided into two plots. One plot manured with 100 lbs. of superphosphate, and 50 lbs. of sulphate of ammonia. The comparison-plot, no manure. Sown to barley, May 28th ; in ear, July 12th ; ripe, August 28th. The manured plot yielded 13 bushels, 14 lbs. ; the comparison-plot, 7 $\frac{1}{2}$  bushels.

(Signed) LÉON TRUDEAU.

*Report of M. Hormidas Carreau.*—An arpent of worn-out meadow, ploughed in the fall of 1897, was divided into 2 plots, one of which was dressed, on the 25th April, with 250 lbs. of Thomas' basic slag, and, on the 30th May, with 50 lbs. of sulphate of ammonia sown at the same time with the grain, which was oats. The other plot was left unmanured.

The oats on the manured plot ripened earlier than the other and yielded 2,000 lbs. of straw and 17 bushels of grain.

The comparison-plot, yielded 1,000 lbs. of straw and 8 bushels of grain.

(Signed) HORMIDAS CARREAU.

(Signed) CHS. DESAUTELS, *Secrétaire du Cercle.*

M. Carreau deserves credit for the most accurate return of the crops of the two plots we have yet seen. Ed. J. of A.

(*Trans. from the French by the Ed. J. of A.*).



### THE CANADIAN BACON TRADE

Mr. George Mathews, President of the George Mathews Co., pork packers, etc., in a letter some weeks ago to the *Lindsay Post*, gives some advice to farmers as to the kind of hog required for bacon purposes, and from which we take the following :

Farmers have often said, "If the hogs you advise us to raise are worth more than the ordinary run of hogs, why don't you pay an extra price for them?" That is just what we are doing now, and we hope that the farmers will see that it is to the interest of their pockets to turn out only first quality hogs and get the highest price. This is a more serious question for our farmers than it is generally considered. By sending, as we are now doing, a large proportion of No. 2 and Stout Bacon to England we are over-loading that market with that article (No. 2 and Stout) to such an extent that it actually depresses the market value of No. 1 selection some shillings per cwt. under the price it would bring if it were not for the large quantity of unsizeable bacon (as it is called in England) going there from Canada. This statement is corroborated by the *Grocer*, the leading provision paper in England, in its issue of January 21st, '99. The following is the quotation : "The dealings in Canadian pea-fed have been similar to those in most other cures, being of a halting and timid character, and with the railway depots fairly choked up with later arrivals, a pressure to sell has been attended by the acceptance of less money. Never has so unmanageable a quantity of Canadian bacon been put forward at one time, and, worse than all, it consists of a greater percentage of unsuitable stuff than can easily be got rid of, and, with both the weight and volume of the imports increased, importers have despaired of meeting with purchasers at rates satisfactory to themselves."

It rests with the farmers to change this state of affairs by having their hogs the right quality and weight to make the first selection of bacon. I notice some speakers referring to this subject, both on the platform and through the press, say that the packers are always changing the selections so that the farmers cannot understand what they really do want. I have been in the export bacon trade for the last six years, and I know of no change excepting that in the late summer and fall we can take the hogs up to 220 as first selection, for at that season the hogs are not penned up, and

having plenty of exercise do not get as fat when weighing 220 pounds as they do in the winter when weighing only 200 pounds. A large number of the hogs that we are now receiving weighing 200 pounds each are altogether too fat to make first selection bacon from. Then there is the hog with thick heavy shoulders—the reason the English dealers want sides with light shoulders is that the shoulder is of only small value as compared with the rest of the side. In Smithfield market, London, the provision men have great stacks of smoked Wiltshire-cut bacon, some stacks of whole sides, others of sides with shoulders cut off, and others with shoulders alone cut from the sides after they have been smoked ; if you inquire the prices they will offer you the shoulders for just about half the price they sell the remainder of the sides for. That is the reason they will not pay the highest price for sides with heavy shoulders.

### DO PACKERS PAY A SUFFICIENT PREMIUM FOR BACON HOGS ?

Those who have followed the weekly market reports in *Farming* for the past month or two anyway closely will have noticed that the difference in the prices paid on the Toronto market for choice bacon hogs and for thick fat hogs has been from twenty-five to forty-five cents per hundred pounds. In last week's issue there was a difference of only twenty-five cents between the prices paid for these two qualities of hogs. This is really a remarkable state of affairs. For the past two or three years nothing has been brought so prominently before our breeders and farmers than the necessity of having the right kind of hog for bacon-producing purposes, and yet we find that the packers and buyers throughout the country will at the most not pay more than fifty cents per cwt. for choice bacon hogs than for thick fat hogs. In fact, many drovers in the country make very often pay as much for one kind as the other.

With this condition of affairs existing is it any wonder that our farmers and breeders are not taking to the raising of choice bacon hogs as readily as was to be expected under the circumstances. So long as the farmer can get within a few cents, if not as much, per cwt. for his thick fat hogs as for the bacon type he will not be very eager to discard the former and adopt the latter. Breeders of what are termed the thick fat hog and farmers

who raise this variety claim that they can produce pork cheaper with it than with the so-called bacon type. If this be true, then the packer or drover must be willing to pay him a sufficiently higher price per lb. for the bacon hog to enable him to make a good profit by the change. Though the farmer realizes as well as anyone else the importance of supplying the export bacon trade with the right kind of goods he is not governed altogether by sentiment in the matter, and unless he can see his way clear to make that kind of pork raising more profitable than what he has been accustomed to he will not change from the old method. If he raises the thick fat hog, and makes a profit out of it at \$4.25 per cwt., he is not going to change to the bacon type, which sells at \$4.60 per cwt., unless it can be proven to his satisfaction that there is more money in raising the latter kind.

The following item from Hodgson Bros'. Liverpool market report of September 17th gives a fairly good idea of the prices obtained for choice Canadian bacon and the American quality, which is made from the thick, fat hog, "Singed Wiltshire, Canadian 40/55 lbs., 50s. to 56s.; American 40/50 lbs., 35s. to 40s." Here we find a difference of 15s. to 16s. in the price per cwt. (112 lbs.) paid for cuts of the Canadian and American varieties. If these figures be taken as a guide are our packers making a sufficient distinction between the prices paid for choice bacon hogs, that will produce the former quality, and thick fat hogs, that will produce the latter kind? We think not, and unless they are willing to make a wider difference between the price of the two than they are now doing it will be hard work to educate the farmer to change his methods.—*Farming.*

## Household Matters.

(CONDUCTED BY MRS. JENNER FUST).

One may fairly say: spring has come at last, and the look-a-head people who took time by the forelock and made every preparation possible for its coming, will have cause to rejoice, for the sun is a splendid detective of indolence, and want of forethought, and justice will be doled out to the unwary in all sorts of ways too numerous to mention.

Neglect of little duties often causes the direst results, in the shape of a double portion of hard work to be done at a very busy time.

A stitch in time saves nine; there never was a truer saying applicable in and on so many occasions; but, as long as the world lasts, there will be people who will give the one necessary stitch in good time, while others will trust to luck, and hope that some kind hand will put in the lucky stitch for them.

I wish there was a little more spirit of willingness shewn by the young people of to day as to the advisability of the one needed stitch. A neglected duty is much harder to be done after a time, and it may be a lie has to be resorted to hide the neglect.

Very little children can be taught obedience early in life and this will cling to them as long as they live.

The one stitch, or act of obedience, will never be neglected by them; they will never be at a loss where to find their belongings at a moment's notice; they will always be in readiness for an emergency, and thus have many a spare moment to help the negligent ones.

### DRESS.

Spring costumes, in many colours, are to be seen at last; it was rather trying to the young people, at Easter-tide, not to be able to bring out the new things which had been made for the occasion.

Now that the fine weather has come, they are to be seen in all their gayness, and how it does enliven the streets to see so much colour about!

There are some who might be all the better for a little toning down in colour.

Red is pretty when used in small quantities, and it works in well in the streets with the more sombre but pretty colours, such as the very fashionable blue, called gray-blue; crushed strawberry is again to the fore; pale green, pink, and white, make a very pretty combination for trimming hats; broad ribbons being so very expensive, has brought out the idea of trimming hats with silk, cut on the cross of the silk, hemmed on one side, and bound on the other with a band of some pretty colour about an inch wide, more or less, making the whole about 7 or 8 inches wide; this, made up into large bows and pointed ends, with a sprinkling of flowers, makes a very fashionable, and the very latest style of hat trimming.

### A CHILD'S GARDEN.

Give the children a little plot of ground, which they can call their very own, where they can dig

to their heart's content, without any fear of trespassing on forbidden ground.

Give them a few seeds of a sort easy to grow, such as sweet peas, pinks, lady's slippers, pansies, &c., and if there is any taste for gardening it will soon be shown in the way it is looked after.

There will be no weeds, the little plot will always be neat and tidy.—The childrens' sense of beauty will be cultivated and they will have the great pleasure of giving flowers to their friends.

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#### EGGS.

When eggs are plentiful and cheap, save all the shells; when they have accumulated, crush them very fine and dry them. Beat half a dozen eggs and stir the shells into the mixture, then spread and dry quickly. Put into a thin muslin bag, and hang near the fire to keep the contents dry. When eggs are high or scarce, a tablespoonful of this mixture, soaked in cold water several hours, will settle coffee as well as a whole egg.

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Eggs laid in March or April, if rubbed with vaseline, into which has been beaten a little salicylic acid, and packed in salt, will keep several months without perceptible deterioration.

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If the yolks of eggs are well beaten and a little flour sifted over the top, they will keep for a day or two; but leave the whites unbeaten, if not used at once.

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The skin of a boiled egg, moistened and applied to a boil, will cause suppuration and relieve soreness in a few hours. It is also an excellent application for a sty or inflamed eyelids.

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A raw egg, swallowed immediately is very effective in removing a fish-bone which has become lodged in the throat. The white of an egg is an excellent application for a burn. If mustard is mixed with the white of an egg, a blister will seldom follow the application of the plaster.

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Hoarseness and tickling in the throat are relieved with a gargle of the white of an egg beaten to a froth with a tumblerful of warm sweetened water.

#### BAKED MACARONI.

Break four ounces of macaroni into two-inch lengths; throw them into a kettle of rapidly boiling water, boil twenty minutes; drain, cover with cold water and soak for fifteen minutes. Put a layer of this into a baking-dish, then a sprinkling of grated cheese, another layer of macaroni, and so continue until the dish is filled, having the last layer of cheese. Put a tablespoonful of butter and one of flour into a saucepan, mix, and add half a pint of milk; stir until boiling. Pour this over the macaroni; dust the top with stale breadcrumbs, and bake in a moderate oven for twenty minutes.

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Preserved ginger syrup is a favored flavoring for pudding sauce or custards and in a very healthful one. It is a substitute for wine in sauces.

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#### HOLES IN BREAD.

The reason why you find large holes immediately under the crust of your bread is because the gas is driven from the bottom of the loaf upward, and held by the heavy crust on top. Brush your bread thoroughly with water before putting it into the oven, prick it with a fork; if it is in large loaves it should be in ten minutes before browning. Small loaves should be baked more quickly.

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#### TO WASH LONG WHITE CURTAINS.

After taking down the curtains give them a good shaking in the open air to get rid of as much dust as possible, then put them to soak in cold water, in which has been dissolved a little soda or borax. Scald the soda or borax in hot water, then add to the cold. Let the curtains remain in this some few hours, and you will be surprised at the colour of the water. Now squeeze carefully out of the steeping water, and rinse it in hot water, then wash with hot water and melted soap. When they look clean boil them for half an hour. Now rinse in cold water, then in water which has been blued. If you possess a wringing machine, take off some of the pressure and pass the curtains through it, for if wrung out the fibres of the lace often give way, especially if the curtains are getting old. Now make some boiled starch, and when it is cool enough, dip in the curtains one at a time, and squeeze out, not twist, and wring,

then hang out to dry. Some people prefer to dry the curtains before starching, but I never do. Now, the drying process must entirely depend upon your drying space or domestic appliances. I have curtain stretchers, and upon these I dry my curtains, which look like new when taken off, and do not require any ironing, but are ready to put up at the window at once. Everyone, however, does not possess curtain stretchers, so the next best plan is to stretch them on a line, pulling them into shape as they dry. When nearly dry, take down, fold, and mangle, then iron out the edges on the wrong side. Another plan, and better than the last, is to lay a sheet down on the carpet, and pin it down, on this stretch and pin out the curtains, and leave them to dry. Before removing, pass a hot iron over them, and they will look very nice if properly pinned out when wet. Ladies who live in towns and whose curtains often need laundering, will find a pair of curtain stretchers a great boon. They cost about ten or twelve shillings, but will soon pay for themselves, if only in the saving of wear and tear, and the labour of ironing.

Moths object to the smell both of paraffin and turpentine, so housekeepers who are storing away winter clothing would do well to lay amongst it pieces of paper moistened with either.

Have the front door, around the handle, wiped off with kerosene weekly to prevent the smeary look which indicates the second rate house on sight. Kerosene removes the soil of contact and keeps the varnish in good order. When the brownstone framing shows smeary and rubbed at the sides scrub with hot potash water and soap suds, applied with a broom and well rinsed off. If ground glass door panes look greasy, wash them with potato water and rinse, using no soap. Apply potash carefully to prevent its running down to spoil the varnish of the frame.

#### A MUTTON CHOP.

There are several ways of serving this most welcome little dish, but the two which I consider the best are as follows:—

No. 1.—Take a chop cut from the fine end of a loin of well-fed, well-hung mutton, and after trimming away nearly all the fat, season the meat

on both sides with salt and pepper, and toast it in a Dutch oven in front of a hot clear fire. Place the chop very near to the fire at first, and turn it in a minute or two so as to brown each side as quickly as possible, and so prevent the juice of the meat from escaping, then draw it further away, and allow the cooking to be produced more slowly, in order that the meat may be done thoroughly without being at all dry or shrivelled up. Have ready a nice hot plate, upon which has been arranged in readiness some finger pieces of hot crisp toast, and upon these place the chop when it is done enough, and serve as hot as possible. Or, if the taste and condition of the patient permit, a still nicer and more dainty method of serving the well toasted chop is to place it on a tiny bed of well-mashed and pleasantly-seasoned potatoes, and to pour round about some very hot brightly-coloured tomato purée.

No. 2.—Chop, cut and trim the chop as already suggested, then season it pleasantly, dust it entirely over with fine flour, and lay it in a stewpan with just sufficiently strong, clear boiling hot stock to cover it, then put on the lid, which should be very close fitting, and simmer as gently as possible until the meat is thoroughly cooked. When done enough, place the chop on a nice hot dish, pour over it a little well-made soubise, celery, or white mushroom sauce, and serve very hot garnished with sprigs of hot fried parsley, accompanied, if considered advisable, by a small quantity of some skilfully prepared suitable vegetable.

#### HORSERADISH SAUCE.

I should be glad if you will insert a recipe for horseradish sauce in your next issue of the AGRICULTURAL GAZETTE.—PEM. [If the sauce is to be used cold, prepare it as follows:—Wash and thoroughly cleanse the root, then soak it in cold water for an hour, and afterwards scrape it into shreds as fine as possible. Put three tablespoonfuls of horseradish thus prepared into a basin with half a teaspoonful of salt, a whole teaspoonful of made mustard, the well beaten yolks of two fresh eggs, four large tablespoonfuls of fine salad oil, and two tablespoonfuls of pure malt vinegar, and stir these various ingredients briskly together until they form a well blended whole, then serve in a sauce-boat. But if the sauce is to be served hot, the method of preparation is quite different.

Put two ounces of butter into a stewpan, and as it melts mix in very smoothly, one ounce of flour ; cook over a gentle fire for about five minutes, taking care that the mixture does not acquire any colour, then add half-a-pint of good white stock, and stir constantly until the sauce boils ; next draw the stewpan a little on one side and add the strained juice of a fresh lemon, the beaten yolks of two fresh eggs, a seasoning of salt, a large tea-spoonful of made mustard, and four large table-spoonfuls of horseradish prepared as already directed. Make the various additions very gradually, and stir briskly all the time, then when the sauce is thoroughly hot, without having boiled again, it is ready for use. If intended as an accompaniment to boiled fowls, another method still must be adopted, which is as follows :—Put two large table-spoonfuls of properly prepared horseradish into a stewpan with a seasoning of salt, a tea-spoonful of fine white sugar, a tiny pinch of cayenne, a quarter of a pint of milk, and the beaten yolks of two fresh eggs, and stir constantly over a gentle fire until the sauce thickens, without ever being allowed to reach boiling point even for a moment, then serve in a hot sauce-boat.

M.

## The Garden and Orchard.

(CONDUCTED BY MR. GEO. MOORE.)

### AMAZING LIFTING POWER OF VEGETABLE GROWTH.

Experiments have been recently tried at the Amherst College, Mass., by Mr. H. Ames, as to the latent force existing in the vegetable world.

Plants of the Yellow Chili Squash were placed where the moisture and temperature could be easily controlled. A bed of rich mould or compost was prepared, in which they were planted ; an ingeniously constructed apparatus for testing the lifting force of the growing fruit was constructed, which consisted of a frame of 7 inches boards ; in this frame-work the squash was placed with iron straps encircling it, and these were attached to a lever on which weights were placed, by which the lifting capacity of the vegetable was measured, and as it grew, other weights were added, and a register kept. On the 21st day of the third month of its growth it lifted the enormous weight of 5,000

pounds. And then the tackle broke so that no further test could be made.

Incredible as this may be appear, it is a well attested fact, as the experiment was made by the officers of a well known scientific institute and carefully noted.

### THE SPRAMOTOR.

In a late issue, page 476, we impressed on our readers the necessity of early spraying, and gave some general directions with regard to the work.

One of the difficulties attending the spraying of all crops has been the want of a suitable implement wherewith to apply the moisture quickly and effectively.

Another difficulty is that of arousing many of the farmers to the fact, that spraying is not so difficult and tedious a task after all, and that by it a clean, abundant, and paying crop of fruit and vegetables can be reckoned on with a certainty of success as far as insect and parasitic fungi, enemies, are concerned.

The Spramotor Co of London, Ont., publish a treatise on the subject, which is full of valuable, statistical, and other information, and which may be obtained by asking for it.

This machine was placed first in a trial of 11, at Grimsby, Ont., and seems to possess all the qualities of a good sprayer ; it is accompanied by a variety of nozzles, cylinders, pipes for spraying rows of roots, vines, or bushes, and with extension rods, to reach the very place in the tree where the spray is required.

There is a misapprehension on the minds of many as to what spraying really is, and people forget that there is a wide difference between spraying and sprinkling. In the former case the leaf and stem, the bud or fruit, are completely saturated, the spray being really a coarse vapour which finds its way to every part ; and in the later it is water, with its particles unseparated, which may or may not reach the very part where its presence is most required. Hence, the spramotor which will "vapourise" the water, without becoming choked, is the most desirable.

Messrs. Ewing & Co are the agents for the implement above mentioned, and have samples in stock which can be inspected by any one interested in spraying. And who that has a garden, orchard, or farm is not ?



There is also a very cheap little instrument for distributing insecticides and fungicides, either in a liquid or powdered form, which any one having a small garden or a few house-plants would do well to have.

### M A Y.

May is looked upon, in all temperate climates, as the gladdest month in the year. October is the month of fruition; May the month of promises, and, to many hearts, promises of good to come are more pleasing than actual fulfilment. May, in this part of the world, is the season of activity for the tiller of the soil and herdsman. Now, all nature seems to be setting them the good example to be up and stirring. The trees are budding into leaf and blossom rapidly, and the grass springing into green and luscious beauty, as if by magic. The broods of chicks, and herds of sheep and cattle are increasing and growing, oh! so quickly and robustly, under the fostering and tender care of the good housewife and careful husbandman, that we call the season a grand revival.

Now, we have the joy of looking forward to the delights of watching the growth and development of our crops and animals, and the working of the processes of culture or care we may have adopted to secure; as far as our part is concerned; a successful result, and, to the man who loves his calling and takes that interest in it which alone can achieve success, what joy! These are pleasures to which the careless and indifferent are strangers.

No wonder that in the good old days, May-day in the country was a gladsome festival, and the young people danced for very joy of heart round the May pole, which was set up on the village green, and the favorite maiden was chosen as Queen of the May.

I sometimes think that, in this intensely practical age, it is a pity that such festivals are no longer kept; for "all work and no play makes Jack a dull boy" and if the joy with which nature inspires us at this season could be allowed expression in one day's "jollification," should we not be prepared to work with greater zeal and determination through the coming days of seed time, cultivation and harvesting of the crop?

At the dawning in May the good farmer will speed  
On his way to the field to deposit the seed,  
His faith in the promise of Heaven secure,  
That seed time and harvest for aye shall endure,

And now the good housewife has risen from bed,  
Seen the cattle well milked, and the poultry well fed.  
Each helping the other, as they journey on,  
And rejoicing at night for a day's work well done,  
For labor is sweet when 'tis lightened by love,  
And brings its reward, both in earth and above.

### PROFESSOR ROBERTSON ADDRESS BEFORE THE NEWSPAPER MEN OF TORONTO.

To the Editor of the JOURNAL OF AGRICULTURE :

SIR—I read with great pleasure the *Montreal Herald's* report of an address delivered by Prof. James W. Robertson before the newspaper men of Toronto, and as it is full of encouragement to our farmers, I think perhaps it will be well to lay some of its salient points before your readers.

After calling attention to the fact that Agriculture is the "Mother Calling" in Canada, a fact which cannot too often be impressed upon the public mind, the learned professor shows that success in the calling depends upon the personal efforts of the manager, and that the prosperity of the country is built upon the intelligence, industry, skill, integrity, fairness, and untiring energy of the farmers, for it is they who create the greatest part of national wealth.

Then he goes on to prove by statistics, the vast importance of agriculture. Comparing the sources of material wealth, he shows that the mines, fisheries and forests yield about \$130,000,000 annually, and the farm products more than four times that sum, that is to say \$600,000,000. These figures are really surprising, and show what rapid strides have been made in developing the natural resources of the soil, and must be gratifying to all men with patriotic sentiments, and full of promise to those who desire to see Canada keep her place among the most important and progressive of Her Majesty's possessions. The Professor goes on to explain that our territory is so vast that there is a room for all, and the more there is produced of the fruits of the earth, the more will commerce increase, and population multiply; thus affording a larger home-market for all kinds of farm products and a basis for a larger export trade.

Speaking of the efficiency of the farmer: a thorough training in trade, business, and professional habits is enforced as a factor in successful agriculture, and this training it is recommended to begin early in the life of the child, as a means

of developing the mental power, not so much by reading, writing, and arithmetic, as by oral instruction by the teacher, directing the scholars to study and observe his surroundings, with a view to quicken his faculties of comparison and judgment.

Better advice could not be given than this; the time to bend the twig is when it is young; and all teachers now understand the value of object-lessons.

Whether a boy is destined to be a farmer or not, a knowledge of the fundamental laws of growth and culture will help to expand his mind, making it more receptive of the theories that may be necessary for him to understand in any trade or profession he may be called upon, by circumstances, to adopt.

In the new book, David Harum, I find one of his wise (?) sayings is: "Small farming is not calculated to bring out the best traits of human character—and keep them out." This may be true of a man who has not the qualifications necessary to make a good farmer, or indeed a good tradesman, but here is what our worthy Commissioner of Agriculture says, the truth of which should be apparent to any one with common sense:

"It would be a good thing if the real charms and advantages of country life could be kept before the young man.

"..... The sense of insecurity to get a chance to make a living is the great dread of most people in the cities. Life on the farm assures every man of intelligence, and industry a good living, and something better, some leisure and a chance to give his children a good start in life.

Farmers, of course, will have, like other men in business, to put up with difficulties, and, especially in a new country, will need the assistance of the State, and as regards the policy of our legislators in this respect, they have nothing of which to complain.

Prince Edward's Island is cited as an example of what has been achieved by the introduction of the co-operative dairy system. In 1892 the system had practically disappeared; in 1898 the export of cheese alone was stated at 46,000 boxes. In 1892, cheese was imported into the Island, and butter-making was almost unknown.

And not only in Prince Edward's Island has this good result be procured, but the same applies to every Province of the Dominion. I remember

being in the village of Compton when no cream could be procured to add to our coffee; and, last year, I was visiting the model farm and co-operative creamery, when Mr. J. Le Moyne, the able superintendent, was distributing among the farmers of the immediate vicinity between two and three thousand dollars for the March month's milk. A small, or at least thinly settled Township in the County of Quebec, Stoneham, in 1886 had scarcely any milking cows, and now there are over 600, and the prosperity of the prudent farmers is most gratifying to see.

Another way in which the state has helped the farmer is by the *cold storage*. Of course, with the millions of acres at our disposal and the methods adopted to cultivate them, and manufacture the produce, when necessary, into marketable shape, it became a matter of the last importance that they should be placed on the market in prime condition; to enable us to meet the competition; and this never could have been accomplished without cold storage.

Especially does this apply in the case of butter, fruit, meat, poultry and eggs. The effect of the adoption of the system has been marvellous, so far, the exports and prices having exceeded all expectations. Butter, eight times as much in 1898 as there was in 1894, and eggs 10,000,000 dozen in 1898, besides dressed poultry, the export-trade for which is in its infancy; it is demonstrated that it is capable of expansion to a very much greater extent than at present and will pay better than any other branch of husbandry, taking the outlay into consideration.

To settlers here from Great Britain, it may appear sentimental, but, to my mind, it is a source of gratification, that the mother country is our best customer for all these farm-products, 600,000,000 of dollars worth it takes annually, because while receiving personal advantage, we are contributing to the welfare and comfort of those left behind in the land which gave us birth. Every man who contributes to the awakening of the interest in the public mind, of these facts and circumstances, and endeavours to show the farmers the proud position they may occupy as benefactors to their race, and pioneers in the march of civilization and progress, is doing a philanthropic and patriotic work.

Such addresses as that of Prof. Robertson should be repeated in every city and hamlet in the Dominion, and printed in every newspaper.

GEO. MOORE.

## The Grazier and Breeder.

### FORM AND FUNCTION.

#### Views of a Holstein-Friesian Breeder

*Ed. Hoard's Dairyman*.—The discussion carried on between the *Breeder's Gazette* and *Hoard's Dairyman* has suggested to my mind some thoughts that I am inclined to transfer to paper, for the reason that "square-endedness" was a term that my father often used when I was a boy, and that the cows possessing the opposite conformation he called "pumpkin-splitters." If the Associate Editor of the *Dairyman* will let his mind wander back to the days of his boy-hood, when his mornings and evenings were spent in the cow yard, and he helped me to drive the cows to and from the pasture, he will well remember that there were no "pumpkin-splitters" in my father's herd, which at that time was giving more milk and producing more cheese per cow than any other herd in Madison Co., N. Y. They were bred from Short-horn bulls of the milking strain, crossed on the best native cows, and some of them having several crosses of Short-horn blood. They had straight lines, clean, blood-like heads and necks, and were well up in "square-endedness."

Perhaps the impression this herd made on my boyish mind, so warped my judgment that I have never since been able to see much virtue in a "pumpkin-splitter," although I will be fair and own that there are some good ones among cows of that conformation. But after experience and observation have taught me that a cow to stand up under the heavy strain of milking and breeding must have two ends to her. It seems to me that it is not necessary that a cow must be cut out like the new moon from her rump to her hock, with a sloped rump, prominent chine, with the crops deficient, with high shoulders, and with angularity all over, to be a good producer. I have seen good ones among them, but I have seen just as good, yes, and better possessing the straight lines.

There are some doggeral lines, more familiar to a former generation, expressing so many of the good points of an up-to date cow that I hope I may be pardoned if I copy them :

She is long in her face, she is fine in her horn,  
 She'll quickly get fat without cake or corn ;  
 She's clean in her jaws and full in her chine,  
 She's deep in her flank and wide in her loin.

She's broad in her ribs, and long in her rump ;  
 A straight and flat back, without ever a hump ;  
 She's wide in her hips and calm in her eyes ;  
 She's fine in her shoulders and thin in her thighs.

She's light in her neck and small in her tail ;  
 She's wide in her breast and good at the pail ;  
 She's fine in her bone and silky of skin ;  
 She's a milkman's without and a butcher's within.

There are angular, ungainly cows in every breed, and some of them are good producers, but do such cows represent the typical dairy animal? I think every dairy breed has a scale of points. I am not very familiar with any of them except the Holstein-Friesian, but I doubt very much if any of them give points for crooked lines or ungainly conformation.

There some breeders that seem to go wild over some sport or some cow that has made a large record, no matter whether she is a roach-back or a sway-back, whether a "pumpkin-splitter" or a "square-ended" one. If she is only good on paper, that is enough. They don't seem to care about whether she is a typical dairy cow and capable of conferring the characteristics of a dairy cow upon her offspring. They forget that there are scales of points of the different breeds, and that it is not only the privilege, but the duty of a breeder to breed as closely as possible to the scale of points of the breed he is handling.

I believe that it is conceded by every good judge of dairy stock, that a loose structure is conducive to milk production ; but this does not mean that the dairy cow should be ill shaped, or that she should look as though she was put together hap-hazard. It only means that the bones in her frame work should be far apart, indicated by the open ribs and joints of the vertebrae, and by the hollows in the shoulders and thigh pits. The breeder who breeds to type, guided by the scale of points, is, in the end, the successful breeder ; animals from the great producers, and drops all animals not typical, will, in a short time, have reason to be proud of his herd.

As I have already said, perhaps my early training has warped my judgment ; those who know me best can better determined. I have handled dairy stock in Central New York for the part fifty years, and the cow that comes the nearest to my ideal of a dairy animal, is the typical Holstein-Friesian, Americanized. The Holstein-Friesian Association have been very wise in their past legislation. They used money and brains without

stint with a view to advancing the breed to that point where every animal will be a typical one, and they have tried to educate the breeders in that line of work. Their scale of points is designed to represent the perfect dairy animal. They consider the far test, the official test, and the show ring as educators. They believe that no man should go into the show ring as a judge of dairy stock unless he can tell when asked, why he makes his awards thus and so. Hence, they have made a list of the best educated men for the fair associations to select from as judges. They believe that the fair is an educational institution for the farmer, and that an incompetent judge brings discredit upon the fair and upon the breed he claims to represent.

The typical Holstein-Friesian, Americanized, is of the milk and beef form. A recent investigator in looking through a few volumes of the *Advanced Register* finds 108 cows, above five years old, of the milk and beef form, which have to their credit an average record of 18 pounds and 14 ounces of butter is one week per cow; 86 cows of the milk form, which have a credit of 16 pounds and 10 $\frac{3}{4}$  ounces per cow; 4 of the beef and milk form, which have a credit of 16 pounds and 4 ounces per cow. These observations, extending to so large a number of cows, show conclusively, that the association have made no mistake in the type chosen. He also finds that the level backed cow, (through another large series of observations) in average production of butter per cow, per week, exceeds by 2 $\frac{1}{2}$  pounds the cow of irregular conformation.

S. BURCHARD.

Hamilton, N. Y.

## The Dairy.

### NOTES ON RECENT DAIRY RESEARCH

(By Dr. C. M. AIKMAN)

Investigations have recently been carried out by Professor F. C. Harrison at the Ontario Agricultural College and Experimental Farm in America, on the number of germs contained by milk; and how this germ content is affected by various conditions, such as contamination from the fore-milk (the first milkings), from the animal and the milker, from the air, and from the use of improperly cleaned utensils. In each case the number of

germs present, and the species to which they belonged, were determined; and the figures stated are those found to be present in a cubic centimetre (the  $\frac{1}{8}$  of an ounce). With regard to the number of organisms present in the milk, comparison was instituted between the milk produced on the College Farm, where the utmost precautions were taken towards minimising, as far as possible, the access of microbic life to the milk, with that sold in the nearest large town. In the case of the milk produced on the Experiment Station Farm, it was found that the number of bacteria present varied from 8,000 to 18,000 per cubic centimeter; while in the milk bought from the ordinary retailers in the town the numbers present ranged from a minimum of 121,000 to a maximum of 1,200,000 per cubic centimetre. It will thus be seen how striking is the difference in the germ content of milk produced where the utmost precautions as to cleanliness are exercised, as compared with that produced under ordinary conditions, and after it has been subjected to various careless processes of handling.

With regard to the number of germs present in the foremilk, Professor Harrison found that in the first few streams of milk removed from the teats, they varied from 18,000 to 54,000 per cubic centimetre; while the numbers present in the remainder of the milk amounted to only from 890 to 4,800 per cubic centimetre. These figures clearly demonstrate how important it is that the first few drops of milk from each teat should be milked into a separate receptacle and subsequently thrown away, and should not on account be mixed with the bulk of the milk.

The importance of wetting the flanks and udder of the cow before milking, was also clearly shown in the experiments conducted by Professor Harrison. Comparison of the numbers of germs present in the milk when the udder and flanks of the cow were wetted, as against those present when recourse was not had to such measures were instituted. The test was carried out by counting the numbers of germs falling into a pail one foot in diameter, in a minute's time in each case. Where the cow was milked without wetting the flanks and udder, the numbers falling into the pail during the minute amounted to from 8,000 to 17,000 germs; while where the flanks and udder were moistened before the milking operation the numbers falling into the pail during a similar period of time only amounted to from 640 to 2,300.

Determinations of the numbers of germs in the air of the byre during the operations of feeding, bedding, cleaning up, etc., as compared with the number present in the air one hour after these operations had been made, were also carried out. In the case of the bedding operation, the numbers falling into a pail one foot in diameter during a minute's time, amounted to from 12,000 to 42,000; while one hour later these numbers had decreased to, from a minimum of 483 to a maximum of 2,300. From a comparison of these figures, it is evident that much benefit would ensue from either moistening the fodder before disturbing it, or else the operation of feeding should be carried out an hour, or even half an hour, before the process of milking takes place, so that the dust occasioned by the feeding and bedding arrangements may have time to settle before the milk is exposed to the germ life contained by the dust. In cases, also, where the manure is not regularly and completely cleaned out, it becomes dry and friable, with the result the small particles becomes detached from it, and float through the air, thus considerably increasing the number of organisms present in the air.

## The Poultry-Yard.

### TESTING EGGS.

This is a very important part of the business, and if properly attended to will throw a flood of light upon many perplexing problems in natural as well as artificial incubation. It not only elucidates but proves the truth or fallacy of theories in the line of hatching.

Men are frequently heard to say, that they never bother with testing eggs. That they cannot replace the infertile eggs with others, and therefore nothing is gained. They are told by the authorities that boiled eggs are not good food for chicks, and, as for themselves, of course they would eat only fresh eggs.

Then there is a risk of taking out hatchable eggs; so they run all the eggs through together.

They say that they can break the unhatched eggs when the hatch is over, and see which were infertile, and who cares whether they were or were not fertile, if they did not hatch?

To attain the best results, it is absolutely necessary to test the eggs in process of incubation. If

the eggs all come from one farm or yard, and a large per cent of them prove infertile, weakly fertilized, or stale, you will notify the party from whom you got them, and he can look into the matter and rectify it, if he will, and afterwards serve you with vigorous fresh ones. If he will not do so, then you can avoid him, and procure better (or worse) ones elsewhere. If the eggs are from your own stock, and you know that they are fresh, and they prove infertile or lack strength, you will know it, and can proceed at once to remove the cause, and thus save time, eggs, and complaints from the customers to whom you sell eggs for hatching. If you have several yards, you should mark the eggs from each yard, so that you can tell which are the best and which the poorest, and then treat the stock in each yard according to the requirements indicated by the testing of their eggs. There is a cause for each imperfection, and you should discover and remove it.

You may test your eggs this month and find them all right; those laid next month may be all wrong. Suppose that you wish to set two hundred eggs, and get several lots of eggs from different yards or persons, to make up the number; one or two lots may be first class, while of other lots nine-tenths are infertile and the balance too weak to hatch. If the separate lots were not marked, you would condemn the whole lot and the parties from whom you bought them; and if you did not test them you would probably condemn the incubator or the hens.

In the selection and marking of eggs, it is well to avoid extremely large or very small ones, odd shaped ones, and those with cracked shells.

In testing, you can very often trace a number of infertile eggs to a particular hen by a peculiarity in shape and a uniformity of size—that is, where a considerable number of eggs of a uniform size all possess the same peculiarity of shape, you can be reasonably sure that they were all laid by the same hen. You can use that hen's eggs for market instead of putting them into the incubator next time (unless you remedy the defect in the bird), and leave room for better ones.

Among the causes of infertile and weakly fertilized eggs are: an insufficient number of cocks for the hens, or, which is just as bad, too many cocks; ill conditioned or debilitated cocks; over fat, or aged hens; too close confinement of breeding stock; lack of green food; too much meat; forced egg-production by the use of condiments;

low vitality of stock, from neglect of feeding properly or protection from the weather ; or diseases.

Stale eggs are almost as bad as infertile ones. After an egg is eight days old, it begins to weaken, both the germ and the sac or tissues which envelop the yolk. The older the eggs are, the fewer the chicks that hatch, and the weaker are those which do hatch. The percentage of deformed chicks increases with the age of the eggs.

As the yolk form no part of the chick, but is absorbed or taken into the chick just before hatching, and is its natural nourishment for the first twenty-four hours after hatching, it is important that the egg should be as fresh as possible when placed in the incubator.

If the yolk should be stuck fast to the skin of the egg, the chick must die, although it may break the shell.

To become an adept at testing eggs for hatching, one has only to use a good tester, one's eyes and a little judgment.

Break into separate saucers (carefully) one which you suppose to be a good, strong, fertile egg ; one which seems to be fertile, but weak ; one that is doubtful — that is, one which you cannot decide whether it is fertile or infertile, and one decidedly infertile. Break one at a time, and examine it carefully, making note of it. This should be done on the fifth day, or at the first test.

A strong, fertile egg will, on the fifth day, (temperature having been kept at 102°, 103° or 104°) show a dark spot which will float and show veins running from it, looking somewhat like a spider ; a weaker one will show a spot, but is cloudy looking and muddled. The above are supposed to be fertile. Those which look clear are infertile. Do not mistake the yolk for the germ or chick. All infertile eggs are not perfectly clear. By breaking a few tested eggs and studying their contents, carrying in your mind's eye the appearance presented through the shell prior to the breaking ; having broken an egg, say, of the strong fertile ones, select another from the unbroken eggs and see how it compares with the former. Then, having opened a fertile but weak egg, select another from the unbroken ones and see how well you can match the germ before you. Then, break a few apparently clear and infertile ones and you will be surprised to find some fertile eggs among them if your tester is inferior, or you

are careless. You will also be surprised to find how easy it is to train the eye to detect and classify minute things with a little systematic practice.

There is a decided economy in this egg-breaking business, for it will save eggs and chicks in the end.

Do not blame the sitting hen or the incubator, unless you know that your eggs are fresh as well as fertile. We would not have eggs for hatching that are eight days old at any price. We would not use them if given to us. We prefer them not over five days old, and would like them still better at or under two days old.

It is hard to remember that fresh eggs from healthy hens, fertilized by vigorous cocks, must be used if we are to hatch a large percentage of strong healthy chickens.

(We regret to say that the cuts to illustrate the following paragraphs have not been sent. Ed.)

Fig. 1 shows a strong fertile egg as seen in the tester on the fifth or sixth day. B, the dark spot is the live germ ; A A, are the blood vessels extending out from it. This germ B, is seen by placing the egg against the aperture of the tester and revolving it between the thumb and fingers until the side on which the germ has formed comes nearest the eye. The spot B, will be seen plainly, often surrounded by a small cloud, as shown, the germ at this time is quite lively, and can be seen to move up and down. This is a strong fertile egg and should be hatched under a good hen or in a good incubator. In a well fertilized egg the blood vessels should show plainly, but the germ is not always seen as plainly varying with the color and thickness of the shell and the power of the tester used. C, shows about the average air bulb in an egg on the fifth day of incubation, though it may be vary according to the freshness of the egg, and some eggs have larger air bulbs than others.

Fig. 2, shows a weak or imperfectly fertilized egg as seen in the tester on the fifth or sixth day. H, is an oblong or circular blood vessel which has started, but nothing more, there is no heart, nor any part of a chick started. This egg will not hatch, but will decay if left in the hatcher. G, shows a small dark spot, a weak germ, without blood vessels, only partially fertilized ; it has died, after a start, and, of course will not hatch. Both H and G, may be seen in the same egg. It will not hatch. F, the air bulb, may be seen in the same egg. The egg may be comparatively fresh,

and yet show both G and H. See the following notes which explain why such eggs are found.

Fig. 3, shows a stale egg, a clouded egg, a doubtful egg. A stale egg is generally distinguishable by the air space E, being very large on the fifth or sixth day, as shown in fig. 3, though all stale eggs do not show a very large air space; but when an egg does show it, it is very good proof the egg is stale. When an egg shows a clouded, muddled appearance as indicated by D (which generally moves about when the egg is turned before tester) it is certainly stale, and will not hatch. Do not confound the fresh egg which is not fertile with the stale egg; in an infertile fresh egg you can see the yolk, which will look somewhat darker than the rest of the egg, but does not look muddled.

Fig. 4, shows a live egg on the sixteenth day. K, is the space occupied by the chick. The lines I and J, show the air bulb, which may be on top or at the side, as indicated by the respective lines. This is about the average air space in the sixteenth day, but it will vary according to the thickness of the shell and age of egg when set; then, some eggs are not as full as others. At this stage of incubation (sixteenth day), a live chick darkens the egg, except the air bulb, when seen with the tester, and by watching the lines I and J the chick may often be seen to move.

Eggs should be tested in a warm room one tray at time.

The chick is harder to see after the seventh day, because the egg becomes more clouded by the growing chick.

NOTE.—In regard to G, in Fig. 2, "a partially fertilized germ" means one that from one of several causes was not strong enough to live and grow. Among those causes are cocks that are too old, an insufficient proportion of male birds for females; old or debilitated hens, or over fat hens, too close confinement of breeding stock, etc. Again you may find (G, Fig. 2) among eggs which you believe or know are not over a week old, and ordinarily the eggs were good and fertile. It frequently happens that an egg will remain in the nest, while several, or may be a dozen hens lay there, and the succession of layers keep the eggs warm enough to start incubation, or it may happen that some eggs may have been subjected to a heat of 100°, in some warm place, unknown to or unnoticed by you. In either case, these eggs are taken from the nest or warm corner to a cooler place, and kept a few days, or over-night, until a

sufficient number has been accumulated to set, they become cold, and the germ dies before they are put under the hen or into an incubator.

In testing the first time, at the fifth or sixth day, a dead germ may be mistaken for a live weak germ, and if left in the incubator for three weeks would decay; so it is always best to test the egg again on the tenth day, and remove all that have been marked doubtful and prove not good.

Some persons think it is just as well to leave all of them in until hatching is finished. But this is not right, the decaying eggs generate objectionable gases, and if broken are very offensive. A dead egg or an infertile egg, does not contain the animal heat that live ones do, and are apt to have an undesirable effect upon the next egg to it either under the hen or in the incubator. An infertile egg—one which has not been impregnated, and in which life will never start or develop—is dead when shown at the tester. This egg under the powerful hens of a first class tester will show the yolk which must not be mistaken for a doubtful or fertile egg. Use only the best egg-tester.

S. J. ANDRES.

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### HAMPSHIRE-DOWNS.

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A small flock of our favourite breed of sheep, the *Hampshire-Down*. Imported by the Hon. Matthew Cochrane, Hillhurst, Compton, Que. Ed.

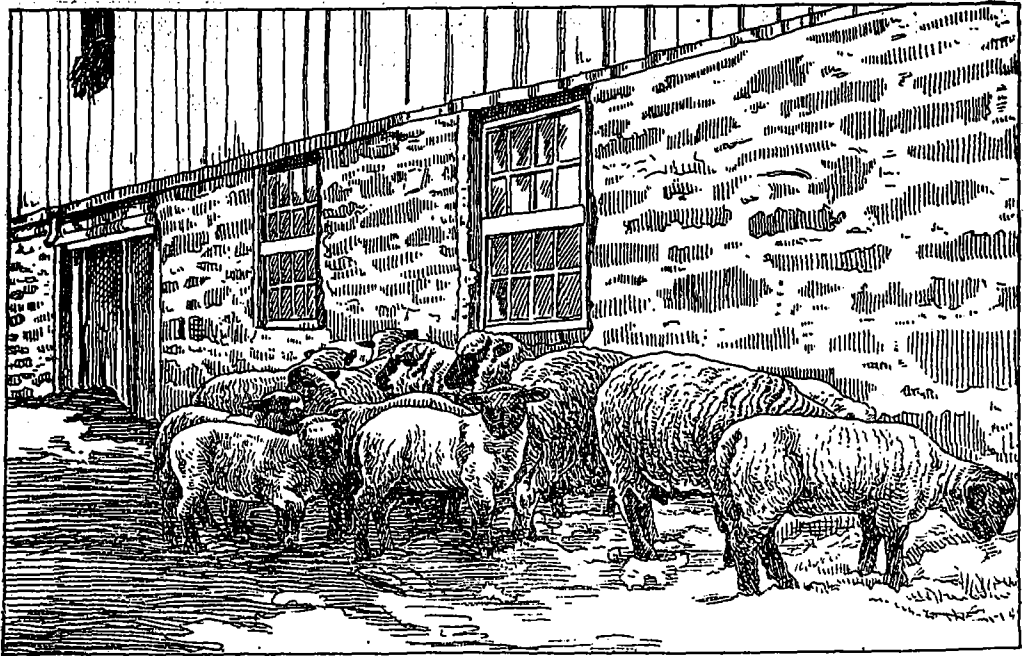
*Dorset-horns*.—The well known producers of early lambs. These ewes often lamb before Christmas, and are excellent mothers. When fattened, we have had them weigh; and not overfat either; 13 stone, i. e. 104 lbs. Mr. Cochrane has had the originals of this photo, for some years, but the *Hampshire-Downs* are a recent importation. Ed.

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HILLHURST STATION, May 5th, 1899.

DEAR MR. JENNER FUST,

In reply to your favour would say the *Hampshire Down* Ewes (10) were bought at Haynes Park, Bedford, from Mr. W. B. Greenfield's *Hamsteadbury* flock. The sire of the lambs was a lamb of 1898 bought from Mr. Edward Whalley-Tooker, Hinton, Horndean, Hants. This *lamb-ram* weighed 175 lbs. when landed at Quebec in October last.



Hampshire-downs.  
(From stock imported by the Hon. Mat. Cochrane.)

The Dorset Horns were bred from the Cottage Grove flock so successfully shown by Mr. T. W. Hector at the World's Fair and afterwards bought out for Hillhurst Farm.

Both photographs were taken on Easter Monday, April 3rd.

Yours very truly,  
JAS. A. COCHRANE.

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**THE PARIS UNIVERSAL EXHIBITION  
OF 1900.**

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(Continued).

11. *Sign and Name Boards*.—No sign or name board may be placed in such a manner as to interfere with the vista, or otherwise than parallel with the front of the stand. All signs placed over show-cases or stands must be uniform in style. Instructions upon this point will be issued later, and the maximum dimensions will be specified.

12. *Conveyance, Expenses*.—The Commission will bear the cost of transportation of all exhibits from the ports of Montreal, Quebec, and Halifax to Paris.

(1) We regret to say that these engraving do not come out so well as we could wish, owing to the paper on which they are printed. Ed.

13. *Supervision of Arrival, Installation, and Departure of Exhibits*.—In the absence of the exhibitor or his accredited representative, the Commission will free of charge, receive, unpack and install the exhibits in Paris, provide the necessary platforms, counters, and other fixtures, and show-cases where it may be decided that the nature, of the exhibits requires these. The Commission will also re-pack and return free of charge to the abovementioned ports such exhibits as are not disposed of in Paris. Exhibitors are expected to dispose, in Paris, of their exhibits when these have a commercial value; only valuable collections of objects of special character being granted free return transportation.

14. *Pricing Goods*.—Exhibitors are particularly requested to mark their goods with the home selling prices, for the information of the jury and public. Prices, weights, and dimensions should be given in French equivalents, as well as in Canadian figures.

15. *Placards and Handbills*.—No printed or written placards, handbills, or descriptions may be displayed or distributed without the permission of the Commission. Such permission may be withdrawn at any time.

16. *Dangerous and Unhealthy Exhibits*.—Dangerous articles, especially those of an explosive nature,





Dorset-horns.

(From stock imported by the Hon. Mat. Cochrane.)

are excluded. Percussion caps, fireworks, matches, and similar articles will only be accepted in the form of imitations, and on condition that they contain no inflammable matter.

Exhibitors of unhealthy products, or of products which may cause inconvenience, must conform at all times to any measures which may be prescribed by the Commission in the interest of public health and safety.

Spirits or alcohols, oils and essences, corrosive substances, and such as are liable to injure other exhibits or inconvenience the public, will only be accepted provided they are contained in such vessels of convenient size, shape and material, as may be approved by the Commission.

17. *Unsuitable Exhibits.*—The French executive reserve the right to remove at any time any article which they may deem objectionable or unsuitable for exhibition.

18. *Opening and Closing Exhibits.*—All show-cases, machinery, and exhibits generally, must be uncovered and properly cleaned each day previous to the hour at which the Exhibition is open to the public. They must not be again covered until the closing of the building.

19. *Attendance of Exhibitors.*—All exhibits must be on view on every day on which the Exhibition

is open. If exhibitors or their representatives do not wish to be in attendance at the Exhibition, the Commission will be prepared to undertake the superintendence of the exhibits, but in that event the Commission will not be responsible for any loss, damage, or accident, however occasioned.

20. *Removal of Exhibits.*—No exhibit may be removed before the close of the Exhibition without special permission from the French executive. This rule does not apply to articles which exhibitors may be authorized to manufacture in the Exhibition.

#### MOTIVE POWER.

21. *Motive Power.*—Motive power will be provided free of charge under conditions which will be communicated to the exhibitors.

22. *Foundations and Connections.*—The Commission will provide at their own expense all necessary foundations, connections with the water, gas, electric, and steam mains, as well as exhaust-pipes, drains, etc., and also provide pulleys (which must be made in halves), or any intermediate gearing that may be necessary to convey power from the main shafting.

(To be continued).