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THE JOURNAL OF AGRICULTURE AND HORTICULTURE

VOL. 2. NO. 6 — This Journal replaces the former "Journal of Agriculture," is delivere free to all members of Farmers' Clubs. — SEPTEMBER 15, 1898

..THE..

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 &c. All matters relating to the reading columns of the Journal must be addressed to Arthur R. Jenner Fust, 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.

September 7th

Once more returned to the good city of Montreal, and delighted to see the scorching heat of the past summer has not resulted in the parching either of the leaves, the flowers, or the grass of our lovely Dominion Square. What a pity it is that no kind enthusiast will take it into his head to blow-up, bark, or otherwise destroy those two elms in the centre inclosure of the prettiest pleasure-ground we ever saw (out of Europe, of course); though Royalty's hands have something to do with their planting, we would eradicate them without any fear of our dreams being haunted by their Dryad, or nymph, though, strictly speaking, the Dryad was devoted to the protection of the oak alone. The maples in the Square are lovely indeed, and were, I believe, all set out by Mr. George Moore.

Deep vs. shallow ploughing.—Our readers will see, by a letter from Monsieur Cortureux, a pupil at Guelph Farm-School, that the system of rotation pursued at that institution is peculiar. Only one ploughing in the shift, and clover every fourth year, seems, to an old-fashioned hand like the writer a rather dangerous lesson to inculcate; and, though very easy to put in practice, we shoul prefer seeing it carried out for some years—sa orty or fifty years—, before trying it on land o our own. If this is the correct principle of cultivation, then ninety-nine farmers out of a hundred in the British Islands are be-fogged. How long will it be before the frequent repetition of the clover-plant will make the land *clover-sick*?

Open drains.—As we have often mentioned in this periodical, open drains, i. e., ditches, always

get their bottoms puddled by the running water. M. Richard's farm, at Joliette, is, it seems, drained to perfection by what are really water-furrows, dividing the land into ridges, 90 feet wide. Now, in a light sandy soil, like the soil of Joliette, the plan may answer, but we see by the Report of the Dairymen's Association Convention of 1897, that the feeling is that it will serve equally well on heavy land, and we were surprised to see a farmer of stiff soil, M. Timothée Brodeur, of St. Hugues, expressing himself, though with some hesitation, as being in favour of the system's introduction into farms in general.

This is what M. Brodeur said :

"I listened to M. Richard's lecture with much pleasure ; his farm I saw this morning ; a friend had already spoken to me about his 90 foot ridges, and I at once asked him : 'Do you think the plan is a good one?' "Yes, he replied ; after the explanations M. Richard gave me, I do think so ;' and I answered : "As you relate it, it is hardly a wise plan.' Now that I have heard M. Richard himself, and have seen his farm, I say that the plan is far from being a bad one.

"It is not surprising that, at first sight, one is likely to think ill of M. Richard's system. Père Lacasse himself was taken in ; he thought that the ridges in question were the ordinary ones. I saw M. Richard's farm this morning, and I confess that to see it was the chief reason that brought me to Joliette. Well ! I was surprised ; I should have seen the land better had it not been covered with snow, but I was able to perfectly apprehend M. Richard's system, and I think it an admirable one.

"I asked him : "Do you think your plan is suited to heavy land?" He told me that a M. Rivet had tried the experiment, and was quite satisfied with it. However, I will not keep on praising M. Richard's system any longer ; although it may be all very fine, it is not a lesson to be instilled into every one's mind, or that can be brought into practical working at once. I know well that, in farm work, we must always study economy."

Now, some years ago, we saw M. Brodeur's farm. Like St. Hugues' land in general, it was a stiffish clay, and consequently the owner had it all laid up in narrow ridges of some 6 or 7 feet, with water-furrow well drawn out ; in fact, it was as like one of our clay-farms in the Hundreds of Essex, England, as anything we ever saw.

There are those who assert that underdrained clays require no surface drainage, and that, in order, so to speak, to force the water from the sky to make its way into the drains regularly all over the land, it would be a vital error to allow any open furrows at all ; the field, they hold, should be ploughed flat, with a turn-wrest plough, from one side to the other. We remember, some fifty years ago, draining a five-acre piece of land in Kent, England, four feet deep, and, misled by a statement made by one who ought to have known better, we proceeded to lay it flat ; and a pretty sight the fall-wheat was when the thaw came in February ! In this country, especially, we agree with the late Mr. Edward Barnard on this point : "We aim," he said, or rather wrote, in the October Journal of 1891, "at thorough drainage, and in our climate of heavy rains and snow, water-furrows and open ditches prove useful even with the best under-drainage."

Our best heavy land farmers in England have all their land laid up in regular ridges, varying from 6 to 8½ feet in width. All the implements, whether drills, harrows, or rollers are made to fit the ridge, so that, after the ploughing is done, no horse sets its foot on the ridge. The horses in the drill are harnessed *at length*, (1) and walk up the open furrow ; the harrowing horses go one in each furrow, the harrows covering the whole ridge, and the roller is broken in the middle the horse or horses walking up one furrow and the implement rolling one half of the ridges on either side. By this method of working, the land is never "poached," an immense advantage, as the footmarks of horses in clay-soils hold water until evaporation dispels it.

Value of dung.—In Montreal, the usual contract price for the dung of each horse in the stable of any of the large carrier companies is two dollars a year. In one of the bulletins of the New York Experiment-station it is stated that the theoretical value of the manure of 1,000 lbs. of each kind of animal kept on the farm is :

Horses, kept in the stable	$19.12
Horses, at work	11.47
Cows	29.82
Sheep	38.55
Hogs	17.11

The 1,000 lbs. of living swine giving so much

(1) The shafts of the drill are *quartered*, i. e. placed on the side. Ed.

less in quantity than the other animals is one reason for their yearly manure being so much less in value. The value of the sheep's dung is the highest per cwt.

From this calculation, we deduce the fact that the value of the dung of farm animals in general is much greater theoretically than it is practically.

Jerseys vs. Dairy-Shorthorns.—Turning over some old agricultural papers the other day, we ran up against a report of two sales, in each of which the stock offered was the property of well known breeders. Mr. Trinder's herd of Jerseys averaged eighty dollars a head. Mr. Simpson's Dairy-Shorthorns, averaged one hundred and twenty-six dollars. Balance, in favour of the Dairy-Shorthorn, forty-six dollars; that is, the "general purpose" cow sold for 56% more than the pure dairy-cow, if these sales are any guide.

The potato-beetle.—Why on earth do not the farmers combine and try to exterminate the brutal beetle? Unfortunately, as long as poor people have, each, a tiny plot of potatoes and put their trust in their fingers and thumbs, instead of polishing the vermin off with Paris green up to the very last hatched egg, so long will the plague endure.

Clover.—Many hundred acres of second-cut clover are still standing uncut in the fields. Not left for seed, we fancy, but left with an idea of enriching the land. Well, if people have too much food for their stock next winter, and as hay is very low in price, perhaps the argument is that they cannot afford the expense of cutting and making; but we persuaded one man to try the second cutting, and all the labour incurred was: mowed by the machine; turned once; carried to the barn without cocking. Not a very costly job, was it? Farmers here, with the finest of climates, fiddle about with their clover thrice as much as an English farmer would do.

Autumn stubble cleaning.—What a splendid fall this has been for cleaning the stubbles! And yet we have not seen a solitary team at that work; some ploughs were at work last week, but the plough is not the proper implement for the work. A good grubber is needed, like the one shown in the engraving at p. 76, of the number for the 15th of August. The plough divides the couch-grass, besides burying it, and another ploughing is needed to bring the grass to the surface again; whereas the grubber tears the rubbish up, roots and all, and keeps everything on the surface.

Barley for the English market seems never to be talked about nowadays, and so much the better, as, unless the treatment of that grain after harvesting is very much improved, our barley will never give satisfaction to the English maltster. There are two principal points that strike the eye of the maltster in looking at a cargo of foreign barley: 1. Is the grain equal in quality throughout the bulk? 2. Are there many broken grains in the cargo? As to the first point: if the grain has not ripened equally, the bulk will not grow equally on the floors; consequently, some of it will be ready for the kiln before the *acrospire* (which would come out as the green *plumule* unless dried off) is half way up the back of the grain. As to the second point: if there are any broken grains—and there are too often lots of them—they will turn mouldy on the floors, and mouldy grains of malt are inevitably the cause of a continuous fermentation in ales that cannot be stopped, and, consequently, ales brewed from such malt is never bright.

To Arthur R. Jenner Fust, Esq., Ste. Anne de Bellevue.

Dear Mr. Jenner Fust,

As you desired, I have written all particulars wtth reference to preparations selling in this province for the Cure of Scab on Sheep and have in addition sent per express all expenses paid, a package of the Celebrated "Cooper's Dipping Powder" usually called "Cooper Sheep Dip" for which preparation Messrs. Evans & Sons, wholesale Druggists St. Jean Baptiste St., Montreal, are the wholesale agents for the Dominion. Any druggist can supply it in small or large quantities at short notice. It is used largely amongst the large flocks in the far west of Canada, and also the U. S., for the province of Quebec the sale is limited in consequence of the small flocks kept here and the habit of selling off a ewe to the local butcher as soon as anything is wrong with her *no matter what.* Very little care or medical aid is applied to sick animals on farms here, as you know.

Believe me truly yours,

HENRY R. GRAY.

Reasons why the Cooper Sheep Dip has been the leading dip of the world for 50 years.

1. It is infallible for Ticks, Lice, &c. 2. It is the one certain Cure for Scab. 3. It is of uniform strength. 4. It is not injured by time or climate. 5. It is soluble in cold water. 6. It is safe. 7. It does not stain the wool. 8. It is cheap. 9. It is lasting in its effects. 10. It is in compact form. 11. It is convenient and agreable in use. 12. It is superior to all others.

The Orchard and Garden.

(Conducted by Mr. Geo. Moore).

THE PLANTING OF FRUIT TREES AND BUSHES

BY THE REV. FATHER-TRAPPISTS.

(*From the French*)

(*Continued.*)

V.

Drying apples

The drying of fruit is an industry taken up to a considerable extent during the last few years, and especially in the United States. Co-operative drying houses are established where the orchardist can bring his fruit, as the dairy man his milk to the creamery, but any one can evaporate his own fruit by means of a special apparatus which is cheap and easily obtained. The preparation of apples for drying in an evaporator consists in peeling them, taking out the core, and cutting them in slices; this is rapidly done by ingenious machinery that can be bought for a small sum.

It is now the custom to submit peeled apples, before or after being sliced, to the fumes of sulphur. This operation is called bleaching, and gives a better appearance to the fruit, causing it to retain its color. The sulphur is placed in a vessel over a fire and the vapor passes through the fruit which is placed in trays above, the fumes escaping by the top; the time necessary for this operation is about 25 minutes. After the bleaching, the fruit is placed on wire trays which are fitted to the inside of the drying chamber of the evaporator, where it remains until sufficiently dry, which takes from 2½ to 4 hours. The fruit must be removed before it becomes brittle, while it is still tender though a little tough.

For the drying of apples there will be required: 1st, portable evaporators, varying in capacity from 5 to 150 bushels a day; 2nd, evaporating ovens that are not costly.

Packing dried fruit.—The fruit must not be packed till 24 hours after drying. It is then put into paper-lined boxes holding from 25 to 50, or 75 lbs. A box for 50 lbs., should be 12 x 12 x 24 inches.

Evaporated apples should be packed in the same manner as the green fruit, that is to say, commencing at the top of the case; nail on the cover, and then turn the case upside down, then place a sheet of paper in the case, and arrange the layers of fruit regularly in lines; letting each layer corner the preceding one. When the case is full, nail the bottom, brand it and it will be ready for market.

Varieties to evaporate.—Summer apples are not fit for the purpose.

The following table gives the best winter varieties for evaporating.:

			lbs. oz.
1 Northern Spy	50 lbs will give when dry		9
2 Golden Russet	"	"	9
3 Ben Davis	"	"	9
4 Pewaukee	"	"	8.7
5 Pomme Grise	"	"	8.2
6 Canada Baldwin	"	"	7.13
7 Fameuse	"	"	6.14
8 Gedeon	"	"	6.4
9 Haas	"	"	6.4
10 Longfield	"	"	5.15
11 Scott's Winter	"	"	5.5
12 Wealthy .	"	"	4.8

(*Extract from report of Experimental farm, Ottawa.*)

Making cider

The growing of apples for cider is destined to increase enormously in the Province of Quebec; and for many reasons: 1st. The soil is eminently suited to their culture, and it is proved that the Canadian apple is superior for the purpose to the Norman apple. 2nd. Without doubt, cider is a wholesome and agreeable drink, and its manufacture should be more general in this country.

To make really good cider the apples must be quite ripe. (1)

A very simple and cheap way of making good cider consists in having three hogsheads, open at one end. Place in one, 100 lbs of apples, cut into small pieces, on these pour 3½ gallons of water for the first time. To prevent the fruit from floating, place in the hogshead, on the surface of the fruit and water, a cover of boards, held to-

(1) And should be piled in heaps for two or three weeks before crushing. Ed.

gether by a transverse board. After 12 hours of immersion, draw off 3½ gallons of water, by means of a faucet placed at the bottom of the barrel, and pour into this hogshead which we will call No 1, 3½ gallons of pure water; the first juice taken from it pour into No 2 hogshead, having previously placed in it another 100 lbs of crushed apples. After another 12 hours of immersion, draw off the juice from the two hogsheads; the juice of No 2 is put into No 3, another 100 lbs of apples having been previously added, then the juice of No 1 is put into No 2 and 3½ gallons more of pure water is poured into No 1 which is the last. At the end of 12 hours the same work is repeated, the juice of No 3 is collected and the juice of the other two is added successively. After they have passed No 3, the crushed apples are thrown away. There should now be about 12 gallons of apple-juice, and when this is fermented it makes a very good family cider.

This juice should be placed in a barrel, left open at the bung-hole. Before long, a bubbling sound will be heard, produced by the liberation of carbonic acid. This working lasts usually three or four weeks. The cider should be kept in a temperature of not less than 46°, and no sudden variations of temperature should be allowed in the fermenting-room.

Care must be taken that the cask be kept constantly filled up, so as to allow the foreign matter, brought to the surface by the fermentation, to run off. The addition of sugar to the juice increases the alcohol, when, at the same time, tannin and tartaric acid are added. For the quantity of juice above mentioned, sugar 1 lb 12 ounces, 2 grammes tannin, and ⅓ ounce of tartaric acid should be added for each degree of alcohol desired.

When fermentation ceases cork up tightly, and to be sure that no accident happens, it is well to bore a gimblet hole at the side of the bung, in which place a straw for a few days, and finally make air-tight with a wooden plug.

Diseases of the apple

Strangling of the trunk. — To remedy this, make three or four longitudinal incisions in the trunk, penetrating into the inner bark or alburnum.

Canker.—Canker is a point on the road to disorganisation in the midst of a living tissue. It is said to be open when the central portion, in full disorganisation, is surrounded by a round swelling of healthy tissue, and it is said to be close when the lips of the swelling are greatly developed and have a tendency to come together. Apples planted in moist soils are often affected with this disease, and it also develops when the circulation of the sap is suddenly checked by cutting off branches when it is in full activity, in April and May.

To avoid canker, we must

1st. Not make rents or scratches, but only clean cuts.

2nd. Not plant apple trees in too moist places.

To cure canker: with a very sharp knife, cut away the damaged tissue, so as to remove the germs of decay, then cut the clean wounds with sorrel, when the wound is dry cover it with grafting wax.

Rust.—The stems and branches, which present cavities resulting from destruction of the tissues, are said to be rusted. To stop the ravages of the disease and preserve the infected parts, the coming of the corrupting germs and the elements necessary for their developement must be arrested. For this purpose, the walls of the cavity must be sheltered from the air and moisture by filling them with mortar and excluding the air by covering the opening with grafting wax.

Moses and lichens.—Scrape the old bark with a scraper to take off the mosses and lichens and cover the cleansed parts with milk of lime.

Caterpillars.—In March, while the trees are still leafless, take off all the rings of caterpillar's eggs round the branches. Destroy their nests as fast as they appear, and crush the caterpillars, smear a portion of the stem with linseed or olive oil, to prevent their ascent.

Green grub or plant louse—These feed on the green matter contained in the leaves and the soft extremities of the young shoots: coal-oil emulsion will kill them:

Dissolve ½ lb strong soap in one gallon of boiling water; when the soap is thoroughly dissolved pour in 2 gallons of coal oil, stir or churn and thoroughly mix until the emulsion has a creaming appearance: then add nine times its volume of water, that is to say, 27 gallons. Apply with a sprayer when the trees are young, and later, by means of a watering barrel mounted on wheels.

Be careful that the emulsion is properly made; one drop of pure coal oil will immediately burn the part of the tree on which it falls.

Woolly grub.—This insect is reddish brown covered with white down, and does great injury to the apple-tree. The waxy down with which it is covered protects it from most insecticides.

When a young tree has its stem and branches covered with cankerous knots, it is often better to eradicate it and plant a good one in its place than to treat it with insecticides. Insecticides should disolve the cotony matter that covers the grub, and kill it without destroying the tissues of the tree. Alcohol, fish-oil unpurified, phenic acid, with much water, urine, tobacco juice with plenty of water, alcohol and petroleum, are the insecticides recommended, and may be used at all times successfully; most of these should be used only before the development of the leaves.

In the spring, before the opening of the flowers, spray the entire tree, particularly any part affected, with a mixture $\frac{2}{3}$ water and $\frac{1}{3}$ tobacco juice, with a sliget addition of alcohol.

The Borer.—Sometimes a tree perishes suddenly without any apparent cause; this is mostly due to this insect which, being furnished with very strong mandibles, digs or bores into the heart of the tree and makes large galleries which ramify in great numbers. The base of the trees should be carefully inspected in August and washed with soft soap. If the worm has already done its work, it should be extracted with a needle or small piece of wire, the hole closed up with mortar and cement, and sprinkled over with phenic water.

Bark Louse.—These are always to be found on trees which are in bad condition, from neglect, worn out, or decrepid from age. The remedy is good culture, and proper pruning to stimulate vegetation and give the tree back its lost vigor. Then, the bark should be scraped and washed with a couch-grass whisk, dipped in soapy water.

A good preventive of this kind of insects is to apply lime to the tree in the autumn.

Apple-gnawing worm.—The ravages of this insect can be prevented by the application of Paris-green when the fruit is begining to be formed; and a second time, when it is partly grown. Nature has given us, in the birds, powerful auxiliaries in the battle with the legions of insects which infest our orchards. We must be careful not to destroy them completely, and count for little the few cherries they may eat or the apples they may damage, in comparison with the millions of insects which they annually destroy. (1)

Spot or scab.—We often see the leaves and the extremities of the young shoots being struck suddenly yellow, next, the base of the branch becomes yellow in its turn, and then the entire branch. If we observe osely, we shall see that the wood is blackened and the bark loose; and if we wait too long, the whole tree will become the prey of this terrible fungus, called *spot* or *scab*. It multiplies with prodigious rapidity, and when one orchard is infested, the surrounding orchards soon suffer in the same way.

If care were taken to treat the trees with Bordeaux mixture in the spring, when the buds are opening, a second time, when the leaves are developed, and a third time, when the year's shoots have grown long, we could prevent the plague. But the mischief is often only perceived when it is too late. In that case, the affected branches must be cut off to the place which is perfectly healthy and exempt from all black stain, neither should we hesitate to cut out a tree to preserve the others. The branches cut off should be burnt; to leave them lying on the ground, favours the propagation of the spores of the fungus. When all the diseased parts are removed, we may make another application of the Bordeaux mixture, which is thus composed:

6 lbs. Sulphate of copper
4 " Lime
22 gallons water.

To prepare this, dissolve the copper sulphate in 16 gallons water, slake the lime in 6 gallons of water, and when this is cool, pour it slowly into the copper solution, mixing it thoroughly. Paris-green may be added to the Bordeaux mixture which will make it an insecticide as well.

Apple spot. — This attacks certain varieties, particularly the Fameuse, Macintosh-red, etc. It is caused by a microscopic fungus and Bordeaux mixture will combat it. Apply first when the fruit is about the size of a nut, a second time when about $\frac{1}{3}$ its growth, and a third time when $\frac{2}{3}$ its full size.

(1) But utterly exterminate that predaceous scoundrel, the sparrow. ED.

Household Matters.

(CONDUCTED BY MRS. JENNER FUST).

A GOOD IDEA ABOUT SKIRTS

Now that dress-skirts are worn so very full, they are of necessity much heavier than they used to be. They are still worn fastened about the waist, with all that weight hanging from the hips, and women go about wondering why they feel so tired

and cannot walk more. The reason is patent: their skirts are too heavy to be worn in this way, and should hang from the shoulders.

To accomplish this, attach the skirt to a waist made of thin calico, fastening in the back with three or four buttons, without sleeves, and cut rather low in the neck.

In this way it will not seem clumsy under the dress waist, and yet will relieve that heavy, dragging sensation imparted by the skirt fastened round the waist. When the skirt is worn over a waist with a belt, sew hooks on the inner side of the skirt-band and corresponding eyes on the waist, and again you nave the weight hanging, practically, from the shoulders.

If a little more attention were given to the matter of supporting heavy clothing, it would be very helpful to growing girls, and, very much more so where there is a tendency to stooping shoulders, so often seen at present.

We can hope to see this remedied very much indeed by the girls themselves now that they have gone in for baseball. I have noticed this summer young girls who could fairly compete with their brothers in catching a ball, not waiting for it to fall, but, with a leap, rising to the catch; being careful to drop the hand with the ball, to avoid the sting of the fall. Other girls there were who would hold up their hands stiffly for the catch: well; they very soon found out that they preferred a quiet game of croquet. These girls, I noticed, had as a rule stooping shoulders, and found it far easier to knock a ball about on the ground, than to catch one in the air.

Two young girls, friends of mine, ended their summer holidays by walking to the station, a distance of 7 miles, and said they were not a bit tired; indeed they seemed less tired than another, who drove all the way, and often pleaded with them to get in and be driven the rest of the way. I see great hopes for the future, if this goes on, and we must hail with delight baseball, or any other game, that will do so much for our growing girls. (With which delight the Editor heartily sympathises.)

LAUNDRY WORK.

We will presume that the shirts and collars are properly washed and perfectly dry before starching, for although I know that some people starch their collars and cuffs without first drying them, my experience has taught me that linen, such as cuffs and collars, dried before starching keeps a better colour and takes the starch better than left wet. Shirts must in all cases be dried.

COLD WATER STARCH.

This starch is for dry linen. Be exact in proportions if you wish for good results. I need scarcely add that every article used must be free from dust and your hands perfectly clean, as the borax used is apt to remove any stain from the hand and deposit it on the linen. Let your starch be the best white; common starch gives no good result, and is dear at any price. Take two tablespoonfuls of starch, one breakfastcupful of water, one teaspoonsul of borax, half a teaspoonful of turpentine, and a little boiling water. Mix the starch smoothly to a paste with a little of the cold water, add the turpentine with the rest of the water. Dissolve the borax in about half a teacupful of boiling water; stir still the water is clear and no stimulant remains; add this to the starch, and mix well. Put your hand into the starch and take some up in your palm. If it runs off clear, leaving no white sediment behind, it is ready for use. You can increase or diminish the quantity of starch according to the quantity of linen to be starched, keeping to the proper proportions. To use starch: Take the white shirts first. Hold the parts to be starched in your hand, and evenly damp the body of the shirt also with the tips of your fingers. Wet the calico all round the front and the sleeves where it joins the cuff; doing this prevents the starch running into the surrounding calico and making unsightly white marks on the body and sleeves of the shirt. About a couple of inches of wet will be enough. Gather the neckband together, and dip in the starch; then dip the front, and lastly the cuffs, squeezing them gently about in the starch. Wring out, rub, and clap them between your hands. Fold the starched parts together, roll up and lay aside. Carefully stir up the starch between each article. Now take the collars and cuffs, not more than two at a time. Dip, rub the starch well into the folds of the linen, wring out, clap between the hands, place them singly in a clean white cloth, lay another over them and roll up and put aside for an hour or more. Now I think I have exhausted my space, so I must leave my hints on ironing till next week. Should you, however, prefer to starch your linen wet make your starch as above, but add a teaspoonful of melted soap to the borax before dissolving it in the boiling water. Stir this into the starch, and it will be fit for use.

MOCK BISQUE SOUP.

Season one pint of strained tomatoes with a little onion juice and just a suspicion of ground mace. Heat in a double boiler one quart of milk. Rub together a tablespoonful and a half of butter and three tablespoonfuls of flour. Stir in the hot milk. When entirely thick and smooth add to the tomatoes an eighth of a teaspoonful of bicarbonate of soda. Pour in the hot milk ; add one teaspoonful of salt, a dash of pepper and serve at once. If it is necessary to keep this soup warm keep the ingredients apart until serving time.

INDIAN MEAL PUDDING.

Sprinkle carefully one cup of Indian meal into one pint of hot milk ; cook in a double boiler for about twenty minutes. Take from the fire. When partially cool add a tablespoonful of butter, the yolks of four eggs ; mix thoroughly ; stir in the well-beaten whites of the eggs, turn into a baking-dish, and bake in a quick oven for thirty-five or forty minutes. Serve hot with liquid sauce.

POTATO SOUP.

One carrot, one onion, and two large potatoes chopped fine. Boil, and put through colander. Then add pepper and salt to taste ; add a good-sized piece of butter, and one quart of milk. Let come to a boil and serve.

POTATO STRAWS.

Cut raw potatoes about two inches long and about one-eight of an inch thick ; fry in boiling fat till a golden brown, and crisp ; drain well on a sieve before the fire and serve in the centre of a dish of cutlets.

COCOANUT COOKIES.

One cup butter, three cups sugar, one cup milk, two eggs, one-half cup shredded cocoanut, one teaspoonful soda, lemon. Flour enough to make them stiff enough to roll out.

COOKIES.

One cupful of butter, two of sugar, five of flour, a teaspoonful of baking powder, four of milk, one egg, flavor to taste. Roll thin, cut in small rounds and bake quickly.

GEMS.

One pint of flour, one of milk, an egg, half a teaspoonful of salt. Beat the egg until light, add the milk and salt to it, and beat gradually into the flour. Bake twenty minutes in hot gem pans. A dozen cakes can be made with the quantities given.

The Farm.

STATE OF THE CROPS

Fall-ploughing

TO THE EDITOR OF THE JOURNAL OF AGRICULTURE.

Dear Sir,

Quite a few farmers have finished harvesting. I may say that all the south-western portion of the province of Quebec has been saved during August. with the exception of buckwheat.

Wheat as stated before has done well and there has been quite a lot sowed throughout the province, and even in the Lake St-John and Chicoutimi sections, the crop has done remarkably well.

Oats.—This grain is the standard crop of this province, a full berry and with a few exceptions—it has escaped the rust—will be a very large crop.

Pease.—Rather a poor crop. I would again advise covering very deep. (Even to 4 inches. ED.)

Barley.—Turning out well, a good colour and plump berry.

Rye.—In some sections they sow rye with other grain such as oats and it makes a very good mixture, the rye is taller and does not interfere with the oats in any way.

Corn will only be a fair crop, it got a bad start. I do hope farmers will cut it before the frost comes, or the half and even more of the substance will be wasted—cut early—for ensilage purposes, when the ear is at the boiling stage.

Potatoes.—The dry weather may have a bad effect on the size of the tubers. I think there is not much rot this season so far, very few have dug yet so it is rather early to judge of the crop.

Hay.—Such a crop of hay everywhere, and saved in good order too, although some were very tardy ; down in the County of l'Islet they were trying to save hay on the 18th to the 20th of August ! Of course the weather was wet then, in July, well, it was too hot—and then it was growing so nicely—and some were afraid it would give the horses the heaves by cutting it before the blossom was all gone ! so you see there are always a multitude of excuses, one man asked me if ever I had cut hay with a scythe ? I said yes, and I would soon cut his, but I should like to cut it when it was green as it was so much easier to cut. I saw an article in "Hoards Dairyman" entitled, "Which is the best way" ; it is not long, so I trust you will print it.

Which is the best way?

An old Irishman living in an adjoining town, who is a most excellent farmer, in speaking of the way farmers cut their clover hay, said the following, once on a time.

"It is a quare thing that so many folks live all their lives wid clover an' don't know it. The way they cut it for hay is just the same as if a man, in fillin' a jug, would turn half the stuff onto the ground."

We have seen a lot of clover hay cut this season, that positively, we would not give half price for as milk fodder.

The clover in almost every instance, is left too long for the first cutting. That spoils it for hay, and also prevents a good second crop.

As we write, we look out on a small field of clover, of an acre in extent. It is new seeding. It came on in the spring with a rank growth, and just as it began to head out and show a few blossoms, it commenced falling down badly. To secure any hay whatever, and prevent its rotting on the ground, the owner was obliged to cut it. It was given a day or so of hot sun, then cocked up and covered with hay-caps. It cured nicely, even in the midst of heavy rains. For the best economy, it was cut a few days too soon, but the question was to save any hay at all.

But here was clearly shown a principle in clover cutting that every farmer ought to study. If the first crop is cut early, before the heads commence to brown, a very much stronger growth will come afterward. Now, in this case this truth is abundantly proved. The second crop came on finely, and that was cut just as about two-thirds of the heads were well in blossom. A larger weight of hay than the first crop, and very much finer in quality, was secured. This was cut two weeks ago. A third crop is coming on rank and strong, and will be ready to cut by the tenth of September. Now here are three crops, two of splendid milk quality, and one quite fair. A yield of hay of fully five tons per acre, will be secured. Is not this a better method to pursue than the one most farmers practice?

A practical feeding value of $30 an acre will be had in this way. The principle involved is this:

Clover is a biennial. That is, it takes two years to grow and produce seed. When once the root has fulfilled its mission, and produced seed, it begins to die. The thing to do then, if we want the largest supply of hay from that root, is to prevent seed from forming.

Nature is very persistent, and so she keeps on throwing up flower stalk after flower stalk, trying to produce seed. By cutting these stalks *before any seed forms*, we secure two results:

(1) We keep the root alive and vigorous.

(2) We secure two, and often three crops of hay, all of which, pound for pound, will produce double the milk that the clover hay commonly harvested by the average farmer will.

This brings us to the caption of this article "Which is the Best Way?"

What is the use of this constant turning of half of the water on the ground when we are filling the jug? Does it indicate that we are students of our business?

Farmers talk about their clover killing out. They don't realize that their practice of allowing it to stand until the seed forms before cutting, is one great reason why it kills out."

This is just my sentiments; and yours also Mr. Editor.

Butter.—The shipments to date have got down now until there are only about one thousand packages more than last year, but this year the greater portion of the shipments have been Canadian produce, of which last year the shippers could not get enough, here, so had to get quite a good deal from the United States. I understand our butter is taking rather better in England this year.

Cheese.—The shipments of cheese were 170,000 boxes less than last year, and the shipments from United States ports make the combined shipments some 400,000 less than last year, so there is nothing to prevent the cheese market coming out right and advance another cent a lb. The make of both butter and cheese fell off from the flush rather more than usual with the drought, more especially in Western Ontario, while those who cut their clover early can now cut it a second time. I would recommend cutting it in preference to feeding down, as the cattle waste lots of it by tramping it down with their feet.

Ploughing has recommenced rather earlier than usual; hardly any one used to think of starting before September, while quite a few have already begun.

PETER MACFARLANE.

Chateauguay,
Aug. 31st 1898.

THE SPASMODIC FARMER

In every profession or trade, there are certain members who work in a spasmodic fashion, in some it does not seem to make a great amount of difference, but with the farmer it is of vital importance that certain methods should be adhered to, which if neglected upset the whole farm routine.

All connected with agriculture know the spasmodic farmer well, his is a familiar figure, and is to a certain extent a boon to the country side, for he is always the source of some joke as to his erratic behaviour. In his method of living, and of carrying on his farming operations he is spasmodic.

He may be dull and listless one day, and the next overfilled with energy and industry.

At the cider making season, whilst the fruit is plentiful, he has a day's start gathering apples.

The carter is stopped and the horses remain idle. In order that a couple of extra sacks may be gathered, every farm hand is taken away from his usual duties to minister to the apple gathering spasm. The next day it is found that through the carter not going to haul away the car of meal from the railway, that has been consigned to him, he has to pay demurrage. The apple spasm is forgotten, and is superseded by a carting spasm.

The colt which has not been harnessed for the past month, must be pressed into service today, necessitating extra hands to tend it. But what matters this to our spasmodic friend? The car of meal has to be unloaded. Then, next day the cowman finds that, whilst he has been away, the cows have found a weak rail in the fence round the hay rick, and, once inside have levelled the whole lot. This has to be remedied while the boss is thinking out another spasm. This turns say on cider making. The apples are mellow and must be ground at once. The weather is fine and field work plentiful: but what matters this? The hands must go to the cider mill, under cover. The cider making is finished, and then down comes the rain. Field work is nearly impossible, and there is no work under cover for the men. Then our friend regrets that he had the cider spasm when he had. Then he has "cropping" spasms. One year it must be wheat, and nothing but wheat. What cares the spasmodic one for such things as markets, routine, or rotation? He must have his land all cropped to wheat. And he does. And when harvest comes he remembers sadly the old adage of carrying all the eggs in one basket. With other branches of farming it is the same. One year it must be nothing but the rearing of young cattle. No matter whether they are dear or cheap, he overstocks, and then when he totals up his losses, he says he will have nothing more to do with the "blamed" things!

He then spasmodically rushes them on the market, regardless of the fact that it is the most unsuitable period in which to do so. When milch cows are at their very dearest, he buys them in a wholesale manner, regardless whether they are suitable or not, or of the price that he is paying. At election times, he is in his element. How restless he is whilst the candidate is making his speech. There is fire in his eye; his muscles are in a state of tremulous agitation, and when the meeting is over, and he drops in for a glass at the village saloon, his impassioned eloquence breaks forth. They must work might and main, hand in hand, and tell the Government what they want, and what they will have. For years past, he argues, the Government have shamefully neglected the farming industry. They must therefore co-operate, combine. A fortnight later, when the chairman of an influential Agricultural Society, which is pledged to the benefit of agriculture, calls upon him and asks our spasmodic friend to join in the movement, he finds that the political spasm has left him, and as he looks up from amongst the group of laborers, whom he is busily assisting in the prosaic occupation of sorting potatoes, his answer to the request is: "What? No! Ain't got time."

W. R. GILBERT

WHY FOREIGN FARMERS DO WELL AND ENGLISH FARMERS FAIL TO SUCCEED

To an Englishman visiting Denmark or Sweden, thoughts are suggested, which are not at all pleasing, when an attempt is made to solve the question why the foreigner lives and does well, while his own people fail in obtaining success. The rent of the land in these countries is about the same as in England, and the mode of cultivation is in no case less costly in one country than in the other. There is equal work, and equal manuring, and yet our own people fall short. The Danes and Swedes do not rely so much on grain crops,

but nevertheless they grow a good deal, quite as much proportionately as the British farmer.

The cattle are fed as well with grass, hay, roots and cake, as are those in England. There is a longer period of housing than we have, in consequence of the climate, and yet there is plenty of butter in winter. Care is taken that a good proportion of the cows, calve down at the time when prices are best.

Wherein lies the difference between the farmers of the country of England, and those of Denmark and Sweden? It seems to be that the latter all work, and the former pay people to work for them; the wives and families of the northern farmers labour in the field, and in the dairy, whilst it is the exception to see such a thing in England.

This is not to say that the British farmer never works, nor his wife, nor his family. In some cases (1) all are active on the farm, but in others there is little done except by hired labour. Here comes the *crux*. The British farmer has to live on the net profit arising from other people's labour, which is, unfortunately, in too many cases, an unknown quantity, or a very small quantity indeed; while the Danish or Swedish farmer takes the pay for the labour, and the profit on any hired labour he may require, and the two combined make him prosperous. But then, it may be said, the Danish farmer is only a labourer pure and simple. We did not so describe the British yeoman, who farmed and worked on his own land, at the beginning of this present century, so why should it be considered degrading at the present day? A great deal of talk is used about peasant proprietors. (2) Just notice what a peasant proprietor is in Denmark and Sweden.

Anyone who owns less than about 300 acres is a peasant proprietor. Of course, the class would include some who had only a few acres, but the idea will be new to those who talk so glibly as to the establishment of a peasant proprietary in Great Britain. These men have to employ labour, as well as to labour themselves, and they form a class, which would be called by quite a different name in England. This, however, is the extreme and top end of the scale, and represents men, who in a greater measure, rely on the work of others.

But, when we come down to more moderate holdings, then we find where the money is earned and saved, aye, saved: for there is all around an air of prosperity, and a general knowledge that farmers amass a little money with which to buy land, when it comes into the market. Not only is it the labour of the farmer, the farmer's wife, and their children, which keeps them in prosperity, but their living expenses and outgoings are anything but large; far less indeed than English farmers in the same position. Their bread of rye, or rye and wheat mixed, their consumption of margarine and of milk, their moderation in other ways, their economy in dress, their easily-satisfied requirements as to house accomodation, their comfortable but old fashioned furniture, and their general thriftiness, all tend to make their comparatively small incomes sufficiently large. Their industry on the land, working from early morn till late at night during their short summer, and their employment in spinning, needlework, and weaving through the long winter days and nights, when scarcely anything can be done except to attend to the cattle, all tend to make "both ends meet and tie."

It is to be feared the English farmers cannot compete successfully with the Danes and Swedes; that is on similar lines, for they have been taught not to work on the land themselves, but to leave that to the hired man, woman, or boy. A few particulars in regard to the pay of labourers in Sweden may be of interest, though they do not bear much on the question. A married labourer gets about 2½ dollars per week with 3½ pints of new milk a day, and 3½ pints of skim milk: he also receives a quantity of rye. If he has a family and requires more than the stipulated quantity of rye, he has it, and the price is deducted from his wages. Unless the land happens to be very dear, he is allowed a plot of ground for a garden—in some cases as much as half an acre. Unmarried labourers receive more money, but they do not have perquisites such as are given to married men.

A sight of the home life of these farmers should open the eyes of their brethren all over the world as to the nature of the competition they have to meet. Some may disagree with the above conclusions, but there is no doubt but that it is the "social condition" of the people which is the ruling factor: indeed as a well known English farmer has

(1) Chiefly in the Northern counties. Ed.

(2) The English *yeomen*, of whom there are but few, very few, left, and the Canadian *habitants*, are peasant proprietors. Ed.

put it. "The Swede works, the Briton does not: the Swede is anxious to learn and be helped, and the Briton will not move out of his old ways and does not like to be told of his faults. These are the causes why the foreigner wins and we lose."

W. R. GILBERT

SHALLOW CULTIVATION

Deep fall plowings have often been recommended with good reason to the farmers. The advantages resulting from their practice, especially in heavy clay lands, have so often been mentioned that it is hardly necessary to enumerate them. However, of late years, serious objections, based upon scientific theories, have been raised against deep cultivation and in a few well managed farms, such as the Ontario Agricultural College, far better results have been obtained with a shallower cultivation, restricting the use of the plow to once in four years.

In order to understand the reasons upon which this system is based, we must acquire a sound knowledge of the various processes going on in a well tilled soil. We know that the most essential element of the fertility of our lands is the *humus*—this product of the decomposition of organic matter. Any soil deprived of it, however rich it may be in other compounds, is practically sterile. Not only then must we provide it by frequent manurings, but we must also hasten its formation and thus secure as soon as possible its good effects. Three agents are required to perfect this work: air, heat and moisture; and we cannot do better than to follow nature's plan which is to leave vegetable matter under the direct influence of these agents. Deep plowing does not fulfil this condition, manure is buried too deeply, (1) and hence its decomposition is slower and the food formed out of the reach of the plant-roots.

Following the transformation of vegetable and animal matter into humus, comes the phenomen of nitrification, by which nitrogen, of which humus is the store-house, is put into available form. This work is effected by numerous microscopic beings called *bacteria*, which live and prosper only in a free, open soil and at a temperature not below 65° F.

Let us take now a field of oats, pease or barley which, having received after harvest a light gang plowing, is in good physical condition. As long as the warm weather keeps on, bacteria will be at work in the field getting plant food ready for the next crop. If a deep plowingis practised in the fall, this available nitrogen, so much needed to ensure an early and successful start of our next crop, will be out of the immediate reach of its young roots. This explains why so many farmers are unsuccessful in clover growing, the plant food required to secure a good catch of clover being not within the reach of the roots (1). Furthermore, the crude and inert layer of sub-soil often brought up by the plow is not in a proper condition for the work of these bacteria and will not acquire heat enough to be so until late in the spring. All crops in the first period of their growth require an abundant supply of available nitrogen and fall plowing is not likely to secure it. (2)

In order to overcome this deficiency and still secure the physical advantages of fall plowing, the ridging up system, such as practiced at the O.A.C., is highly recommended. The land after harvest or after a root crop is kept cultivated, so as to destroy weeds and accelerate the decomposition of vegetable matter, until late in the fall, when it is ribbed up in drills of about 20 in. in width with the double mouldboard plow. In the centre of these drills is thus kept the humus formed during the fall, protected from the washing of the rains and ready for the first needs of the next crop. In the spring, a single harrowing, levelling these drills, already worked by the frost, will make a splendid seed bed. Better draining of the land is also effected, the water running off between the drills (3). The sub-soil, already worked by the grubber and the long roots of the clover which occupy the land 2 years out of 4, is rendered still more open by the frost acting upon it between the drills.

The only plowing effected during the rotation is to bury down an aftermath of clover at the depth of 3 or 4 in. All through the fall, frequent cultivation follows; a good manuring is added and in November humus and manure are stored up in drills and carried successfully during the winter months to meet the first requirements of the crops

(1) Is manure, generally, ploughed in deeply? ED.

(1) Even Sir John Lawes has not yet discovered the cause of the failure of the clover plant. ED

(2) No good farmers, in England, plough deeply, except before a *manured* root-crop. ED.

(3) But we want the water to go *down*, not *off*, into the drains. ED.

following. On light pea land, preceding fall wheat, a gang plowing, followed by the grubber, is sufficient.

Shallow cultivation has proved as perfect in practice as it is in theory, and the splendid clover leys and the wonderful crops of the O. A. C. speak highly in its favor. Since its introduction a few years ago by Mr. W. Rennie, the superintendent of the farm, lands lacking in humus have been restored to their natural fertility, the production has steadily increased, and this year the crop averaged no less than 70 bushels to the acre for the oats, and 37 bushels for the fall wheat. The use of grubbers and the adoption of a four years rotation, including 2 of clover, one of hoed crops and one in cereals have done away with fall plowing and sub-soiling. Clover, used as green manure once in the course of the rotation, besides its power of gathering the nitrogen of the air and of bringing up plant food from the depths of the soil, and one coat of dung, suffice to keep up and even increase the fertility of the land. Without any doubt, a system of cultivation which enables us to keep our soils well tilled, to derive the greatest benefit possible from our manures, and to keep up the fertility of the land without the need of commercial fertilizers, deserves consideration (1).

C. W. Corteeux.

LAYING DOWN LAND TO GRASS

The immediate preparation of the land for laying down to grass.—When, in the course of the rotation, the break is to be laid down to grass, it must first have a good autumn furrow, after the root-crop is harvested; if the land is light, nothing but simple stubble-cleaning need be done, to kill the insect-pests, such as maggots, cut-worms, etc., and the ploughing is to be done in the spring. But before this furrow, all largish stones, bush-stubs, must be cleared off, the rails, post-butts, that might encumber the field, must be taken away, so that, when the time comes to use the mower, it may meet with no obstacles. The ridges or lands should be, where possible, made wide and well rounded, with the furrows between them well cleared out to allow the escape of the water. This will make the work of the mower much more easy, and in wet seasons, the grass will grow much more equally on wide ridges, well rounded up, than on narrow ridges, which multiply furrows in which the grass is never so strong, and which make the work of man and horse much harder, to say nothing about the wear and tear of the machine. Here, on the ploughed land, may be applied the chemical manures, especially superphosphate, at the rate, when the previous root crop was fairly manured, of 300 lbs. to the *arpent*. It may be affirmed without fear that a surplus of a ton of hay to the *arpent* may be expected from this dressing, and this certainly deserves the attention of all those who aim at the best results.

A few remarks on grass-seeds.—Before speaking of the sowing of grass-seeds, I will say a few words about the proper seeds for meadows. Here is a list of those that are generally offered for sale by seedsmen, and which ought, at least some of them, to be employed more than they usually are in the mixtures sown for laying down land to grass. As most of these are only known, most frequently, by their common French name, and some even by their English name, I append a small table, giving with their botanical name in French and Latin, both their French and English common, or vulgar names. I also add the weight of a bushel of each variety, the number of seeds contained in a pound of each kind, as well as the percentage of seeds that may be expected to grow, if the seed is of the best quality. This latter point is important, for if it happens, especially when seeds of new varieties are in use, that one only finds that one-half of the seeds germinate, as is the case with orchard-grass, one is apt to think that the seedsman is a rogue.

In naming the different grasses in the table, I do not mean to say that they have in all cases the same value. Some of them answer best for meadows, others for pastures, and others again only appear in the table because they appear in the lists of the seedsmen, although are not really worth much. Such are the "Sweetscented vernal grass," and the "Meadow soft grass." Even Pacey's perennial rye-grass, so highly valued, and properly so, in Europe and the United States, hardly succeeds in this province, except in the Montreal district. Many repeated trials, with mixtures containing this seed at the rate of ten pounds to the arpent, have only shown me a few stems of this plant, while of foxtail, the fescues,

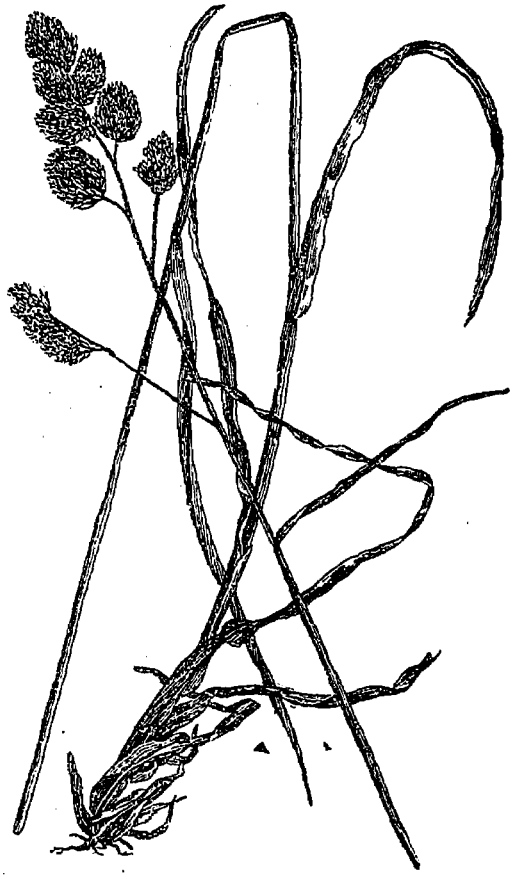
(1). And how long will it be before this frequent repetition of clover will have the effect of preventing the growth of that plant at all? Ed.

and especially of the orchard-grass, there was an abundance.

Red-top, orchard-grass, the rough meadow-grass, June-grass, timothy, alsike and white clover, do well on almost all kinds of soils.

Meadow fescue, the red clovers, and foxtail, prefer rich moist land.

Orchard grass and broad-clover, are best for pastures. All the others mentioned are suited to both pastures and meadows.



Dactyle Pelotonné—*Dactylis glomerata*—Orchard Grass

Blue joint-grass and the rush are exceptions to this rule, since they are plants belonging to natural permanent-meadows.

Mixtures of seeds for meadows and pastures.—In the seedmen's catalogues, and in the books of different authors, many mixtures of grass-seeds, varying in quantities and weights, are to be found. The chief defect in these recipes is that the seeds of plants valueless for fodder are often introduced into them. After having tried many, I ended by putting aside certain varieties of seeds that I considered useless, either because they were not suited to the climate, or they did not yield enough to compensate for their cost. I, at last, stood by the following mixture, which can be varied according to the soil. It has been used by many farmers in this province, and has always answered.

Orchard grass	4 lbs
Meadow fescue	5 "
Common broad grass	4 "
Meadow grasse	4 "
Timothy	4 "
Alsike clover	2 "
White clover	1 "
Red clover	4 "
Meadow foxtail	4 "
Total to the arpent. . .	32 lbs

J. C. Chapais.

(*From the French*)

The Dairy.

MOTTLES IN BUTTER

By J. W. Mitchell, Superintendent of the Guelph Dairy-School.

In unsalted butter, there are no mottles. Salt has the effect of deepening the colour of butter; to use an artist's expression, it "brings it out." Consequently, if, from some cause or other, the distribution of the salt is not perfect, when the working of the butter is finished, the butter will be mottled; for, the parts that contain less salt, being less highly coloured than the others, will show blemishes, in veins or mottles, when the butter is cut or tried with the taster.

If butter is placed on the worker in the proper conditions of temperature and moisture, and, not overworked, there is no reason to fear that it will be mottled, even if salting and working are done simultaneously.

Temperature and moisture are very closely allied in butter-making. The quantity of moisture retained in the butter greatly depends upon the size of the grains and the temperature at the time of salting and working: the smaller the grains, the greater the quantity of moisture present; and all other conditions being equal, the reverse holds good. The grains should not exceed in size a

LAYING DOWN LAND TO GRASS.—Description.

Botanical name; French.	Botanical name; Latin.	Common name; French.	Common name; English.	Weight per bushel	Number of grains in a lb.	Percentage of grains that germinate.
Agrostide commune	Agrostis vulgaris	Franc-foin	Red top—Dew grass	13 lbs	2,000,000	72
Calamagrostide du Canada	Calamagrostis Canadensis	Herbe à lien—Foin-bleu	Blue joint grass	—	—	—
Dactyle pelotonné	Dactylis glomerata	Foin rude	Orchard grass	14 "	335,000	52
Fétuque des prés	Festuca pratensis	Fétuque élevée	Meadow fescue	15 "	336,000	71
Flouve odorante	Anthoxantum odoratum	Flouve des Bressants	Sweet scented vernal grass	10 "	924,000	26
Houque laineuse	Holcus lanatus	Blanchard velouté	Meadow soft grass	7 "	1,304,000	40
Ivraie vivace de Pacey	Lolium perenne Paceyanum	Ray-grass de Pacey	Pacey's Perennial Rye-grass	24 "	213,000	71
Jonc bulbeux	Juncus bulbosus	Rouche	Rush	—	—	—
Paturin commun	Poa trivialis	——	Rough meadow grass	14 "	1,575,000	45
Paturin des prés	Poa pratensis	——	June grass	13 "	1,264,000	48
Phléole des prés	Phleum pratense	Mil, Marsette	Timothy	45 "	1,120,000	85
Trèfle de Suède	Trifolium hybridum	Trèfle alsique—Trèfle hybride	Alsike clover	60 "	250,000	73
Trèfle rampant	Trifolium repens	Trèfle blanc	White Dutch clover	60 "	603,000	72
Trèfle des prés	Trifolium pratense	Petit trèfle rouge, Trèfle rouge bis-annuel, Trèfle rouge commun, Trèfle rouge du Haut-Canada.	Broad clover, Common red clover, Meadow trefoil, Western clover.	60 "	307,000	88
Trèfle des prés vivace	Trifolium pratense perenne	Grand trèfle rouge, Trèfle de Rawdon, Trèfle du Vermont, Trèfle rouge vivace.	Cow grass, Large late clover, Large red clover, Mammoth clover, Peavine clover, Red perennial clover, sapling clover.	60 "	300,000	88
Vulpin des prés	Alopecurus pratensis	Vulpine	Meadow foxtail	7 "	269,000	27

grain of wheat. When butter is worked at a low temperature, the water exudes so rapidly that there is not enough left to dissolve the salt properly. Besides, if the butter is too cold, it has to be worked too much; to ensure a regular distribution of the salt; whereby the grain is spoiled.

The water used for washing butter ought to be invariably of such a temperature that 20 to 24 turns of the worker suffice to distinctly give the butter the appearance of "waxiness"; that is, the proper medium between salve or grease, and crumbly butter. In this state, butter contains just the proper quantity of water to dissolve the salt: neither too much nor too little; and when, after working, butter has this waxy look, it is certain the grain is not injured.

The temperature of the butter must be regulated in accordance with the temperature of the room. This is done by using water at the right temperature for washing it. From 52° to 54° in summer, when the room is hot, and 54° to 56° in winter when the room is warmer: these are the temperatures at which it is right to start the worker. No fixed rule can be given; the maker must be the judge. It being granted that butter should have the waxy look just described, the maker must adopt the temperature likely to produce such a look after working. This is the time to say that if butter is worked at too high a temperature, it will become incompact, too moist, and with a bad grain. Lastly, while being worked, the temperature of the butter should be uniform throughout the entire mass, otherwise, the softer parts will be much more worked and will incorporate much more salt than the firmer parts.

Bearing in mind that the mottles in butter are due to an unequal distribution of the salt, and to its incomplete dissolution at the time of working, we shall classify as follows the causes of the mottles in butter:

1. A too low temperature of the butter when put on the worker;

2. Not enough moisture in the butter to dissolve the salt; we have already mentioned the effects of temperature and of the size of the grains of butter on the degree of moisture.

3. Insufficient working of the butter; all things being right, 24 turns of the Mason butter-worker are enough, but, if the butter is worked at a low temperature, more turns are needed.

4. The butter gathering in lumps in the churn (*which it always did till* within the last 20 years, and yet, in spite of that, we used to make delicious butter. Ed.), that makes the butter drier. When butter thus gathered has to be cooled and washed at once, the lumps are usually harder outside than inside, and do not work equally, the softer parts of the butter being more worked and engrossing more than their share of salt.

5. Want of a regularly distributed temperature through the mass of butter, whatever may be the cause.

6. Using too coarse salt, which it takes more time and labour to dissolve and incorporate properly with the butter.

When butter is salted in the churn and allowed to rest before being worked from two to four hours, either in the churn or in vessels placed in a room at a proper temperature; or when butter is worked twice over; it takes less working to secure an equalised colour through the mass, and in this kind of treatment the grain is better preserved.

When butter is to be worked twice, the first working should be only just sufficient to incorporate the salt; then, let it rest for two or three hours in a room at 52° to 55°, and let the second working be carried on just long enough to make the colour uniform throughout. Either of these ways of salting and working the butter requires more labour than salting and working it only once; and though both are very good, it is nevertheless as sure, and decidedly more expeditious, to salt it on the worker and finish the making up of the butter at once, always provided that the conditions of temperature, etc., be strictly observed.

If, however, the mottles still give trouble, or in case that the temperature of the room cannot be controlled during summer, I advise makers to either salt the butter in the churn, or to work it twice over.

Never neglect a daily inspection of the previous day's churning, as to its colour, etc. Do not confound the tiny white spots—they are curd—with the mottles; these white spots cannot be dissolved by heat when you work them between your finger and thumb. They are to be found in unstrained, sour cream.

(*From the French*)

The Poultry-Yard.

CARE OF FOWLS IN MOULTING

Probably the majority of the farmer's fowls are moulting and perhaps a few words as to their case will be in order. Consider for a moment the wonderful strain on them at this time forward while in moult. When the fowls have the free run of the farm they can find for themselves all kinds of food such as seeds, worms, insects, all kinds of vegetable matter, sand, gravel, to their liking, but when fine stock is kept in a limited space they must be provided with material for feather formation. Good strong food must be supplied, blood forming in large quantities should be given them and nothing is better than ground green bone. The material used for making this should be fresh and a liberal supply of meat should be given with the bone: grind it fine and feed fresh. Never give them stale or spoiled meat; this has a tendency to ferment in the crop and cause looseness of the bowels. The best you can give them has a tendency to cause this trouble at first, and to avoid this it is well to boil the green bone until all the meat is cooked and mix the broth and use with a dry mixture of ground oats, corn and bran: feed a little warm. Never feed any mixed food or mash hot, it is bad for them in hot weather also in cold weather; in the former it makes them uncomfortable and in the latter has a tendency to cause cold after eating and cooling off in the chilling atmosphere.

In addition to the above, feed plenty of grain such as corn, wheat, buckwheat, and sunflower seed. Buckwheat and sunflower seed are of an oleagenous nature and improve the gloss of the feathers. Flax seed is fed by some but we do not consider it as good as the others, for the reason that it is so full of gluten it has an unhealthy influence on the bowels. Hemp seed is better than the flax seed; when fed to fowls, it has a good influence on them in the way of increasing and flushing the color of comb and head trimmings. It also adds life and vigor to the birds. Never feed a large quantity of hemp seed at any one time. During the moulting season fowls incline to go to their roosting places rather early in the day. Always provide them with a good full meal of these grains before they go to roost. A mixture of grains is the best for them: it forms a "balanced ration," as they say for cattle. Keep the fowls well housed at this time, to prevent the chance of cold and roup, for while the moult is natural to the life of all fowls the strain on their constitutions is very weakening and they more readily contract diseases of all kinds at this time. It is a good plan to give some little tonic, and nothing is better than iron of some kind. I have used the muriated tincture of iron, one half ounce to a gallon of drinking water with great success. Keep a sharp look out for those of the flock that lose all their feathers at once; often they cannot get upon the roost and sit in a cold corner and droop. If well cared for they will come out all right; a little extra care at this critical time means much to them when in this condition.

A common mistake with our farmers, which I noticed during the last summer, is hatching chickens too late, I saw chickens less than half grown (*when?*) many of the flocks being only from ten to fifteen days old, some farmers only leaving small clutches of from six to eight with one hen. Those late hatched chicks will never be good for anything. They will not grow to anything like the normal size of the adult fowl and the pullets will not lay before March or April, when eggs command the lowest price and will have cost so much to raise for flesh that there will be no profit in them. A growing chick overtaken by the cold of our Canadian winter months of November and December is not a pleasant thing to look at; they are stunted in size, their small frames nnd flesh have not become inured to the climate, the cold seems to shrived them up and the discouraged little ones huddle together in the most despairing manner, unmatured and scarcely worth eating by the time the summer visitors go to the country in May and June, and even as late as July. "The evil that men do lives after them." Late hatched and late maturing chicks beget more of the same kind, and so it goes from year to year and thus the generation of this year entails its unprofitableness on the chickens of next year on to the third and fourth generation.

It is the early hatched pullets that mature before cold weather and begin to lay when eggs pay, selling at a price that pays the best profit, and next spring go broody also early so can hatch another generation of early chickens to grow into another flock of early layers. There is method in this advice which our readers should remember. Hatch the chicks early; keep them growing so they

will come to laying maturity before cold weather overtakes them and then keep them laying by good care and good food.

Buy your stock now. Do not wait if you want to buy good stock at cheap prices. I give, further on, some of the advantages of buying birds in September.

1. The breeder has a larger stock on hand from which to select.

2. He has more birds than he can accommodate and will "thin out" at a sacrifice.

3. As business is usually dull at this season of the year, he can do better for you.

4. If he is compelled to keep his stock over until spring he will add the extra expenses, and if eggs are in demand he will refuse to sell at all.

5. In the spring, the yards are made up, and the breeders will not break up his matings.

6. Hens and pullets of any breed are seldom to be had in the spring.

7. By buying young birds now, you may get the best, as the best birds cannot be well selected until they are matured.

8. Cockerels are in excess now. You cannot choose a better time than now to secure a good one at a reasonable price. Now is the time to start in for improvement of stock, which I will speak of in another letter soon: "A word to the wise," etc.

Cold Poultry Houses.

It is only when cold weather appears that the farmer finds he has neglected the most important matter connected with poultry raising, which is the protection of the hens against the cold. Hundreds of dollars have been expended in the building of poultry houses which, when finished, were supposed to be complete because they were well "ventilated"; but the "ventilation" was the cause of failure, because it simply allowed cold drafts of air to come in on the poultry.

It has long been a problem why so many poultry men are desirous of giving plenty of fresh air after taking pains to keep it out. During the severe cold period of winter the cold air will find plenty ways of getting in and warmth cannot remain as long as cold drafts are allowed. Unless a poultry house is lathed and plastered and every crack caulked, it is impossible to keep the cold air out; but there are many which have ample ventilation from the top or elsewhere, which has the effect of causing roup and similar diseases due to cold and exposure. As poultry houses are ordinarily constructed, the object should be to avoid ventilation as there will be more difficulty in keeping fresh air out than getting it in. Stop up every crack that you can see, particularly near or about the roosts, often a small hole made by a nail will cause great trouble to the birds if roosting near it, and severe cold in the eye or head is the result, often followed by roup of the most malignant type, so look to it this month and next before snow flies and you will not regret it: "a stitch in time saves nine."

S. J. ANDRES.

PREPARATIONS FOR FALL AND WINTER

Work for the winter season begins with this month and it is not too soon, as autumn is upon us, to begin preparations for next winter; too soon to do the work is not to be considered, unless there is nothing to do. It is surprising how much one will have to do when winter comes on and one is unprepared for it. The poultry house may need to be thoroughly cleaned and overhauled in many ways or perhaps a new one must be built. Earth floors that have been saturated with the droppings of fowls should be removed to the depth of six inches and fresh material put in. All the buildings should be limewashed, the roof carefully examined, all cracks stopped to prevent drafts through the houses. No one ever yet built a poultry house that he could not see some improvement to make upon it after he has used it for a year, and it is this experience which assists in getting more eggs in winter; everything should be made comfortable and snug for the cold weather. Any one who has spent hours performing the labor of cleaning out the poultry house will appreciate any labor saving contrivance, and the time to adopt them is now, before the winter sets in. Pullets and hens should be housed each in their own winter quarters and everything done to promote egg production. Begin feeding the mash ration of clover and bran and vary the grain diet. Feed green cut bones twice a week and keep pure water before the fowls. Cull out the flock and dispose of all that are not up to your idea of what you are aiming at and send them to market. Birds intended for exhibition should be separated and cared for separately. Select the birds for exhibition a week or two before showing them, and place them in coops by themselves so they will become tame. People in pas-

sing before them in the show room will not startle them and they will stand up in good shape. Showing poultry is profitable to traders and a splendid advertisement for their stock. Almost every farmer who constructs a poultry house makes it of a certain size and resolves that only a limited number of birds shall be put in it; but as his flock increases, the space appears to decrease, until the birds are so crowded as to render another house necessary; if the birds are culled out, however, this would not be necessary, and the farmer will get more eggs from a flock in a roomy house than he will from two flocks that are crowded in separate houses. At least, the profit will be larger as there will be a saving of food and labor. It is best that the poultry house should have plenty of windows so as to secure sunlight and heat. Nothing is so repugnant to fowls as darkness during the day, and they will often rather remain in a storm outside than keep within the walls of a dark or gloomy house. Begin the fall right and prepare for winter early, so as to have the hens and pullets laying before cold weather sets in. See that the houses are not damp, and the fresh earth as dry as possible when put into the floor of the house. Cover the floor, if it be a wooden one, with clean sifted coal ashes, if you cannot get dry sand, utilizing the ashes from your house burner or cooking stove. (Never use wood ashes on the floor of a henhouse). Let it be at least six or eight inches thick on the floor, then cover it again with straw, refuse hay chaff, leaves or any dry litter among which to throw the dry grain, and make them scratch for the grain for a living: no work, no eat; the waste chaff from the clover-hay mow is a most excellent thing to increase the egg yield. See they have plenty of vegetables laid in for the winter, cull the small potatoes, carrots, turnips, and give the fowls a chance at them, with the green cut bone and meat, at least twice a week all the winter. I propose to give in another article soon, some of the different methods adopted by several large breeders in the United States with whom I have had some pleasant and profitable correspondence. They are well adopted to our climate and temperature and will be, I hope, of benefit to the readers of the JOURNAL.

S. J. ANDRES.

The Grazier and Breeder.

THE COW AND HER CALF

By Mrs. Jones, Brockville, Ont.

Now, in telling you how I manage my cows, I don't set up to be infallible; lots of you know more than I do. But many know less, and it is to them I speak. I only want to tell them how I have made things pay, and where they can convict me of mistakes it may be of still greater use to them in telling them "How *not* to do it," as I say in my book. I have the calf taken from the dam before it attempts to drink; it is put in a box stall with a good bed and rubbed dry (1). Here let me say that we keep bulls and all young calves in a different barn from the cows, and in this building is the large box stall where the cows calve. The reason is, partly, because this building is quieter, but much more because it is nearly of an even temperature. If you turn out thirty or forty milking cows and leave a very few young calves or a newly-calved cow there, the temperature falls in a surprising way, and these animals get chilled, while in the other barn it is not so. Also, it is better for the herd to have no calving in their midst. We soon offer the calf a pint of her dam's warm milk, and this is put in a tin like a wash-basin, as it is lighter to hold and has no sharp, upright edge like a pail, to press on the calf's throat. Wet the fingers of one hand and put in the calf's mouth; with the other hand raise the basin while gently coaxing the calf's head towards it with your fingers in its mouth. Remember, it is *against nature* for a calf to put its head *down* to drink, so be patient. Hold the basin well up and don't let the calf get its nostrils under the milk to choke and splutter and splash you all over, and it will soon put its head in a pail and drink itself.

When fairly started, we feed our calves 4 quarts of new milk a day, one quart at each feed; the hours are 6 a.m., 11 a.m., 4 p.m., and 9 p.m. This may seem troublesome, but it is less work than to nurse a sick animal, and it gives the calf a good start that it never forgets. Soon the calf will do on three feeds a day, given at morning, noon, and night, three pints of new milk at each

(1) Rubbing we do not like, as it makes the hairs stick together; cover the calf up with lots of straw and leave it to get dry. Years ago, the farmer used to sprinkle the calf with salt, and the cow, in licking it dry, was supposed to get an appetite for her mash! ED.

feed. At two weeks old, a little warm skim-milk is added, so that the calf is soon getting six quarts a day, but still divided into three feeds, and before six weeks old our calves are fed entirely upon skim-milk, of which they get nine quarts a day, three quarts at each feed. They are then getting a little early-cut clover hay, which is renewed each day, and we begin to feed porridge, giving half a tea-cupful only, in *just one* of the daily feeds. Next day it gets a half cupful in two of its meals, then in three, and by degrees the quantity is increased, till it gets a half-pint or more in each feed, as it seems to need. To make this porridge I put into an empty tin (that has held two pounds of coffee) all I can grasp in one hand of *pure ground linseed meal*, not cottonseed, or oil cake, but the pure ground flaxseed (1). I fill up the can with good Scotch oatmeal, add a little salt, and then stir into a pot of hard-boiling water, and cook as thoroughly and as carefully as if for the table. In cool weather we make it every second day, as much as needed. We *never* feed in a wooden pail—they soon sour. Always in galvanized pails, and we *always* rinse each pail thoroughly, immediately after use, and turn up to drain and air. In addition to this they are often scalded, and occasionally all the calf pails are dropped into a big boiler in the yard, and actually boiled. The great causes of scours are three things: overfeeding, irregular feeding (as to time, quality, warmth), and dirty feeding; but the first of the three evils is *dirty* feeding. More calves die from this cause than people imagine. Another thing in feeding. In each loose box, near the floor, is a stationary wooden button, kept out from the wall by a tiny block one-half inch thick, which is fastened on the button and between it and the wall; one moment slips the edge of the pail under this, where it is firmly held; no delay, no spilt milk, and by the time a man has got to the last of the calves he can go back and begin to gather up the pails and rinse them.

Every calf is kept separate, and every pen is thoroughly cleaned once a day, and dry bedding added. If a calf does scour, it is generally in some way the fault of the feeder. Stop all food for a time, giving a dose of castor oil; then feed only one pint, or less, of fresh warm milk at a time, with a little lime water added. If milk still disagrees, make flax-seed tea, with a raw egg beaten up in each feed.

(1) It is just 19 years since, in this periodical, we recommended this treatment of calves from the birth. Ed.

But you will find the "ounce of prevention" much easier than the "pound of cure." After three or four months, the calf has a little ground oats and bran mixed put before him, and it will take to this by degrees and eat all it wants, but salt must be kept near it, as the porridge is now passed on to younger ones. If only nine quarts a day of skim milk can be spared, instead of heating it on the stove add hot water (not boiling) till of the desired temperature and it is a good big drink for the calf; a handful of shorts stirred in each time mixes readily with the milk and is most acceptable. No young calf is put on pasture. I have seen valuable ones turned out in a weedy lot or in an orchard, where they can get green apples, steal each other's milk out of filthy wooden pails or troughs that you could smell rods away, the calves scouring and stamping, and fighting flies in the heat, and then chilled by a night rain. Then I have looked with increased satisfaction at my own calves, in their cool, shady boxes, and their healthy looks, bright eyes, and glossy coats more than repaid for their extra care.

Another valuable hint is this: After two or three months old, especially in hot weather, offer every calf a drink of cold water each day, even if they sometimes refuse. Try it. The first winter my calves are fed all the clover hay they want, and a little mess of pulped roots; also bran and ground oats mixed, with a little oil meal added (not too much). I begin with a pint of this mixed feed, night and morning, and the roots at noon, and increase till they get a quart at each feed night and morning. If any older calf seems to need more, we give it an extra feed on the noonday roots. Fresh water in abundance, what salt they want, sweet corn fodder to pick over; at night, separate stalls, dry beds, and a minute or two brushing daily, and take my word for it, your calves will do you credit.

Next summer supply them with the best pasture you can give them and *see them often*. The following winter much the same treatment as before, only a larger allowance, and a little good ensilage, which I *never* feed to a calf under a year old, and, if a heifer begins to take on fat, her feed is reduced. I like to have them calve at about two years or twenty eight months old, and the first year I aim to have them milk from calf to calf. Indeed, most of my cows do that anyway, and I never force one dry, although if I find it can be done safely I dry her for a month. But with Jerseys I can seldom do it; they are most persistent milkers and butter-

makers. I have Grace of Belvedere, that dropped her first calf (a heifer) in July, 1897, milked splendidly all winter, and in the end of April of this year, as I found she would not go dry, I churned her cream by itself for one week. She was then just three years old, and had been in milk nine months, and was due with second calf in two months, and she made just eight pounds of beautiful butter. This is the sort of cow that pays.

For three months before calving I allow a cow no grain at all, but feed her cooling bran mashes, with a little oil meal, and plenty of good hay. If on rank pasture, I move to shorter grass and near home at the last; and, unless the bowels are quite loose, I give one-quarter pound Epsom salts every two or three days, or oftener. Almost any cow will take this in her mash. If the udder is too full and hard, we don't hesitate to milk regularly. When about to calve, we almost always give 1¼ pounds Epsom salts, with a little saltpetre and ground ginger. This is dissolved in boiling water, and, when cool, is put into three beer bottles and easily given to the cow. Many use less water, but I think the dose too strong, and not so effectual. The calf being taken away, the cow is given an "old country" white drink. A quart of oatmeal is put in a pail and wet with cold water; then half-a-pail of actually boiling water is poured on, and, when stirred, it is frothy, like cream. Then add cold water till the pail is full, and the drink only comfortably warm, and if your cow is all right, she won't leave a drop of it. When she is on her feet she is partially milked, but do not empty the udder at once, by any means—that is to be done by degrees. If the udder is swollen, hard and painful, rub gently and often, and keep milk pretty well drawn—you won't be apt to get very much any way—and give her doses of salts and feed on low diet. Should it not improve try hot fomenting, but, unless you are prepared to do this faithfully, better not attempt it. I have seen a cow bathed in water so hot that she nearly jumped out of her skin, but, soon the water got too cold; afterwards she was just turned with the others, left out all night, and finally she lost the use of half of her udder. In the first place, whatever the season, your cow should have been in a loose box for days, or, better still, for weeks, before calving.

Now lead her out of the box, but where no draught can reach her, and, with a very large sponge or woolen cloth, foment the udder well for a half-an-hour at least, constantly adding to the hot water in the pail, so that it is just as hot at the last as at the first. You will then be apt to get quite a little milk; after this oil or grease the udder to prevent cold, and return her to her comfortable box. You may need to do this four times a day, and the last thing before bedtime, but it pays. In very cold weather I tack up old blankets or split up salt sacks around the box stall nearly up to the ceiling as nothing is so dangerous as a chill. If really needed, put a blanket on the cow also, till past the critical time. All this takes longer to tell than it does to do, and it means hard cash to you. The man who lets a cow calve in a stanchion at night, with no one near her, and who finds a calf in the gutter either dead or alive, in the morning, is not fit to have the care of any animal at all. For three or four days our cows get only a short allowance of hay and nothing else whatever, except all the "white drink" they will take (every alternate drink is made with bran instead of oatmeal), not a drop of cold water is allowed, no green food, and no draught till the cow is past all danger, when she gradually returns to her full feed, and to the herd, although not left out at night for a couple of weeks, in case of storms.

This treatment from calfhood up, may not be faultless, but it is the best I know,(1) and the results are these: We never have a kicker or a vicious cow, and never remember to have had a cow lose even one teat. It is many years since I lost a cow with milk fever, and I have not lost one calf with scours in fifteen years. In feeding one must be guided by the cow's appetite and also by the way she responds to feed. Don't get her fat, or you are losing your money and spoiling the cow. There is one statement prevailing, which is misleading to many people, because although true, it is not the whole truth. They say that you can't feed richness (or fat) into a cow's milk. I will never agree to that. Beyond a certain point you cannot do it, but up to that point you certainly can; and the dairyman's success lies largely in finding out just where that point is. It varies in different cows; some will respond much more readily than others. In my little book, "Dairying for Profit," I have given a year's feeding of a cow I once owned. The ration was very large, but her yield was large, so that she gave me a cash profit in butter alone, of $49.70 in the year

(1) Or we, either. ED.

above her keep. I have charged nothing for attendance, and barn room, but neither did I credit her with the skim-milk and buttermilk, the large pile of manure, or the fine heifer calf she gave me. It has been said that this was an exceptional animal, and that few cows would respond as she did. Precisely. That just hits the nail on the head. Now, what we want to do is, to get rid of those poor cows that will not respond to feeding. Beef them, bury them, but get rid of them, as I have said in my book, and you will make money where you are losing it now. Some years ago I bought from a friend closing out, a number of Jerseys closely related to my own. I knew them to be extra good, but they were in a starved condition and, having been obliged to buy all or none, I was overstocked and short of feed, too, and I was prepared to give a bargain to an acquaintance who came to buy. I offered him a large, handsome heifer, soon to drop her first calf, for one-third of her value, but after no end of fussing he went off and bought a cheaper and poorer one. This very summer he sold a solid-colored heifer calf from that cow, eligible for registry and all right in every way, for $15 and was glad to get it. My heifer dropped a fine heifer calf which I sold for $100, and that same summer tested 14¼ ibs. butter a week, then made her mark as a winner at our largest fairs, and I eventually sold her for nearly four times the price Mr. Smith refused to pay. Her new owner tested seventeen cows accurately for a whole year for butter and cheese, and what is far more important weighed and charged every bit of food. Not only did the cow I sold him produce far more butter and cheese than any of the seventeen, but she made it at far less cost than any of the whole lot, except one, who made butter a small fraction cheaper, but so little of it as to be almost worthless.

My cow's test for the year was:

Milk.....6,702 lbs.
Butter..... 424 lbs.

Showed by test, if it were made into cheese, 954 lbs., and the total food cost for the year was $37.50. These are actual facts and I wish the record were printed and in every barn in the country. It adds to the value of this cow's record to tell you that she was not a "sport" or an accident. Her dam, whom I never owned, was not tested for butter, but I saw her yield over twenty quarts strained milk in the day. Her half-sister made 14 lbs. 5 ozs. butter on her second calf, before three years old. Her grand-dam made over 17 lbs. a week and over 20 quarts a day, and was not a day dry in years. Her grand-dam's sister made 17½ lbs. a week, milked 47 lbs. a day, and, when over thirteen years old and one hip knocked down, she made for the person who bought her from me, in less than eleven months, 340 lbs. of butter on ordinary keep and milk set in shallow pans.

As I only keep half a dozen cows now, and shall never exhibit again, I may be pardoned if I refer to the exhibitions of '96, which was my valedictory year. I had a grand, golden fawn bull, Lilium's Rioter, that took 1st prize at Toronto, Montreal, Ottawa and Gananoque, sweepstakes at all these places, and also headed my first prize herd at all these places. This bull was the son of one of the great cows I have named, and as closely as possible related to all the others, thus bearing out the judges' verdict in the most triumphant way. Try, therefore, to have not only one cow as good as those I have named, but all your herd as close to that mark as possible. Keep no bull except one with such a glorious array of performers in the family, not on paper but *in actual fact*, and then your success in the dairy will be equalled by that in the show ring. An expert judge is not often mistaken. Where you have true merit it is generally known. But remember that without good, sensible, unceasing care of your cattle you cannot succeed. No animal can thrive under neglect or unsuitable treatment, and no one can expect to make money in cattle who thinks that "any sort" of care and keep are good enough. You know the old saying that, "No eye watches like a mother's." That is indeed true, but just next to that comes the eye of the dairyman who knows his business, and when he shuts that eye his profit is gone. —*Farming.*

Science.

NOTES ON RECENT AGRICULTURAL CHEMICAL RESEARCH.

(Dr. C. M. Aikman.)

Experiments have recently been conducted by Professor Déherain as to the amount of nitric nitrogen produced in a certain amount of soil when kept under conditions most favourable for the pro-

cess of nitrification. The soil was spread out in a stable, and maintained at the most favourable degree of moistness for the process, viz., containing from 20 to 25 per cent. In fifteen months it was found that the nitric nitrogen increased from .14 gram to 1.66 gram per kilogram ; while during the same period the organic nitrogen decreased from 3.13 to 2.57 gram per kilo. The total increase in nitrogen, therefore, during this period was .96 gram per kilo. With another soil treated in the same way the increase was as much as 2.09 gram per kilo.

From these results, it will be seen that the decrease in organic nitrogen was not sufficient to account for the increase in the amount of nitric nitrogen, they apparently justify the assumption that a considerable amount of the free nitrogen of the atmosphere had been fixed by the soil during the period of the experiment. To make sure that no increase in ammonia, due to the absorption of ammonia from the fumes in the stable, took place, a check experiment was kept going simultaneously, and was protected from all chance of absorbing ammonia fumes. When the moisture was allowed to fall below a certain percentage, it was found that the fixation and nitrification of the nitrogen was almost completely checked.

The risks attendant upon the admixture of certain combinations of the fertilising elements—nitrogen and potash—are strikingly exemplified by the results of some experiments carried out by Professor Goessmann at the Massachusetts Hatch Experiment Station. In the course of these experiments it was found that mixtures of the two manurial ingredients, nitrogen, and potash, in the form of muriate of potash and sulphate of ammonia, invariably gave much lower results than mixtures containing sulphate of potash and sulphate of ammonia. Since the experiments were carried out under exactly similar conditions, as to character of soil and general mode of cultivation, it was concluded by the investigator that the mixture of muriate of potash and sulphate of ammonia suffered some unfavourable change when incorporated with the soil. To ascertain, if possible, the explanation of this unfavourable action of the mixture some of the dry mixture of muriate of potash and sulphate of ammonia was dissolved in water, when it was found that the muriate of potash was converted into sulphate of potash ; while the sulphate of ammonia was changed into chloride (or muriate) of ammonia (sal ammoniac). Sal ammoniac, it is well known, exercises a most unfavourable action on growing plants. It is well to bear in mind, therefore, that on no account should these two substances be mixed together in a manure.

The question of the reversion of soluble phosphates in superphosphate has recently engaged the attention of Professor Stocklasa, in France. The general opinion is that the reversion of the soluble phosphate is due to the presence of iron and alumina compounds in the superphosphate; but experiments conducted by Professor Stocklasa in his laboratory led him to the conclusion that the retrogression of the phosphoric acid in the superphosphate is very largely dependent on the amount of free phosphoric acid present.—*Ex.*

PLAIN TALKS ON BACTERIA AS APPLIED TO FARM PROBLEMS.

Continued.

EFFECTS OF EXTERNAL CONDITIONS ON BACTERIAL GROWTH

Effect of Temperature.—All kinds of life are limited in their ability to grew. Only within certain temperatures is development possible. Above and below these limits, the bacterial cell, as well as all other forms of life, becomes dormant, and, in many cases, finally loses its vitality. With bacteria in a growing stage, these limits correspond, in a general way, with those that affect other kinds of life, although they are semewhat broader. Most bacteria are unable to thrive below 40 or 50 degrees F. This explains why it is that foods, such as meat, eggs and butter, keep so well, when put in cold storage. The bacteria are not killed at these temperatures, but it is too low for them to grow. Just as corn fails to sprout, if it is planted too early in the spring, when the ground is cold, so these bacteria are held in check, until a favorable temperature awakens them into activity.

The rapidity with which bacteria growth takes place, gradually increases with the temperature, until the blood heat 98 to 100 degrees is approximated, then quickly diminishes. Bacteria that produce disease grow most rapidly at about 100 degress F., the temperature of the warm-blooded

animals. Many of those forms that live in the soil thrive better at a lower temperature, ranging from 80 to 90 degrees F.

It is believed by many that the warmer it is the more rapidly do fermentative and putrefactive changes occur, but this is only true within certain limits. If we place a sample of milk at 110 degrees F., another at 95 degrees, and still another at the ordinary temperature of air, say 75 to 80 degrees F., the second sample will sour soonest. The sample kept at 100 degrees F., will not change as rapidly, because at this temperature the bacteria pass into a torpid condition, although they are not killed. To actually destroy them, even in a growing condition, requires a temperature of 130 to 160 degrees F., maintained for, at least, ten minutes. This is what is done when milk is pasteurized.

Where bacteria possess spores, they are much more resistant than this. An exposure to a boiling temperature for hours is frequently insufficient to entirely destroy all vestiges of germ life. Was it any wonder that the earlier scientists thought that life could spontaneously spring into existence from dead matter, when they found infusions of vegetables spoiling, after continued boiling for hours, even though they were fully protected from the influence of the air?

Influence of Air.—All living things require oxygen in order to breathe. The bacteria are no exception to this universal rule, although the possess a peculiarity that distinguishes them from most other kinds of like. Most living things breathe by securing the necessary oxygen from the atmosphere but, at least, with certain bacteria, this element is taken from compounds containing it in combination, such as sugar, etc., and not from the air.

Such organisms are called *anaerobic* because they can live without air. The larger number of bacteria draw their oxygen supply from the ordinary source, and are therefore *aerobic*.

It not infrequently happens that canned fruits and vegetables spoil even though great care is taken in excluding the air. This is caused by the development of some of these anaerobic forms that find, under these conditions, favorable opportunities for growth. In many cases, bacteria possess the power of accommodating themselves to either condition. Thus, the bacteria that sour milk grow quite as well in absence of air, as they do in the air.

Moisture.—In a dried state, living things are incapable of development, although many of the bacteria retain their vitality for a long time and are distributed in the dust. A certain degree of moisture is, however, necessary before growth can occur. In dried meats and fruits we have an illustration of where the water content is too low to permit growth to occur.

Effect of Light.—The Italians have a proverb that runs as follows: "Where the sun comes not, there the physician enters." The philosophy of this is that sunlight is a destroyer of germ life, and, indeed, it is one of the most potent germ killing agents that are known. The good effect that is frequently supposed to follow a thorough airing, is in the main attributable to the disinfecting action of sunlight. The importance of this agent in controlling disease germs will be considered more fully under the head of various animal maladies.

Influence of Food. Everyone knows what substances are liable to ferment, to decompose, to decay. Such are evidently suitable for bacterial development, for the great majority af these changes are due to the activity of these germs. Those containing proteid substances are especially liable to putrefy; vegetables generally decay. Sugar containing fluids ferment, even in pure water. On the other hand, fluids may be so dense, i. e., the amount of solids dissolved in the same may be so large, that bacteria cannot thrive in them. When syrup "works" or condensed milk "spoils," it is because they are too "thin." Further addition of sugar will ultimately prevent all bacterial growth.—*Hoard.*

TUBERCULOSIS

The Veterinary Conference in connection with the Congress of the Institute of Public Health, which is being held in Dublin, on Friday discussed the question of tuberculosis, and, among other resolutions, passed the following:— "In the opinion of this Congress, tuberculosis should be scheduled under the Diseases of Animal Act, 1894, or, if that is not considered practical, it should be dealt with by a special Act." "In the opinion of the Conference, it is at once just, expedient, and, according to the invariable practice of the British Legislature, that when an animal which showed no outward sign of tuberculosis during life proves after slaughter to be affected, and the carcase, or any portion thereof, is accordingly confiscated in the public interest, the owner should received compensation for the meat so confiscated."—*Agricultural Gazette.*