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THE ILLUSTRATED

Journal of Agriculture

Montreal, January 1, 1896.

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Notes by the Way.

Mr. John Baptist's name (v. Dec. No.) puzzled us a good deal, as we missed the final *e* and it evidently was not a French Canadian family name. But, as an old French proverb says: *Tout vient à fin à qui sait attendre*, and so it proved, for a week, or so, after we sent the translation of the article on Mr. Baptist's farm to the printers appeared the following in one of the Montreal papers:

HOW BAPTIST SPELLS HIS NAME.

A correspondent says: Baptist, of the Montreal football team, spells his name without the final "e," his grandfather—as genuine a Scotchman as ever came to Canada—made the name a household word in the lumber district of Three Rivers; and with the Bishop of Montreal as grandfather, on the maternal side, the lad classes British-Canadian.

We then remembered meeting an old "shanty-man" at Joliette, some 25 years ago, who was named *Macbeth*; but who could not speak a word of Gaelic, Scotch or English, nothing but French. No doubt, there are many descendants of old settlers, both Scotch and English, in a like case.

Mangels.—We have always held that, with proper cultivation and plenty of nitrogen, there is hardly any limit to the weight of mangels that can be grown on an acre. In the S E. of England, from 25 to 30 tons is reckoned a good crop; 40 tons are not uncommonly seen, but the crowning crop of all is one grown this year near Reading, Berkshire, on land we know well. The previous crop was a two-year-old rye-grass lea; it was ploughed 8 inches deep and subsoiled 6 inches below that in November '94. Nothing is said about the manure applied, but the drills were 32 inches apart, and the plants 12 inches distant from each other in the rows. After trimming all the leaves off and freeing the roots from soil, the produce of an acre weighed all but 119 tons of 2,000 lbs., or, allowing a bushel of ordinary roots to weigh 42 pounds, this wonderful crop returned 5,646 bushels to the acre. And its value? Well, Prof. Wrightson calculates the price, for home use, of a gross ton of mangels to be worth 10s. say, $2.40, at which rate the crop would be worth $252.00!

We are happy to see that farmers in general are giving more attention to root growing. Nobody dreams of such crops as the above mangel-crop being grown here, but now the value of swedes, Belgian carrots, &c., is better appreciated, there is every prospect of a far greater number of acres being put into hoed crops than ever has been known in this province. We have always held that one great reason for the neglect of root-growing was the sort of idea floating in the air that chemists found so much water even in the best specimens that they were not worth the trouble of cultivating. No one, however, who has once laid up a score or two of tons of swedes or mangels but must have felt how very untrustworthy science was in this case, and we were highly delighted to find the following very sensible remarks in a late numbers of *Hoard's Dairyman*:

"The water of succulence whether in grass, silage, green fodder or roots, does seem to have a stimulating or nutritive value that the chemists' analysis cannot find. What it is, or why it is, cannot be easily or satisfactorily explained, unless it be that it carries the nutriment in such a soluble state that it is both more easily and more fully digested. The chemists apply a somewhat similar theory, at least, to the action of fertilisers in the soil. The nitrogen, the phosphoric acid and the potash must be dissolved before the plant can utilise them, and in like manner, the protein and the carbohydrates must be dissolved before they can be appropriated by the animal, and there is no solution so perfect and homogenous as that made by nature in the vegetable worlds." (1)

Old readers of this periodical may perhaps remember our favorite illustration of the chemist's incapacity to distinguish between spring water and the water in the roots: In Kent and the other S E. counties of England, swedes will just keep sheep going; in Aberdeenshire, Forfar, &c., they will fatten big bullocks with no additional food but oat straw. Is it climate that makes the difference? Hardly; for whereas the roots grown on the Downs above Brighton are poor in the extreme, those grown six or eight miles from that watering place are of first-rate quality. But in all these cases, the chemist cannot, by analysis, tell one which is the better swede or mangel: the cattle and sheep can, though! By the bye, our old friend and pupil, M. Séraphin Guèvremont, sent us a bag of carrots last week, from Sorel, which are a credit to the sandy soil of that place. Whereas the carrots we had been using took two hours to cook, the Sorel lot take hardly 30 minutes! And some swedes, from that district, are of the same tender nature, without, a single lump in them.

Feeding for butter.—It is a regular case of practice versus science, is this doubt of the possibility of altering the quality of milk by altering the food of the cow. But all agricultural chemist are not on the same side in this matter. Prof. John Campbell, of Glasgow Technical College, evidently has a strong opinion as to the alteration of food making a difference in the richness in butter-fat in milk. We have often advocated the feeding of milking cows with pease-meal and crushed linseed, when butter-making was this object, as unless the albuminoids (protein), of which these are full, be largely present in the food of animals subjected to such calls upon their system, their health and constitution must be both greatly weakened. Mr. Horsfall, the great London milkman, as a leading feature of his feeding-practice, attaches the greatest importance to the *maintenance of the condition* of cows giving a large yield of milk. "I am able," he says, "by the addition of bean-meal in proportion to the greater yield of milk, to avert the loss of condition in cows giving from 16 to 18 quarts a day." And note, especially, the following: "Albuminous matter is the most essential element in the food of the milch-cow, and any deficiency in its supply will be attended with loss of condition, *and a consequent deterioration* in the QUALITY of the milk." Pease, of course, are pretty much the same in composition as the horse-bean.

Mr Campbell agrees thoroughly with Mr. Horsfall; he gives the following practical rule for feeding milch cows:

Give a natural food, and add albuminoid foods *until there is no increase in quality* and increase the quantity of food mixture so obtained until the quantity of milk also ceases to increase. If the natural food used as the basis of the mixture be unnaturally grown, *addition of albuminoids may be expected to improve quality* Otherwise, increase in quantity of food would.

To fully answer the general question already asked why so many cows yield so little milk, we must harp back again to our principle that milk is the product of vitality of living substance. And this question properly put is this—Why is the vital substance not fully active? The answer is—Because many men have not realized and taken full advantage of the principles demonstrated by the great breeder. Because those who have the care of animals do not realise the great adaptability of milk cows to variation in environment. Because the feeding is not sufficiently nutritive to bring out the great capabilities of some cows.

And this is also Sir John Lawes' practice, though he uses decorticated cottonseed-cake to furnish protein instead of beans, the former being the cheaper of the two sources of that element. It will of course be seen by the above that both Mr. Horsfall and Professor Campbell are thorough believers in the possibility of feeding quality, i. e, butter-fat into milk.

(1) As the impossibility of making any mineral water equal to those formed in the natural springs fully shows. Ems, Carlsbad, Hunyadi waters are immitable.—Ed.

Dairy-shorthorns.—Professor James Wilson, of the Iowa Experiment Station, has been giving some very interesting details of his experiments on 77 days feeding Holstein, Shorthorn, and Jersey cows. We call particular attention to the passage we have underlined.

Facts About Feeding.—Prof. James Wilson, of the Iowa Experiment Station, in an address before the Iowa Stock Breeders' Association, detailed some very interesting facts gained from 77 days feeding experiment with Holstein, Shorthorn and Jersey cows. From the same we take the following extracts:

Milk is a highly nitrogenous product, fat is carbonaceous. When the ration is constituted for milk, fat is not likely to be formed. Fat is deposited in the fat tissues proper, and also in the muscles between the fibres. The dairy cow is generally a matured animal not requiring, like growing animals, more protein for the support of her body than is necessary to maintain it, not more carbohydrates than is necessary to keep her warm outside of the fat which she turns into her milk. *If she gets more carbohydrates than she requires to make milk or keep her warm*, it is either wasted *or is deposited as fat in her body* During the seventy-seven days alluded to, with the ration I have described, the two Jerseys neither gained nor lost. One Short-horn cow gained twenty-six pounds and the other Short-horn cow gained ninety-eight pounds, one fifty-two pounds, one ninety-one, and the fourth Holstein cow lost twenty-six pounds.

***

Much more care must be taken in compounding rations for the easy fattened dairy cow than for the one less disposed to fatten, when gain in weight is not desired. Iowa meats are made with grass and maize almost entirely, without much attempt to add more protein, even in winter, justified by the low price of corn, and not only so, but the dairy products of the state are made from the same ration in a majority of cases. The dairy products of the state from this ration excel all others, as maize gives butter and cheese fine flavors, but cows with a tendency to fatten are spoiled for dairying by the ration. Added weight is an element of value when the cow is turned over to the butcher at the end of her milking period, and, when the farmer desires to raise calves from his dairy cows for feeding, the fattening disposition is valuable, and to the extent that the cow should be put in good order during winter to fortify her against the drain of summer milking

But which neither of these objects is in view, the tendency to gain weight in feeding requires skill in feeding to avoid.

Mr. John Gould's cows. — Every reader of *Hoard's Dairyman* must be acquainted with at least the name of Mr. John Gould, of Ohio. Mr. Baker, an Orange County farmer, has been lately paying him a visit and speaks thus of his cows and their management: They were in the pink of condition, sleek and in fine order. In winter, they are supplied with water in their mangers, are tied about the neck in a well ventilated, warm stable, not going out from fall to spring, quietly using what they are fed to their owner's profit, rather than trying to warm up the barnyard at the expense of the milk-pail.

Well, that is how a thoroughly practical farmer manages his milch-cows in winter. Now let us see how cows are dealt with at the Michigan Experiment station: In the winter, the cows are kept in box-stalls. These stalls, while affording protection from the wind and storms are well ventilated. Their temperature in cold nights dropped considerably below freezing point. Plenty of straw is used for bedding. The cows are watered three or more times daily, going to the trough in the barnyard except on the days when cold snow-storms are raging. They were allowed exercise in the yard every day, except in the coldest weather and stormy days.

We must confess that in spite of the enormous yield of milk given by the three Dutch cows under experiment at the Michigan station, of which we give an account in another column, we prefer Mr. Gould's plan to the more natural plan followed at the station. But how about the theory of feeding only twice a day? And if; as Mr Geo. Moore tells us, a very successful farmer in the Townships assured him that if, between his cows having eaten their morning-meal and the occurrence of the night's meal, any visitor was shown round the cowhouse, he could tell by the falling off in the next day's milk yield how much the cows had suffered by the disturbance the visit had caused; we should like to know the probable loss of milk occasioned by the "three or more times' journey to the water-trough, and the exercise the cows were allowed in the yard, at the Michigan station. The modern cow, udder and, all, is an artificial product, and, when once brought into milking service, must be treated artificially.

Butter.—Says the Editor of the *Country Gentleman*: Careful study of the Danish methods of butter-making would seem to be well worth while even for our (in some respects better educated and more advanced) American butter-makers. The following are the prices of the principal butters sent to the London market: Russian, 96s to 112s; Cork, 106s to 110s; Irish creameries, 110s to 128s; Paris baskets, 120s to 122s; Australian, 124s to 126; Danish, 134s to 136s." But according to the *Agricultural Gazette* of November 18th, these prices are very much overrated, the quotations of that day being as follows:

BUTTER.—*London, Friday.*—Irish creamery butter has been obtainable at some concession, and 108s to 112s has been accepted for superior quality, also 96s to 104s for pyramids, and 90s to 100s for dairies; but Cork brands have not undergone any material change, firsts having been wired at 103s. to 112s., seconds at 92s. to 95s., thirds at 81s. to 87s., and fourths at 76s. to 78s, per cwt. Danish was 10 kroner down yesterday in Copenhagen, but as the change was made mainly to meet the fall here, there was little alteration, choice casks being 106s, to 110s., and occasionally 112s., and useful quality 104s. Australian sold slowly at similar rates to Danish. French was nominally unchanged on Paris and ordinary baskets, but in some quarters extra mild was selling at 102s., and other grades down to 90s., while Saumur was 2s. to 4s. lower at 96s. to 84s.; fresh rolls, 14s. to 11s. Italian rolls, 13s. to 11s. In Dutch there was rather more doing, dairies being unchanged at 94s. to 98., but factories 2s. to 4s. down at 100s. to 104s. Finnish casks quoted 90s. to 100s., and Russian 84s. to 90s. Irish creameries quiet at 106s. to 110s.

The Danish *kroner* is worth about thirteen pence English.

Linseed-cake. — Best linseed-cake, from Western States, is worth at Liverpool $21 36; here, we believe it cannot be bought for less than $34 00; if it can be had cheaper, we should be glad to know of it. And yet we grow lots of flax in the Dominion!

Wool.—In England, Down teg wool (the first clip) is still hanging about at 9½d. a pound; Lincoln hoggs (same as tegs) are worth 11½d, so, long wools are worth more than Downs, which is not generally the case.

Ammonia and gypsum.—We have often expressed our doubts as to the possibility of preventing the escape of nitrogen in the stable by the use of gypsum, or plaster, owing to the difficulty of bringing a dry powder into combination with the dry dung and litter; and in this the well-known analytical chemists, Doctors Girdwood and Baker Edwards, agree with us. No one doubts for a moment that "the reaction with *sulphate* (gypsum is *sulphate* of lime), *if complete*, and managed as can be done in a test-tube in the laboratory, will prevent the escape of nitrogen, as ammonia, entirely. But in a stable, it is another matter." We append a letter from Mr. Monson, of the S. Eastern Agricultural College, Wye, Kent, Eng., and beg to call attention to the very trifling loss of nitrogen as testified to by Doctor Voelcker If the manure when carted or thrown out of the stables and byres, pigsties and sheep-sheds, is well mixed, made into level, broad piles, and, in the open season covered with a good layer of earth, the horses and carts passing over the mixen during the time of its construction, the loss of nitrogen as ammonia will be found to be very trifling indeed.

LOSS OF NITROGEN.—A correspondent, having asked the opinion of Mr. H. J. Monson, of the South-Eastern Agricultural College, Wye, Kent, as to the best method of checking the loss of nitrogen from farm-yard manure, sends us the reply, which we are allowed to print: — "The loss of some nitrogen in the urine of animals in the management of the stable is bound to occur. But the loss of nitrogen in the manure heap, carefully managed, entirely without gypsum, is very little indeed (see Dr. Voelcker's remarks, and also Holdefleiss's, in the article, *Vinton's Almanac* 1894, you refer me to,. the amount at most is 2 per cent As the loss in the heap mentioned on page 46 is high, and as the statement is made that it was taken out of the stable and left in heaps several months, we can only assume the heap badly constructed in such a case,. It is however, the loss of nitrogen in the urine in the stable which is the trouble, and I think has not in any way been shown, so far as I am aware Müntz's experiments, page 47, were apparently not successful. Anyone knows the reaction with sulphates (gypsum and others), if complete and managed as can be done in a test tube in the laboratory, will prevent loss of nitrogen as ammonia entirely. The management of the application of gypsum in the stable is another matter. It appears to me that the cost and the care with which it would have to be applied are completely against it. Supposing you did apply gypsum in your cow stable, the first time the cows made urine the gypsum would be washed into the drains; another sprinkling would have to be applied, and soon, in fact, a boy would have to be in the stable as long as the cows.

Linseed-meal.—Mr. Stephens, in his "Book of the Farm", strongly recommends the use of cake for cows for six weeks or so before calving. And, though we never used cake, preferring the seed of the flax-plant in its natural state, or rather cracked, we do not remember ever having lost a cow after parturition. Some American writers on stock are not in favour of this food for cows about to calve, but we are glad to see the "National Stockman" taking a more favourable view of it, as may be seen below. But what does the writer mean by his derivation of the word "cathartic"? Every one knows that it comes from the Greek *kathairein*, to cleanse.

"If you have a little money that you want to spend in a profitable manner, a good way to do is to lay in a supply of linseed meal for the coming winter. It is much cheaper now than it will probably be in the winter, and it is an excellent thing to have in the fall when the fall calves are expected. I never knew of a case of trouble at calving when a little meal had been fed for a short time before, and while this is not so necessary in summer as it is in winter, when the feed is almost dry, still a little is a very good thing to use at such a time." So says the *National Stockman*. "A neighbor of mine some time ago asked me what was the best thing to give a cow that had failed to drop the placenta. I told him that I did not know as I ever had any trouble in that line, but I could tell him what would prevent it, and recommended linseed meal. The medical profession generally recommends a dose of physic as a first course in certain cases of ailments that affect animals, and while Epsom salts may have their place, yet it is much better, I think, to use linseed meal and do away with the need of such medecines. The above mentioned medicines are called "carthartics," which is derived from a word in some ancient language which means to kick.

Shorthorns.—We are almost tired of trying to make the American writers on stock understand the difference between the Bates, Booth, &c., Shorthorns, and the real Dairy-Shorthorn. If "Shorthorn dairy-cows and Shorthorn grades" are not "of a milking-breed, and yet a herd of them, 76 in number; gives an average of 10,000 lbs of milk a year, we should like to know what really constitutes a "dairy-breed". It would amuse some of our *English* friends to read the subjoined article.

Continuous Stabling of Cows.—An article appears in the London *Live Stock Journal*, detailing the method of keeping and feeding the cows on the Lyburn farm of the Birmingham Sewage Co., which should be in the hands of every dairyman in America. On this farm, in one stable, eighty-six cows are kept, and are never allowed *to go out of the stables in summer or* winter. They are soiled in summer and have succulent food in winter, besides which they get about eight pounds of grain per day. These cows are Shorthorns and Shorthorn grades, and still they are wonderfully productive of milk, and the flow is well maintained. Some of the cows give as much as 16,500 pounds in a year. Others, which started in after calving with a yield of fifty-nine pounds per day, have kept it up to forty pounds at the end of ten months. Not a cow is ever sick or off her feed.

This shows how profitable cows can be made by constant stabling, but the *reader should not fail to note all the* conditions required to obtain such surprising results. The stable is large, with an abundance of air space for the cows; they are made very warm, are well lighted and have ample ventilation. The cows are not in stanchions, or even tied, but kept in little box stalls with a separate manger in each one. The cows are well bedded and have water constantly accessible. Here is a herd of seventy-six cows, *of not a milking breed*, which give an average of over 10,000 pounds of milk a year, but when we contrast the most admirable accommodations and perfect manner in which they are *quartered and kept, with water always* before them, with the low, close, dark, cold, ill-ventilated damp stables, in which so many of our herds are kept for from eighteen to twenty two hours per day, and that our cows are then turned out into zero weather, and too often compelled to drink ice-water, and instead of having succulent food the year round. are in the winter forced to eat dry hay, corn fodder and grain, is it any wonder that the average of our herds is less than 3,500 pounds of milk per year? Will the time ever come when our dairymen shall realize the fact that warmer quarters, perfect comfort, absolute *quiet, and high feeding* are the requisites necessary to get the largest production and greatest profit from the cows? Perfect hygienic surroundings and plenty of properly compounded food, and an ample water supply are more in compliance with the needs of the cow's health than exposure to cold to get a breath of fresh air and a bit of sunshine. — J. S. WOODWARD, in *Prairie Farmer*.

NITROGEN.

(*Continued.*)

NOTE.—In the last paragraph of the article on nitrogen in the December number of the Journal, the decimal mark of the amount of potash lost per acre in a four years' rotation of crops was so indistinct that it may be worth while to observe that the weight is 2.34, or about 2 lbs. 5⅝ oz. Of course, the figures take no account of the loss of nitrogen in the manure *while rotting*, or *of the loss of nitrates* by drainage. In this country, where the land is hide-bound for some five or six months of the year, the drainage loss of nitrogen is trifling compared with the loss in England, where it is supposed to be at least 7 lbs. an acre, a great part of which is compensated by the amount annually supplied by the rainfall, say 4 lbs. or 5 lbs. an acre. Also, note, that when, as in this province, land is

laid down to grass for six or seven years, and is thus continuously covered by vegetation, the loss of nitric acid by drainage will be reduced to a minimum, and if the grass is *fed off*, the surface soil will at the end of the term be considerably enriched with nitrogen, and with the ash-constituents as well, "but that is another story." The ash-constituents will have been collected from the subsoil by the roots of the grass, and returned to the land in the dung and urine of the cattle. This nitrogen includes the accumulated receipts from the atmosphere and subsoil during the term, minus the quantity lost by drainage and that carried off by the stock. This accumulation of nitrogen will be chiefly in the form of grass-roots, stem, and humus, which, when the land is turned up by the plough, are oxidised, and gradually yield their nitrogen in the form of nitric acid.

When about to use any nitrogenous artificial manure, the farmer cannot be too particular about preparing it. Pulverise it thoroughly, and mix it with at least three times its bulk of finely sifted mould.

Why nitrogen should be of comparatively little use in a turnip-manure, and absolutely indispensable to a crop of mangels or sugar-beets, neither Lawes nor Georges Ville can tell us: but it is so.

NITROGEN IN THE FEEDING OF CATTLE.—The substances containing nitrogen that go to the composition of the animal frame are, generally speaking: 1. albuminoids or protein; 2. gelatinoids, and, 3., horny matter. These three groups are related in composition, though differing a good deal in their properties. The albuminoids form the substance of animal muscle (lean) and nerve, and the greater part of the solid matter of blood. The gelatinoids form the substance of skin and sinew, of all connective tissue, and also the combustible matter of cartilage and bone. Horny matter (*keratin*, from the Greek *keras*, a horn) is the material of which horn, hair, wool, and feathers are constituted.

Sir John Lawes, gives the following percentage composition, as regards the nitrogenous matters, of eight animals, the contents of the stomachs and intestines being deducted:

	Nitrogen. matter.
Fat calf	15.7
Half-fat ox	18 1
Fat ox	15.4
Fat lamb	13.5
Store sheep	15.8
Fat sheep	13 0
Extra fat-sheep	11.5
Store pig	14 5
Fat pig	11.4

From the above it will be easily seen that the percentage of nitrogenous matter tends to increase from youth to maturity, but diminishes as the fattening process goes on. The largest proportion of nitrogenous matter is found in the half-fat ox, the smallest in the fat pig.

The following table shows the quantity of nitrogen in the *fasted* live weight of the animals analysed at Rothamsted, the animals, for convenience-sake, being taken to weigh 1,000 lbs. each. We add to this table the articles wool and milk; so that full information as to the loss sustained by the farm, if the animal products is all sold off, may be easily seen:

	Nitrogen in 1,000 lbs. lbs.
Fat calf	24.64
Half-fat ox	27.45
Fat ox	23.26
Fat lamb	19.71
Store Sheep	23.77
Fat sheep	19.76
Store pig	22 08
Fat pig	17.65
Wool unwashed	54 00
" washed	94.40
Milk	5 92

In this table, the above constituents are reckoned on a fasted live-weight, including the contents of the stomachs and intestines.

Here, it will be remarked, how much richer in nitrogen is the ox than either the sheep or the pig.

As to the loss to the farm, in nitrogen, if the milk is sold; supposing a cow to give 6,000 lbs. of milk in a season, there will be about 35½ lbs. of nitrogen exported; to replace this, in nitrate of soda, would cost, here some thing like $6.40, but in England, the same quantity can be bought for $3.50! If butter is made, there will be no perceptible loss of nitrogen, but with cheese the tale is very different, for in dealing with the above quantity of milk, no less than 28 lbs. of nitrogen will be lost to the farm.

In a fat ox, as generally slaughtered, about 60% of the fasted live weight will be butcher's carcase (1); in a fat sheep, about 58 per cent; in a fat pig, —as pigs are marketed as porkers— about 83 per cent. As for the increased proportion of carcase to live weight while fattening, it was found at Rothamsted that, in store sheep, the average per centage was 53.4; in fat sheep, 58 6; and in very fat sheep, 64.1.

The difference between the percentage of carcase to live weight in sheep and other animals may be partly accounted for by the wool. Many fat sheep carry as much as 15 to 18 pounds of wool, in its unwashed state.

The percentage composition of the increase of sheep and pigs from the lean to the fat state is remarkable:

	Water.	Nitrogen. matters.	Fat.	Ash.
Sheep	22.0	7.2	68 8	2.0
Pigs	28.6	7.8	63.1	0.5

Bullocks of mature age show about the same composition. No wonder the bones of the pig are so tender when the proportion of ash is so small. And, it will be observed, the increase of fat is enormous: eight to nine parts laid on in fattening to one of nitrogenous matters. Whence comes this immense amount of fat? From the fat of the food and from the carbo-hydrates.

NITROGEN IN THE CONSTITUENTS OF FOOD—The *albuminoids* and the *amides* found in the grain, roots, &c., given to our farm-stock are nitrogenous matters, the fat, carbo-hydrates and salts are non-nitrogenous.

These albuminoids, proteids, are quite similar in composition to those found in milk, blood, and flesh. They may be described as *flesh formers*, and an animal even when not increasing in weight, i. e., when not fattening; will always require a supply of albuminoids in its food to repair the waste of nitrogenous tissue that is always going on. The quantity required for this purpose is but small; an adult man is supposed to need 1¼ oz. a day in his food for this purpose.

When the nitrogenous tissues, or the albuminoids consumed as food, are oxidised in the body, the nitrogen they contain is not burned, but excreted in the form of urea.

(1) Some of the very fattest show-b asts at the London Xmas Exhibition have given as much as 74 %.—ED.

In the usual plants, grains, &c., used for the food of the animals kept on our farms, the following are the percentage of nitrogenous substances:

Decorticated cotton-seed cake	44.0
Undecorticated " "	20.8
Linseed cake	27.0
Pease	22 4
Horse-beans	25.5
Oats	12 9
Barley	10.6
Corn-maize	10.4
Wheat-bran	14 5
Brewers grains	4 9
Fair clover hay	12.3
" meadow-hay	9 7
Bean-haulm	8 1
Oat-straw	4 0
Pasture-grass	3.5
Red-clover (before bloom)	3 3
Potatoes	2.1
Carrots	1.3
Mangels	1.1
Swedes	1.4
Turnips	1.0

Here it must be observed that some allowance is to be made for variations of practice, climate, &c. For instance: brewers' grains are more valuable here in Canada, on account of the inferior quality of our barley. (1) Meadow-hay in England, where these analyses were made, is a very different thing to a timothy meadow after the clover has died out; the former is full of clovers of different kinds: red-perennial, white or Dutch, yellow or hop, and lots of different grasses.

The nitrogenous substance in the table is obtained by multiplying the percentage of nitrogen by 6.25. No use troubling our readers with the *amides* and the *nitrates* in food.

Variations in the composition of these foods occur from difference of treatment in harvesting; for instance, in regard to meadow hay:

Cutting.	Nitrogenous matters.
May 14	17.65
June 9	11.16
June 26	8.46

DIGESTIBILITY OF NITROGENOUS FOOD MATTERS.—Not all the food given to our farm-stock is digestible. In the human subject, it is generally calculated that the constituents of a fair meal are digested in about five hours; but with the ruminants a longer time is occupied in this process; indeed, the ox will not have entirely expelled the meal of Monday morning till the night of the following Friday. This, it will be seen, is one of the principal reasons why the food of the ruminants should contain so large a proportion of what the Americans call "roughage," i. e., straw, &c.

In the case of ordinary meadow-hay, about 57 % of the nitrogenous substance is digested; of clover hay, 55 %; of very good lucerne hay, 74 %; of oat-straw, 35 %; of wheat-straw, only 17 %; but of horse bean-straw, 51 %.

Pease and horse-beans contain about the same percentage of digestible nitrogenous substance, viz., which fully accounts for their very nourishing properties, and for the immense support they afford the cow when her milking powers are exerted to the utmost.

The digestive power of the pig is remarkable. Of every 100 lbs. of nitrogenous substance given in *sour milk*, this animal is capable of digesting 96 lbs., and in two pigs, fed experimentally on green oats and vetches, 48.9 % of the *fibre* was digested: this by the way.—(*To be continued.*)

(1) Brewers know their business better now, in this country, than they did in 1869. The yield of malt then was at least 15 % less here than in England. Hence, the grains were worth more as cattle-food.—ED.

PRIZE-ESSAYS.

We are happy to be able, at last, to lay before our readers three of the essays that were distinguished as the most meritorious in their class at the competition, held in September last, at the meeting of the Montreal Exhibition Company:

On Butter making, by Mr. Horace Weston Parry, Model-farm, Compton, E. Townships, 1st prize.

On the cultivation of mangels, by R. R. Sangster, Lancaster, Ont., 1st prize.

On Farmyard Manure, by Jas. Dickson, Trenholmville, Q., 1st prize.

BUTTER MAKING.

In writing on this subject I shall confine myself more especially to the methods practiced in creameries which however apply more or less to the home dairy. The first thing to make sure of in the manufacture of really gilt-edged butter, is that the milk we receive daily is entirely pure and wholesome. This is a difficult thing to do, but if all the patrons are compelled to use aerators, and use them properly, and if the butter maker is most particular in refusing all stale and tainted milk, that object is attainable.

Having received the milk into the vat, it needs all our care and vigilance, to protect the wholesome and favorable germs suspended in the milk from coming into contact with and being inoculated by other unfavorable germs, the production of any body in a state of partial or entire decomposition. This care is essential from the moment even the cow is milked until the moment the butter is consumed.

We will now direct our attention to the proper handling of the milk as it passes through these processes, all of which, if improperly managed, will affect the quality or the quantity of our daily product.

When in the feeding or receiving vat, the milk should be stirred occasionally in order to keep the fat globules, which would naturally be forced to the surface, evenly distributed throughout the entire mass. The milk should be tempered gradually to the temperature desired for separating, as sudden heating makes the milk harder to separate and would not tend to improve the grain of the butter.

The temperature at which to separate depends entirely upon the machine in use and the season of the year. In winter, it may be advisable to separate at a temperature of 80° or 85° F., but in summer, when the weather is warm, it is of great importance to keep the temperature down at every move, and therefore I should advise separating at from 70° to 75°, which will be found to be the temperature of the milk as it is received at the factory. This may necessitate running the milk through somewhat slower than if heated artificially to 80° or 85°, but, as long as the skim-milk tests no more than ⅒, of 1%, the end will justify the means, as the grain and flavor will be the better preserved to the butter, and, Mr. Patron, who grumble because you have to wait so long, your skim-milk won't sour half as easily. The cream should be taken about 15% or should contain 20 to 25 % of butter fat, as thick cream can be churned at a lower temp. than thin.

Having separated our cream, it should immediately be cooled, to as low a temp. as 48° if possible, this will effectually stop all fermentation

which may have commenced, and will very much prevent that lack of flavor in very hot weather, a point of great importance.

Having got the cream down to a uniformly low temperature, we proceed to set for ripening, and gradually raise the temperature to about 65° in summer or 80° in winter, and during this process the cream should be frequently stirred, so that the cream which is in contact with the vat may not at any time become over-heated.

Any froth floating on the top of the cream must be stirred in if possible as there is fat in this froth and, if left on the top, it will not ripen with the rest of the cream and will not churn so thoroughly, thus causing a loss of fat in the buttermilk. It sometimes also is the cause of mottled butter, as it does not take the color so readily.

Where cream is churned the day after it is separated, it is necessary to use a starter to hasten the ripening process. I use a fermentation starter composed of separated skim milk from a perfectly healthy newly calved cow. This is set to ripen at a temperature of 80° until it loppers, then I skim off about two inches of the top in order to avoid using the impure germs which may have reached it through the air and I also leave about an inch of that at the bottom, to avoid using the precipitated caseous matter. That remaining I stir up and strain through a fine sieve into the cream, and mix thoroughly.

If a supply of new milk cannot be obtained, a starter can be prepared by heating separated skim milk to a temperature of 160° and keep it at that temperature sufficiently long to destroy all living organisms, and then ripen it gradually at a temperature from 65° to 70°, cool down, and keep it on hand at a low temperature

Pure cultures for the making of starters can be prepared and are now also on the market.

Having mixed in the starter, the cream should be stirred occasionally and then left undisturbed until ripe for churning.

Cream is ripe when it develops a pleasant but slightly acid taste, and is like oil, uniformly thick and smooth in appearance.

When ripe, and at the proper temperature, the cream is *strained* into the churn, in order to remove any curd or other foreign matter which may be held in suspension in it.

The churn should not be filled much more than half full in order to obtain best results.

The proper temperature at which to churn depends on the quality of the cream and on the surrounding atmosphere.

I always aim to churn as low as possible, say from 50° in summer to 58° in winter, as a low temperature gives much more exhaustive churning, as a rule.

I want butter to come in 35 minutes.

If any coloring is used it should be added directly the cream is all in the churn.

When the grains are about the size of wheat-grains, I stop the churn, and draw off the butter milk.

Then I add as much pure water as there was butter milk, at a slightly lower temperature than the cream when it was put into the churn, say 2° lower, and give the churn a few quick turns to wash the butter.

One method of salting is to run off the water in which the butter is washed at once, and let the grains in the churn drain for twenty minutes, then add the salt as the granular butter lies in the churn, and give the churn a few slow revolutions in order to thoroughly mix the salt.

My pratice however, is to convey the butter in granular form to the worker by means of a tin dish with a perforated bottom, taking care not to get too much on the table to work at once.

When the moisture pressed out of the butter runs off the table perfectly clear, I add salt from ¼ to 1 oz. to the pound of butter, according to the requirements of the market supplied.

Care should be taken to procure the finest quality of pure salt on the market, and it should be kept in a sweet and dry place, as it very readily absorbs to it any noxious odors which may exist in the surrounding atmosphere.

The salt being added, it must be mixed thoroughly and uniformly, and the butter worked until all the moisture is expelled. It this can be done in one working, without injury to the grain or without spoiling that clean waxy texture so desirable, so much the better, and it is then ready for packing. On the other hand it may be necessary, after the salt is evenly distributed throughout the butter, to leave it for a few hours at a temperature of from 50° to 55°, until the salt is dissolved, then, with a few turns of the worker all excess of moisture is expelled, and any break in the color removed.

The proper temperature at which to work butter is from 50° to 55°, if worked at a higher temperature we may make it greasy, this may be done too by over-working it.

The appearance of butter when finished should be like wax, and it should be in a condition so that the grain would be the least injured With regard to coloring, a color similar to straw is required for the British Market, but for the home supply a somewhat higher color is called for. Also in salting 2 % is required in England, while 4 % and over is called for at home.

Butter should be packed in whatever package the trade demands.

I have been using this summer, for export, the ½ cwt. (56 lbs.) boxes, which give every satisfaction in England.

In packing, no air holes should be left, and all corners should be properly filled, as the tighter the packing and package the better is the chance of the butter keeping.

All packages should be thoroughly scalded, and cooled afterwards, and a lining of parchment paper used to make it air tight.

The bare hands should never touch the butter. In all things connected with creamery work and butter making, let us remember that Cleanliness is next to Godliness. In fact the profitable results attendant on cleanliness in the creamery, would almost award that virtue premier honours.

Beside bad smells, &c., &c., the following irrevocable mistakes in manipulation will injure the flavor of butter . holding cream too long at a high temperature, over churning, and overworking.

Now that we are looking across the sea for a market for our butter, we must study the requirements of that market. And if we try to improve our utmost, and turn out butter with the best keeping qualities, a firm waxy article, colored with a delicate primrose tint, salted just enough to tell it is salted, free from moisture, free from taint and impurities, we shall make better butter than the Danes are making, and establish for Canada a reputation as great and glorious as our cheese has already earned:

"Facile princeps."

HORACE WESTON PARRY,
Buttermaker,
Model Farm,
Compton, Que.

I hereby certify that this essay is written by our buttermaker. Mr. Parry, maker of our exhibit of butter at the Provincial Exhibition, Montreal.

(Signed) ROBT ROBERTSON,
Manager, C. M. F.

Sept 11th 1895.

INTRODUCTORY

MAKING AND SAVING MANURE

It is an easy matter to lay down the principle to be observed: To make all the manure possible, and save it without waste. But it is the practical application of that principle wherein lies the difficulty.

The writer once attempted to dig a well in a place where a former owner had scooped out a hollow in the yard, and in which for years the manure pile had been made. But finding the manure juice roosing out of the bank at a depth of fourteen feet, he gave it up as a bad job—There was a lesson that has never been forgotten, and a proof of mistaken care of manure.

We read of the system of tank-building, to contain the liquids of stables and yards. That is another costly mistake in the case of manure We know of those who daily draw the manure from their stables, and scatter it on the frozen ground and snow, to the bleaching winds and sun, regardless of the fact, that a pile of uncovered manure will waste away, with scarcely a mark left. That is another mistake, which is aptly demonstrated in the experience of those who practise the soiling system, by which all the excrements are saved, instead of the waste incurred in the pasturing system. Much has been written of the good effects of hauling muck into the yards and stables. Some writers asserting that one load of muck, and one of dung, are as good as two loads of dung. (See Journal vol. 3 p. 165. — ED.) Except with the view that dry muck prevents the loss of urine, muck about the stable is a nuisance: "Where there is muck, there is muck." There is doubtless great benefit from its use on certain lands, but the most economical mode of dealing with it, is to draw direct to the field which the farmer has previously proved has been benefited by it. (I am directly opposed to the frequent handling of either muck or manure. I assert that nothing is added to either by handling and without loss: the virtues will be extracted by direct contact with the soil).

Formerly, in Great Britain, farmers fed the stock in the yards, in the effort to convert the immense crops of wheat straw into manure. That system has almost entirely disappeared. For generations, the *habitant* of the St-Lawrence-side, with a soil already fertile to the full, could make no use of the manure accumulated by his stables. That, also, is a thing of the past. And the Pioneer, who, with axe and firebrand made annual inroads upon the forest, and with crotch harrow and 'pioche" scratched a living from the virgin soil, has disappeared to the West, the hills echoing back his cry "the farms are running out." I am aware it is the generally accepted opinion among careless farmers, that it is necessary to use artificial manures for the purpose of keeping up the fertility of the farms. But from an experience extending over half a century as a farmer, I am confident that, if no hay, grain, or roots are sold from the farm, if the soil is properly cultivated; if the excrements of the animals are properly conserved, and properly applied, there is no farm in the Province but can be improved, and be made to pay at the same time. That is my experience, and the experience of parts of China, Japan, Germany, France, Great Britain, also Palestine, dating back thousands of years, proves it to be a fact. I am aware there are those who do not accept it as a fact. Those whose manure heaps are under the eaves of the barn, the juices washing into the brook, the urine having first leaked through the stable floor. The cattle shivering in the yard, knee deep in straw, dung, and slush, with the indispensable gutter, to draw off the overflow. And the steaming stench rising near the horse stable door, disclosing a pile of burnt, useless stuff called horse dung, not worth the hauling. It is needless to look for the path to the watering place, that is marked by the hummocks of dung, and by the heaps lying round the trough. And the look on the face of the owner betrays the fact that "farming don't pay, that the farm is running out," by the rain, by the sun, by the winds, by the heated pile, by the stable floor, by the leaky tank, by the poached yard, by the gutter, the brook, running out,—out down to the sea.

It is an axiom that it is easier to show the errors of other systems, than to present one that is perfect. And it is easier to state a theory, than to put it in practice. But my theory has long been in successful operation on my own farm, and I think will commend itself for its simplicity and its economy of labour, if I can succeed in making myself understood.

THE MAKING AND SAVING OF MANURE

Can be best done in a basement barn. The cattle and horse stables above the manure-cellar. The cellar-floor made of cobble-stones imbedded in puddled clay, and at no time completely uncovered, thus allowing it to become dry. Otherwise the clay underneath may crack. Into this, the entire droppings of the cattle fall through traps in the floor the entire length of the stable. The plank covering the trap resting about an inch on each side of the floor, properly hinged, and about eighteen inches from the drop of the stalls. This makes a gutter, and is a great economy in keeping the stable clean, and the urine is completely saved. The droppings from the horse-stable on the other side of the barn-floor are wheeled into the cow stable and dropped down, thus mixing with the cow dung. Too much weight cannot be placed on the benefit of mixing the horse and cattle droppings. There is too much liquid from the cattle to be taken up by the dung of the cattle, but I find that the droppings of four horses, properly distributed, with that of about twenty cattle, including proper bedding, completely absorbs the liquids. Care must be taken that in no place the heap is allowed to firefang. This will occur unless the horse dung is pretty evenly distributed. Under the best management, the urine will tend toward particular places, this is rather a benefit than otherwise, as with an old pail and tin, it can be dipped up and thrown on any place where the pile is heating too much. It is particularly necessary to see that manure does not fire-

fang. In that state it is useless. This can be detected at once by the escape of the gases, and if no manure liquid is available, water, or snow, must be used to stop the firing. I am aware of the common, suicidal mode of turning over the pile. That being done, the gases escape, and, until they are consumed, the pile will continue to burn. The liquid stops the firing, fixes the gases, and the pile becomes a fetid mass, ready for the immediate use of plants. My experience is, that with proper bedding the solids of about twenty cattle and four horses will absorb the liquids. But if the cattle are fed silage, and the horses are only at night in the stable, it will be necessary to use more sawdust, (of which, more anon). I may add that I am not in favor of using much straw for bedding, as the straw ought to be cut and saved, so that the stock eat nearly all of it.

I am aware that some object to the use of sawdust. I have never seen any ill effects from it on any kind of land (1). And on heavy clay, the places where even clear sawdust is put will show the benefit without stakes to mark the place.

In connection with the horse-stable, and indeed with any stable not made with a drop into the basement manure pile, it is very difficult to save the urine, especially that of horses. It is, like coal oil, turpentine, and such liquids, so volatile, that it disappears into the air, or into a two inch plank, unless some absorbent is used to hold it. For years I have had the dung of the horses thrown forward under them. This, with a little straw, or sawdust, keeps them perfectly clean and dry. I am aware of the objections that it will heat under the horse, cause trouble with scratches, bad effluvia &c., but by using common prudence and a thorough clean-out once a week, I have never found any ill effects from it, and I thus save a fine lot of good manure.

As I have previously remarked, a stable with a basement is the thing to make and save manure in. It is so difficult to make the floors tight in common stables, that gutters are advisable, but they are almost useless unless imbedded in puddled clay, the contents being wheeled into a shed prepared for the purpose, which ought to be floored in puddled clay. The wall surrounding should be built at least three feet high with stone and mortar, and pointed with cement.

It will be remarked that I suppose a stable to contain twenty cattle and four horses. This is about the number of large stock of a moderately sized farm in this part of the country, not including young cattle, colts, and sheep. Under two years old, I never pretend to tie them up. With suitable feed racks, in moderately warm stables, convenient to the fodder, and water, young cattle, dehorned, can be more economically taken care of (excepting calves, all my young cattle are housed under the barnfloor 12 × 70 feet, adjoining the manure cellar). All kinds of garbage and straw of great amount can be made use of in these loose stables. I find no need of floor in such stables, as a couple of inches of road dust, dry manure, or sawdust, with sufficient straw to keep it in place, prevents waste, more dry material being added as required. After it gets a foot deep or so, it is a good plan to loosen it up once in a while with a pick, that makes it comfortable, allows the urine to penetrate the mass, and tends to decomposition. (Allow me here to remark, that, neither in this case, nor in any other, would I allow such an amount of decomposition to take place, as to hurt the stock, and at the same time I approve of ventilation to prevent stock from contaminating itself, which it is more likely to do from want of ventilation than from the effects of properly saved manure). For the economical handling of the manure of such stables and cellars, the door must admit of a cart or sled being backed in, and generally it is advisable to draw to a dump during sleighing, to allow of easy handling in the early spring. Many barns are so situated that, if raised two or three feet, a good cellar could be made under the entire barn, or at least under the lower side of it sufficient for the manure, and in these days of horse forks, high barns are rather favorable than otherwise.

(1) Neither have we.—Ed.

AS TO WATERING.

The time is coming when no one with any pretensions as a farmer will turn his cattle out to water From upland springs, windmill or handpump, water will be supplied to the stock in the stable. There is here a great loss of manure, to say nothing of the extra labour. In stables where the stock must be turned out to water, try the plan I used previous to putting water into the stable. At the regular time, with a barrel hoop, or something noisy, and with the same term and tone, all the animals in the stable should be roused up and kept moving, until each one has made a dropping. This will be requisite only a few times. It is surprising how soon they learn. By this plan a minimum of droppings are left outside. The usual mode of tying up the cows to be milked is to be commended, but the also usual mode of turning them out at once cannot be too severely condemned. They enjoy an hour at each end of the day resting in the stable, and they will, at the end of that time, certainly each leave a dropping in the stable, if taught, and they will go right to work on arriving at the pasture. I would rather have one dropping in the stable than ten in the pasture, and on the road they are a nuisance. If the cows are milked in the yard the same rule applies, rouse them up, then let them stand. (The dog can easily be taught to do this both in yard and stable) the urine will be lost, but the solids can be gathered into the shed.

IN CONNEXION WITH THE HOUSE CLOSETS.

Light boxes, not too large for one man to handle on a stone drag, should be properly placed underneath, (a handle of common wire can be put in the ends of the boxes for convenience) and a small box in the closet for dry earth, ashes, or sawdust, and an old tin plate are all the requisites for saving everything in connection with the house, except the night slops, which ought to be taken to the manure cellar. I find it better to draw the boxes direct to the field, and spread when plough ing is going on. But before I leave this,—see that the boxes are properly in place, kept replenished with dry material, and don't let them get inconveniently full.

Some writers tell us to put the pigs amongst the manure, "they will turn it over, and eat the waste grain from the stables." That may be good for the manure, but is certainly bad for the pigs. My winter styo is in a corner of the cellar, but I keep it as clean and dry as possible. Hens are better scavengers.

I do not particularly mention the care of manure in the sheep-sheds as they are practically cared for the same as young cattle.

To recapitulate. I have endeavoured to impress the fact that, *unless the liquids of the animals are saved*, the farm will deteriorate; that certain conveniences of the *buildings are necessary* for the economical making and saving manure. I have endeavoured to show, that much of it is *lost after being produced*. I have called attention to the *over heating* of horse dung, and the avoidance of loss by mixing it with the colder and moister cow-dung. Also the proper *use of liquids*. That, to succeed, the common farmer must *do without artificial manures*, and apply himself to *save that he already has* in his possession. And that by proper management *farms will not run out*, but continue to improve. I have done this warranted by history and experience. I have endeavoured to compress *matter for a volume* into a few sheets, and no subject can be more interesting to the thoughtful farmer than "How to make and save manure."

And now having completed the task laid before me, and being confronted by a want of space, I will only add a few general rules as to the

APPLICATION OF MANURES.

Keep manures under cover until required.

When spread, mix with the soil as soon as possible.

On sandy lands, let the rule be little and often, of fine tilth, and keep it near the top.—(Good.—Ed)

On clay lands, put the longest manure, and plough it in, not too deep If intended for roots, plough it in four inches deep in the fall, and cross plough eight inches in spring. (Very good indeed.—Ed.)

Where manure is drawn out in winter, dump it in a flat pile, near the top of the poorest knoll in the field.

In top-dressing *never* do it in hot, dry weather. (1)

And in all your handling of manure, always remember, that, like the old lady's tea, *the first water takes the best hold of it.*

James Dickson.

Trenholmville, Que., Sept 1895.

(1) Why not? The loss of *made* manure, by evaporation, is but trifling.—Ed.

ESSAY ON THE CULTIVATION OF MANGELS.

There are four essential points to observe to insure the successful growth of a good crop of mangels, viz: first, the soil and its preparation.

2nd the seed and sowing;

3rd the thinning and cultivating;

4th Harvesting and storing.

In the first place the best soil for mangels is a rich clay, sandy, or gravelly loam well drained with surface drains, or if underdrained, all the better, then take second sod, after wheat, oats, barley or peas, the latter most preferable, (mangels succeed remarkably well on the same sod year after year) then gang plow three or four inch deep to kill all weeds and rot all stubble and grass, let lie in this state one or two weeks, if the weather is dry, then harrow thoroughly until all weeds, grass and stubble are on the surface, harrow at intervals to keep the surface smooth until the middle of October but if previously cultivated with roots or corn, the land will not require this amount of labor; then apply thirty or forty cart loads per acre of good barn-yard manure, for mangels are heavy feeders on the soil, as one acre takes from the soil the following manurial constituents, viz. nitrogen ninety eight pounds, potash two hundred and twenty two pounds, phosphoric acid, thirty six pounds, which must be applied to the soil in farm yard manure, but if any special manure is used in addition to farm yard manure nitrate of soda would be the best. The manure should be well rotted, spread evenly, and ploughed under immediately. Do not let the land lie to dry, or allow any of the valuable parts to escape into the air, plow six inches deep, and if low land, in ridges about eighteen or twenty feet in width.

Have all surface water well drained off, with plenty of cross furrows; then, if convenient, apply from thirty to forty bushels per acre of good wood-ashes evenly spread on the surface of the plowing, and let lie exposed to the action of the frost until spring; then, as soon as the soil is dry mangels requiring to be sown early, and firm enough to work fine and carry the horse, harrow the surface thoroughly to break all lumps as fine as possible, and after plowing crosswise six or seven inches deep, let it lie for a couple of days to dry and warm up.

2nd. Now have seed ready and make sure that it is fresh. The best varieties to sow are long red, intermediate yellow, Yellow globe, and Golden tankard, in the order named; three lbs. per acre is sufficient, if seed is fresh.

Harrow the land thoroughly until it is all as fine as it can be made. Drill it up thirty inches apart, drills running north and south, if possible, to insure as much sunlight as possible to the young plants.

As soon as a few drills are raised, rake the top of the drills with a garden rake to level the surface for the machine to run more easily, then commence sowing, do not allow the drills to stand over night unsown, for it is very important that all drills raised be sown before the ground settles. If any are raised and not sown the same day, harrow down next day, for herein lies the secret of success or failure for the seed to germinate, as there is something in the settling of the soil that causes the seed to take root and grow more evenly if sown at once. I have more than once had a few drills left raised over night and sown with the same seed, and found that not more than half the seed came up.

3rd. Now, as soon as the plants are up, so that they can be seen from end to end of drills, go through them with scuffler or horse hoe cutting up within two or three inches of the plants but not so close as to disturb them. this done then with sharp hand hoe trim off the shoulders close up to plants, this will kill all weeds that may have started. Then, as soon as the plants get three inches high, or the fourth leaf shoots out, commence thinning, which must be done by hand, and avoid as much as possible pulling them down, as that causes them to grow crooked. (1) If the soil is rich, thin to ten or twelve inches apart and do not leave a weed. That done, in a few days run the scuffler through again, which will pulverize the soil and retain the moisture. In a few days, go through them with hand hoes, and hoe between the plants which will loosen the soil and give them a start to set, if the weather is dry and the soil begins to crack go through with the scuffler quite light and keep the moisture from escaping; but if the weather is wet that is not necessary.

(1) Totally opposed to our experience. Ed.

A moderately dry season is much preferred for a good crop of mangels. Watch closely that there is no cracking of the soil, if that begins, run the scuffler quite light through them again. I find from twenty years experience that level cultivation is best suited for mangels, finding they derive more nourishment from a level surface rather than from a moulded or banked surface. (1) But if size is wanted for show roots apply a good dressing of manure with horse and cart driven between the drills, spread even all over the surface and round the plants, the horse walks in the drill and the ordinary cart runs between the two drills, and can be driven to the other end to turn.

The breaking off of the under leaves is of great advantage and keeps the roots from growing crooked and allows more sunlight which in my experience is of great advantage in producing a much firmer root, and a better keeper with more dry matter for feeding. (2)

This being done, no more is required except to watch for any weeds that may spring up; if any go through and pull by hand, which is all that is needed until harvesting comes on.

Harvesting and storing now commence which must most assuredly be done before frost sets in if possible, as frost causes the roots to become colored with black spots and causes them to rot more readily. I advise taking them up about the 20th of September and on dry afternoons, with as much sunlight as can be had and by all means avoid pulling wet. I recommend hand topping: just hold the root in the left hand, and with the right hand grasp the top and twist it off, then throw into the cart direct which can be driven between the drills taking five drills at a time. Watch closely that no weeds or leaves adhere to the roots, for that causes ultimate decay in the root-house or cellar. If the above is closely followed, and the roots are stored dry, the grower will have no difficulty in producing from twenty to thirty tons per acre of one of our most valuable farm crops.

R. R. SANGSTER,
Lancaster,
Ont.

QUEBEC PROVINCE DAIRY ASSOCIATION

Fourteenth Annual Convention at Waterloo.

Reports of The Various Inspectors and Departments— Statistics of Interest to The Trade — Mr. Macfarlane's Report.

Waterloo, Que., December 4.— The town is crowded with delegates from every part of the province, attending the fourteenth annual convention of the Province of Quebec Dairy Association. Among those who assisted at the meeting at 2 p. m. on Tuesday were Messrs J. C. Chapais, Assistant Dairy Commissioner, Edward A. Barnard, editor of the Journal d'Agriculture; Peter Macfarlane, Provincial Cheese Inspector, and J. D. Leclair, superintendent of the St-Hyacinthe Dairy School.

Rev. Father T. Montminy took the chair at the opening yesterday afternoon. The elections for members of committee resulted as follows: Committee on Ensilage, Messrs. Walker, Bourbeau and Ness; Committee on Machinery, Messrs, Macfarlane Bourbeau and Seguin; Committee on Nominations and Elections, Messrs. Chapais, Ness, Taché and Guay.

Messrs. Peter Macfarlane, general inspector of Syndicates, E. Bourbeau, assistant inspector and J. D. Leclair, Superintendent of the St-Hyacinthe Dairy School presented their reports, the reading of which gave rise to interesting discussions among the delegates present, in the evening.

The visitors were tendered a reception by the Mayor and townspeople of Waterloo, speeches being made by prominent citizens and members of the association.

In opening the convention, Rev. Father Montminy requested the members to not only follow the papers as they were read, but also to take part in the discussions which would follow each essay and report. The papers themselves would doubtless contain a large amount of interesting information, but this could be materially added to, if the members would bring their experience to bear on each point raised, and give all present the benefit of their opinions.

Mr. E. Bourbeau's report (as assistant inspector general of butter and cheese syndicates stated he had been engaged in visiting the various syndicates from May until October, and had during that time visited every part of the Province. He had found many causes which retarded the butter and cheese industry, but the most dangerous one, and the one to which he desired to draw special attention, was the great number of small factories which exist. They caused trouble in a number of ways, but especially by taking milk which the larger factories, anxious as they were to turn out good cheese, would not buy, and as a result, a great deal of bad cheese was put on the market. During the twelve months, Mr. Bourbeau had visited 288 factories, in company with the local inspectors, of which number, he classed 131 as belonging to the first class, 120 to the second, and 27 to the third. Of the cheese examined by him, 10,417 were of first class, 11,665 of second, and 2141 of third.

In the discussion which followed, Mr. Thibault, of Waterloo, said that he thought there should be some rule made, that not a pound of cheese should be allowed to go out of any factory until it was paid for. As things existed at present, the agent came along and bought what he like, it was shipped to Montreal, and his firm paid what it liked. The manufacturers were being robbed by someone, whether it was by purchasing agent or the purchasers themselves, but one way or another they were allowing themselves to be got ahead of.

Mr. Macfarlane, when called upon for his fourth annual report, stated that he had commenced his labors on May 1 last by holding schools in the Lake St-John and Chicoutimi districts. He had opened four such schools, two in the Lake St-John district and two in Chicoutimi. In all, eighty makers and apprentices attended these schools. The speaker was sorry that these people could not attend the Dairy School at St-Hyacinthe, but the Dairy School was so full that it would have been utterly impossible to accommodate them.

There were in all three butter syndicates and thirty-five cheese syndicates, and there were 780 factories receiving inspection, which, after all, was only half of the total number existing in the province. The inspector general had visited 360 factories, some twice, and examined 30,201 cheese and 1407 tubs of butter. He had found 5984 poor cheese or about one-sixth of the total quantity submitted; but of the butter, only 14 packages were poor. The poor cheese was nearly always the result of negligence. The proprietors of factories were getting such low prices for it that they simply told themselves that it was not worth while troubling about the milk being aerated or other precautions of prime importance.

The shipments of cheese for the year 1895 show very little variation from those of the year before, and although the butter exports had increased, they were not anything like what they should be.

The money returns for cheese and butter do not show a total equal to the average of the last three years, in fact, the price of cheese has not been so low for ten years. They must work to break down the prejudice which had grown up in the British Isles. He believed that the standard of the cheese in this province was higher to-day than at the time of the World's Fair.

Some one hundred factories now pay their patrons by the Babcock test a marked increase since last year, and a fact, at which, in the estimation of Mr. Macfarlane, all good men should rejoice.

Following Mr. Macfarlane's address, an animated discussion on the Babcock test was entered into, Mr. Wherry starting the ball rolling by differing from the majority, and asking whether after all it was not unwise to purchase milk in this way. He had attempted for years to get a scientific opinion to guide him, but could find nothing but contradictions. Mr. Macfarlane went into the arguments and counter-arguments very carefully, but summed up by declaring that in his opinion the system of paying by the fat was not only more honorable and more honest, but would also save innumerable lawsuits and misunderstandings between buyers and sellers.

Mr. Foster pointed out that the trouble lay in the taking of the sample, as so few people are competent to do this correctly. Mr. Macfarlane replied that while he agreed with Mr. Foster in the main, yet if the milk was well looked after overnight, the difficulty would be greatly reduced.

Mr. Wilkins asked for farther information regarding the statement made by Mr. Macfarlane in his report, that one-sixth of the cheese he had examined was not good. The inspector drew attention to the fact that in his report, he had ascribed this to negligence, but he might add that carelessness in giving the cows bad water, and allowing them to feed on weeds for want of proper nourishment were the main reasons for the bad results in cheese.

Mr. J. D. Leclair, Superintendent of the St-Hyacinthe Dairy School, then read an interesting report, of the educational work done at this institution, which is at present filled to overflowing.

In the evening, the mayor Mr L. Bouchard, gave a reception to the visiting delegates in the Town Hall, expressing the pleasure which he felt in welcoming them to Waterloo and thanking them for the honor they had done the town by selecting it as their place of meeting. Several of the visitors made suitable replies, and a very pleasant evening followed.

December 5th, Waterloo.

The attention of all present having been called to the evil effects of successive hay crops on the food of the animals, their subject of artificial milk producers was entered upon, and a resolution was passed favoring the use of linseed meal, or any other suitable meal, for this purpose."

"Mr. E. A. Barnard, editor of the *Journal d'Agriculture*, delivered an interesting address, once more calling attention to the various means by which fodder could be improved, and the standard of butter and cheese improved and increased in value. He was followed by Mr. J. C. Chapais, Assistant Dairy Commissioner, who gave an account of the work done throughout the country districts by holding meetings, and explaining the latest improvements and scientific methods of butter and cheese making. In a number of cases the lecturers had been called to task for talking over the heads of some of those present, and many amusing scenes had followed, but as a general rule, the farmers were only too glad to hear them. The gatherings had been well attended, and much good had been done

"Hon. Louis Beaubien, Com. of Agriculture, having been called upon to address the meeting, said he was highly pleased to see what a great interest in the proceeding was being manifested by the members, and he was very glad to be in a position to inform them that the money necessary for the carrying on of the work had been voted by the Government at Quebec within the preceding twenty-four hours. Touching on the exportation of butter to Europe, he was quite willing to admit that a great deal had been done already, but at the same time, although there was an English proverb which said "Let well alone," he would advise them to work together and endeavor to obtain even better accommodation in the future. With regard to the actual manufacture of butter and cheese, he reminded the delegates of the prime importance of cleanliness, and advocated the aerating and straining the milk used for these purposes. Care must be taken to see that there was a good supply of feed for the cows, and nothing must let them overlook the necessity of this. In conclusion, he drew particular attention to the work to be done by the Good Roads Association, and hoped that they would not only do their utmost to induce the Government to act in the matter, but would also act together, themselves."

SOME IMPORTANT RESOLUTIONS.

"The following recommendations, embodied a series of resolutions, moved by Mr. E. A. Barnard, were endorsed by the association at to-day's session:

First, the society, looking to the advancement of dairy interests and the production of the best quality of butter and cheese, recommends to patrons the encouragement of *large* factories, under competent management, and drawing the milk to factories under contract.

With a view of improving the equipment, etc, of existing factories or of erecting new ones, the society will recommend to the government that the laws relating to co-operative societies be amended and made to apply to farmers' organizations. If necessary, to give to such co operative societies and organizations unlimited responsibility that farmers might with greater freedom secure funds to carry on works of improvement in equipping their farms and constructing or improving cheese and butter factories, roads, etc.

(1) We prefer drills.—ED.
(2) We disagree with this utterly.—ED.

The Federal Government will be approached with reference to the establishment of an improved system of refrigerators on trans-Atlantic steamships, such as exist on steamers going to Australia and New-Zealand, that Canada may be able to ship fresh meat, poultry, game, etc., to the English market, as well as dairy products. (1)

Another section of the resolution calls attention to the facts that the most of our cultivated fields do not produce what they might, with profit, if a better system of cultivation was followed; that sufficient means for the destruction of weeds are not taken; that our fields are insufficiently fertilized; that our ploughing is not deep enough to secure the benefits of a deeper and richer soil, which entails a greater suffering from drought or excessive rain, and that a large part of the fertilizers which are carried into the subsoil are lost: that heavy soils would be much more valuable, and more easy to cultivate if a good system of underdrainage was established; and recommends to all the *friends of agriculture* in this province, more particularly the Agricultural Commissioners, the directors of our schools, lecturers, and editors of agricultural papers, to make every possible effort in order to bring about the improvements outlined above.

After alluding to various facts as to the impoverishment of the soil by being robbed of successive grain and hay crops, for sale as such, and that farmyard manure is not produced in sufficient quantity to bring back fertility to the soil, referring more especially to distant fields, which receive little attention, the sixth resolution recommends to all farmers the adoption of cotton seed meal, linseed meal, or any other meal of like nature, as a food for stock, both as a milk producer and to enable them to feed more cows; and additionally, recommends the use of lime, wood ashes, potash and phosphoric acid as a fertilizer, either in connection with farm yard manure, or separately and directly for the production of such crops as clover and beans and other leguminous plants, which produce excellent fodder, rich in nitrogen, and which will leave in the soil, through their roots, the four elements of fertility which are indispensable to the securing of the largest crops."

AGRICULTURE.

"The Hon. L. Beaubien, Minister of Agriculture, received a despatch yesterday afternoon from Waterloo, Que., informing him that at the Dairymen's Annual Convention there Prof. Robertson in his address estimated that improved mechanical refrigerators would be provided next year on steamships for butter and cheese; that he stated that he was authorized by the Minister of Agriculture for the Dominion to announce that a plan for *opening up trade with Great Britain* in dressed meats from Canada was under favourable consideration, the idea being for the Federal Government to purchase picked cattle to be slaughtered at Montreal, the meat to be shipped in cold chambers to a central depot in England to be distributed thence to the retail depots at prices fixed by the Canadian Commissioner; Canadian beef, mutton, poultry, &c., to be put within reach of the British consumer under their own name and in their best conditition to establish a permanent demand. This was specially valuable for the small sized cattle of Quebec.

From Star and Withness.

(1) This plan we believe, has been adopted by the federal government.—Ed.

Correspondence.

SUGAR-BEETS.

M. Séraphin Guèvremont writes me word, in reply to a question:

"We have only grown half an arpent of beets this year, and only carted a ton of them to the boat that was loading for the Berthier factory, because we found that the deduction they were making of 15 % was too much when such well cleaned beets were concerned. In my humble opinion, I do not think the factory will go on long if conducted on that principle."—(The above is a literal translation of M. Guèvremont's letter. Ed)

Mr. Peter Macfarlane kindly sends us the following:

On Thursday morning, at the Convention of the Dairymen's Association, Mr. Wherry read a paper on cheese making, after which, Prof. Shultz gave a lecture on the chemistry of milk, and the relation of butter fat in milk for cheese making purposes. Prof. Jas. W. Robertson gave it also as his opinion that milk should be paid for by the Babcock test. Quite a number took part in the discussion, the prevailing opinion being that it is the best plan, and does away with all doubts as to dishonesty among patrons. The report of the auditors was accepted: they find the accounts kept in good order by the able and efficient secretary. The attendance in point of members was hardly up to the last 3 or 4 conventions

Yours truly,

PETER MACFARLANE.

Chateauguay,
Dec. 10th 1895.

EDITOR OF *Journal of Agriculture.*

Sir, — In your report of prizes awarded for essays on cheese making (Cheddar system) at the Montreal Exhibition, you only give the names of parties who received 1st and 3rd prizes, for the very good reason that the name on the one which was awarded 2nd was torn of and could not be recognised.

I wish to state that I know this was not done by anyone after its receipt at the Sect's office.

Yours truly,

CHAS. W. ILKINS.

If you wish you can ascertain at Sect's office that I was awarded 2nd and mention it if you like.

TO THE EDITOR OF THE
Journal of Agriculture.

Dear Sir,—The education of the farmer is one of the most important objects to be obtained. Canada being a purely agricultural country, our wealth depends upon the productions of the soil.

There are about 800,000 men in the Dominion capable of work; 600,000 of these are engaged in raising, from the soil, the wealth of the country. The balance are professional men, or men living on means they have accumulated as business men or speculators. Out of the exports of this country amounting to $108,000,000 the farmer, the lumberer, and the miner export $100,000,000. The highly protected manufacturer brings very little wealth into the country. The merchant and the professional men are like the drones in the hive, they are a necessity, but produce none of the honey. Steamboats, railroads, and canals produce none of the wealth. They carry the productions of the soil to the different markets of the world, and bring back the price of the sales, which is the real wealth of the country.

If this is the case, should not our farmers be the best educated men among us?

It is true that our Government has done a great deal for the cheese and butter interest, by educating a few men in the manufacture of these articles, but the farmer's education is not advanced by it, he is where he he was before, and until we teach him the best system of managing the soil, we shall not produce a first class butter or cheese. English cheese is worth twenty shillings the cwt. more than Canadian. Australian butter is worth more in the English market than ours, not because it is better made, but is of a better flavour. You may teach a few men the best system of making these articles and you will not succeed in obtaining the highest price. The farmer must first change his system of cultivation. To do this you must educate him in his profession.

Good flavoured cheese or butter, cannot be made from weeds or inferior grasses—however abundant they may be—and that is what our pastures principally produce. And not only this, but these weeds and grasses begin to decline in the early part of August. Our farmers experience this in the falling off in the quantity of milk produced, and condition of their cows.

I think if our agricultural exhibitions were fewer—say once in three years—and the grants applied to some system whereby the farmer could be taught to add to the productions of the farm, we should soon be a wealthier country. It is not only in butter and cheese, but in the knowledge of breeding and raising of good fattening cattle we are deficient. It now takes all the summer and another six months in the house to make a three year old steer fit for the English market. Little progress is made at pasture, and timothy hay and grain is not profitable winter feeding.

We see now in almost every country large grants given by the Governments to farmers Institutes. Even in England, where it is supposed agriculture is carried on to perfection, the County Councils are voting large sums to agricultural schools, and should not we, whose wealth depends principally on the productions of the soil, do the same.

Yours truly,

AYLMER.

Aylmer, Que., Nov. 26th, 1895.

THE HONORABLE COMMISSIONER
OF AGRICULTURE, QUEBEC.

Sir:

The Standing crops Competition advertised by the County of Ottawa Agricultural Society No 1, Div. A, which took place during the summer 1895, has proved very popular in our section, although being the first one held, and I would suggest that the same be continued on a larger scale at least every second year, as it is a good way of securing perfect farming.

As to ploughing matches, they should be done away with, and a competition for best Ploughed Fields of 2, 3, 4 and 5 acres, as the Honorable Commissioner or the Council of Agriculture may direct, should be substituted.

I believe this would be a very popular movement, and tend to make farmers, and farmers' sons, good ploughmen.

Soil well prepared and well cultivated as you know is the only sure way to successes in farming.

I have the honor to be,
Sir,
Your obedient servant,
(Signed) N. E. COMMER.
Sec. Tres.
C. O A. S. No. 1 D. A.

We are glad to see that a favourable view of the "Competition of Standing Crops" has invaded the country in the neighbourhood of Ottawa, and we trust that the "Competition of the best cultivated Farms" will be equally approved; for we are convinced no better means of exciting emulation among farmers than these two contests can be found.

And, after all, emulation is the grand point that tends to raise the aims of our too easily satisfied people. Where *Pierre* finds that his neighbour *Jacques* has grown five or six bushels to the arpent more than he has made, Pierre is dissatisfied with himself, and sets to work to, first, find out the reason of Jacques' better success, and, then, after having found the reason, he tries to put his discovery into active work.

As to the abolition of ploughing-matches, and substitution of "Competition for the best ploughed fields", the only doubt we have about it is that the actual work of ploughing is perhaps more likely to be appreciated during its performance than when the whole surface of an acre or two is laid before the spectator. Of course, to a real judge of ploughing, the equal laying out of the work, the regularity and proper angle of the furrow slice, the clean cut of the "crumb-furrow. and the true finish of the ridges will indicate clearly the perfection of the work done; but it might be well for, at any rate the younger men, to see the ploughing while in operation.

and not related, will be furnished them at $12.00 a pair. with certificate of pedigree free; these pigs are worth $10.00 a piece, and cannot be found anywhere under that price. All sorts of sheep can be had at reasonable prices and are guaranteed first class: Shropshire, Lincoln, Oxford, Leicester, &c., &c.

Orders for fertilisers should be given immediately as the season is advanced; large discounts have been granted by the manufacturers to the Syndicate; profit by them and place your orders at once. Write for prices and all necessary explanations will be given to you free of charge.

Mark lane: Prices current; Nov: 11th

WHEAT, per 504 lbs.; British	s.	s.
White	26	29
Red	25	28
Household flour per 280 lbs	25	—
Barley foreign per 8 bushels	15	27
Malting	30	38
Grinding	16	21
Oats, English per 8 bushels	15	27
White peas	32	36
FOREIGN.		
Wheat—Manitoba	27	28
Canadian white peas	27	28

London Cattle market, Oct. 14th:

Milch cows, per head.. £15 to £23

BEASTS.	s.	d.
Scotch	4	8
Herefords per stone of 8 lbs	4	8
Welsh (*runts*) " "	4	4
Shorthorns " " "	4	4
Fat cows " " "	3	8
SHEEP.		
Small Downs " "	5	10
Half breds " "	5	6
Canadians " "	4	0
" lambs " "	4	8
Calves " "	5	2
Pigs " "	3	4

BUTTER.	s.	s.
Fresh, (Finest factory) per doz. lbs	14	15
English Dairy butter, fresh	10	14
Irish (creamery)	105	
Danish	110	
CHEESE.		
Cheshire per 112 lbs	74	80
Cheddar, finest	56	62
BACON.		
Irish	52	
Canadian	37	
Hams, Danish	54	
American	54	
Irish, small	100	
HAY, per load of 2016 lbs		
Prime meadow	90	
" clover	92	
STRAW, per load 1296 lbs		
Best	38	
HOPS from 40s. to 105s. per 112 lbs	40	105

THE ROTHAMSTED FEEDING EXPERIMENTS

(*Continued from the November No.*)

It was in 1847, after Boussingault had published his first table of the comparative nutritive value of different foods, founded on their percentage of nitrogen, and after Liebig had substantially indorsed Boussingault's conclusions on the point, that systematic feeding experiments were commenced at Rothamsted In the arrangement of them, the settlement of the questions raised by the experiments and conclusions of Boussingault, and by the enunciation of the theoretical views of Liebig, was kept prominently in view But the plans adopted were, in some points, characteristically different from those adopted by Boussingault, and even more so from those which, as we shall see further on, have been generally followed by subsequent experimenters.

In Boussingault's feeding experiments he sought to ascertain the comparative values of different foods by trials with animals which were, as far as possible, maintened in a uniform condition, both as to weight and other circumstances, but which were, nevertheless, living and feeding under the normal conditions of such animals; for example, a cow yielding milk, or a horse performing work. A vast amount of careful experiment has, however, since been devoted by others to determine the food requirements of a given live weight for mere sustenance or maintenance, that is, not only without either loss or gain, but exclusively of the yield of milk, increase in live weight, or the exercise of force; and then, as a separate question, to determine in the case of animals feeding for the production of meat, how much of the different constituents of food is required to be supplemented to the mere sustenance ration, to obtain the maximum increase for the minimum expenditure of the different food constituents

Our own plan was, on the other hand, in the case of animals fed for the production of meat, to select foods of recognized value for such animals; to give a fixed quantity daily, of one or more, and to allow the animals to take ad libitum of some other or complementary food; the object being, excepting in certain cases for comparison, to secure that they should yield normal or full increase in weight, and that the results should indicate to what constituent, or class of constituents, in the food, the actual and comparative results were to be attributed.

It will be seen that, under such a plan, the animals practically fixed their own consumption according to the composition of the foods and to their requirements, and that the amounts of food, or of its various constituents consumed, covered the requirements, both for mere maintenance, and for the growth and fattening increase as the case might be. It was thought that results so obtained, being comparable with those of actual practice, would supply important data for the elucidation of the principles involved in such practice.

Several hundred animals, oxen, sheep, and pigs, have been experimented upon. In the greater number of cases, and especially in the earlier years, it was, owing to the amount of labor involved, found to be impracticable to do more in the way of analysis of the foods than to determine in them the percentages of dry substance, of mineral matter, of nitrogen, and sometimes of fatty matter From the results were calculated the amounts of total nitrogenous substance, of total non-nitrogenous organic substance, and of total organic matter which the foods supplied.

At that time little or nothing had been done in the way of the determining either the condition of combination of the nitrogen in vegetable foods or the character of the non-nitrogenous bodies. The only method then practicable was to calculate the amount of nitrogenous substances from the amount of nitrogen, a plan which we pointed out was liable seriously to mislead, if due allowance were not made for difference in the composition and condition of the substances so estimated In the case of ripened final products, such as cereal grains and the leguminous seeds, there is comparatively little error in so reckoning the whole of the nitrogen to exist as albuminoid bodies. In hays and straws there is a much larger proportion of the total nitrogen non albuminoid, and in succulent products, such as roots and tubers, much more still.

Then, again, the proportion of the non-nitrogenous organic substance which is digestible is very different in different vegetable products. Thus, in hays and straws there is a large proportion of indigestible woody fibre; in cereal grains and leguminous seeds much less, and in roots and tubers very little.

We shall, nevertheless, find that when, as was always done in our interpretation of the results, due reservation is made as to the character both of the so reckoned nitrogenous and of the non-nitrogenous organic substance of the different foods, the indications are very clear and significant as to whether, taking our fattening food stuffs as they go, their comparative food value is measurable more by their contents in digestible nitrogenous or in digestible non-nitrogenous constituents.

The investigation also involved the determination of the composition and especially of the amounts and the proportion of the nitrogenous and of the non nitrogenous constituents in the bodies of the animals themselves and in their increase while fattening, and it also involved that of the composition of the excrements, that is, of the manure.

Thus, the inquiry embraced the following points:

(1) The amount of food and of its several constituents consumed in relation to a given live weight of animal within a given time.

(2) The amount of food and of its several constituents consumed to produce a given amount of increase in live weight.

(3) The proportion and relative development of the different organs or parts of different animals.

(4) The proximate and ultimate composition of the animals in different conditions as to age and fatness, and the probable composition of their increase in live weight during the fattening process.

(5) The composition of the solid and liquid excreta (the manure) in relation to that of the food consumed.

(6) The loss or expenditure of constituents by respiration and the cutaneous exhalations; that is, in the mere sustenance of the living meat-and-manure-making machine.

(7) The yield of milk in relation to the food consumed to produce it, and the influence of different descriptions of food on the quantity and on the compostion of the milk.

As already said, several hundred animals — oxen., sheep, and pigs— have been submitted to experiment.

The amount and the relative development of the different organs or parts were determined in 2 calves, 2 heifers; 14 bullocks, 1 lamb, 249 sheep, and 59 pigs.

The percentage of water, mineral matter, fat, and nitrogenous substance were determined in certain separated parts, and the entire bodies of ten animals, namely, 1 calf, 2 oxen, 1 lamb, 4 sheep, and 2 pigs. Complete analyses of the ashes, respectively, of the entire carcasses of the mixed internal and other "offal" parts, and of the entire bodies of each of these ten animals have also been made.

From the data provided, as above described, as to the chemical composition of the different descriptions of animal in different conditions as to age and fatness, the composition of the increase while fattening, and the relation of the constituents stored up in the increase to those consumed in food have been estimated.

To ascertain the composition of the manure in relation to that of the food consumed, oxen, sheep, and pigs have been experimented upon.

The loss or expenditure of constituents, by respiration and the cutaneous exhalations, has not been determined directely; that is, by means of a respiration apparatus, but only by difference; that is, by calculation, founded on the amounts of dry matter, ash, and nitrogen in the food, in the (increase) fœces, and urine.

Independently of the points of inquiry above enumerated, the results obtained have supplied data for the consideration of the following questions: (1) The sources in the food of the fat produced in the animal body; (2) the characteristic demands of the animal body (for nitrogenous or non-nitrogenous constituents of food) in the exercise of muscular power; (3) the comparative characters of animal and vegetable foods in human dietaries.

FOOD CONSUMED AND INCREASE PRODUCED.

I propose first to consider the results illustrating the amounts of food and of its nitrogenous and non-nitrogenous constituents, respectively, consumed by a given live weight of animal within a given time, and the amounts required to produce a given amount of increase in live weight. The illustrations will be drawn from experiments with sheep and with pigs.

THE EXPERIMENTS WITH SHEEP.

Table 67 shows, for each of three series of experiments with sheep, in the first three columns the amounts of nitrogenous, of non-nitrogenous, and of total organic substance consumed per 100 pounds live weight per week, and in the last three columns the amounts consumed to produce 100 pounds increase in live weight. The figures represent the quantities of the crude constituents consumed; that is, the amounts of nitrogenous substance calculated by multiplying the nitrogen by 6.3, which implies that the whole of it exists in the foods as albuminoids, which admittedly is not the case. It will be seen, however, that this method is quite sufficient for the purposes of the illustrations at present in view, though it is frequently far from accurate in the case of unripened vegetable products, and it is especially so in that of succulent foods, such as feeding roots. The amounts of crude non-nitrogenous substance are calculated by deducting those of the mineral matter and of the crude nitrogenous constituents from those of the total dry matter consumed. Here, again, it is admitted that the results are only approximations to the truth, but it will be seen that, as in the case of the nitrogenous constituents, they are nevertheless quite sufficient for the purposes of our present illustrations. The crude total organic matter is simply the sum of the nitrogenous and non-nitrogenous, calculated as above.

TABLE 67.—*Experiments with sheep, made at Rothamsted in* 18 0 *(nitrogenous and non nitrogenous constituents consumed per* 100 *pounds live weight per week, and to produce* 100 *pounds increase in live weight.)*

SERIES 1.—FIVE SHEEP IN EACH PEN (FOURTEEN WEEKS.)

Pens	Limited food.	Ad libitum food.	Per 100 pounds live weight per week			To produce 100 pounds increase in live weight.		
			Nitrogenous	Non-nitrogenous	Total organic	Nitrogenous	Non-nitrogenous	Total organic.
1	Linseed cake.....	Swedish turnips	2.46	9.85	12.31	167	650	817
2	Oats.....		1.57	11.36	12.93	103	684	787
3	Clover chaff.....		1.64	13.12	14.76	102	736	838
4	Oats straw chaff.....		1.07	10.17	11.24	102	913	1.015
	mean.....	.....	1 68	11.13	12.81	118	746	864

SERIES 2.—FIVE SHEEP IN EACH PEN (NINETEEN WEEKS)

1	Linseed cake.....	Clover chaff.....	3.78	12.93	16 71	321	1.103	1,434
2	Linseed.....		3.21	12.66	15.87	289	1,144	1,433
3	Barley.....		2.58	13.79	16.37	235	1,269	1,504
4	Malt.....		2.5.	14.02	16.55	266	1,457	1,723
	Mean.....	.....	3.02	13.35	16.38	278	1,244	1,521

SERIES 3.—FIVE (1) SHEEP IN EACH PEN (TEN WEEKS)

1	Barley.....	Mangels.....	1.70	10.59	12.29	118	73	850
2	Malt and malt dust..		1.64	10.12	11.76	111	677	788
3	Barley (steeped.....		2.08	12.60	14.68	121	730	851
4	Malt and dust (steeped).....		1.77	10.70	12.47	136	821	958
5	Malt and dust (extra quantity).....		1.89	11.63	13.52	126	776	903
	Mean.....	.....	1.82	11.13	12.94	123	747	870

Referring to the results, it is impossible to go into any detail here. A glance at the figures in the first three columns of the table (67), relating to the amounts of the constituents consumed per 100 pounds live weight per week, is sufficient to show that, in all comparable cases, there was much more uniformity in the amounts of the non-nitrogenous than in those of the nitrogenous substance consumed for a given live weight of the fattening animal within a given time. The deviations from this general regularity in the amount of non-nitrogenous substance consumed are, indeed, in most cases, such that when they are examined they tend clearly to show that the uniformity would be considerably greater if the amounts of only the really available respiratory and fat forming constituents had been represented, instead of those of the crude or total nonnitrogenous substance consumed.

In reading the figures, allowance has obviously to be made, both for those of the nonnitrogenous constituents which would probably become at once effete, and also for the different respiratory and fat forming capacities of the portions which are digestible Thus, comparing series with series, the amounts are higher in series 2, where the ad libitum food was clover chaff containing a large amount of indigestible fiber, than either of the other series, where it consisted of Swedish turnips or mangel-wurzel. Then, the quantity consumed was higher in the third pen of series 1, with clover chaff, than in the other pens of the same series; and it was lower in pen 1 of series 1, with linseed cake containing much oil, and it was again lower in pens 1 and 2 of series 2, also with much fatty matter in the other pens of the same series with cereal grain.

Indeed, when we bear in mind the various circumstances which must tend to modify the indications of actual figures, it will be admitted that the coincidences in the amounts of valuable respiratory and fat forming constituents consumed by a given weight of animal within a given time are much more striking and conclusive than, considering the views prevalent on the subject at the time, could have been anticipated.

With this general uniformity in the amounts of the non nitrogenous substance consumed by a given live weight within a given time, the amounts of the nitrogenous constituents so consumed are, on the other hand, seen to vary under the same circumstances in the proportion of from 1 to 2, or 3, or more.

Let us now refer to the last three columns of the table (67), which show the amounts of the respective constituents consumed to produce 100 pounds increase in live weight. In considering these results we must, as when discussing those relating to the consumption by a given live weight within a given time, read the indications of the actual figures as modified by the obviously different capacities for the purposes of the animal economy, of the substances, the amounts of which they are assumed to represent. It must also be borne in mind that the proportion of real dry substance in the increase of the animal will vary to some extent according to the character of the food. For example, it will be rather the less, the more succulent the food, and the greater, the greater the proportion of fat in the increase. Again, as in the case of the results showing the consumption for a given live weight of the fattening animal within a given time, the figures represented the demand, not only for respiration and for maintenance in other respects, but also that for increase at the same time include the amounts required by the exigencies of respiration and maintenance.

Taking a general view of the results, which is all that can be done here, it is seen that where clover chaff, with its large amount of indigestible woody fibre was used as the ad libitum food, the total amount of non-nitrogenous substance consumed to produce a given increase in live weight was much greater than where the ad libitum food consisted of roots. Due allowance must, therefore, be made for this in comparing the results of one series with those of another. Doing this, it is obvious that the amounts of really available non-nitrogenous substance consumed were at any rate much more nearly uniform in the different series and in the different pens than were those of the nitrogenous substance. Of the differences that would still remain most would be again reduced by making allowance for the different respiratory and fat forming capacities of the remaining available non nitrogenous constituents, since, for example, much less of fatty matter would be required than of starch or sugar, or of the pectine compounds of the roots.

Again, as in the case of the consumption by a given live weight within a given time, so now in that of the consumption to produce a given amount of increase there is a much wider range of difference in the amounts of the nitrogenous than of the non nitrogenous constituents consumed; and the differences are, as before, much greater than can be explained by the differences in the character of the nitrogenous substances which the figures represent in the different cases.

Thus, then, the results of these experiments with sheep, when interpreted with due regard to the known differences in the character of the nitrogenous and non-nitrogenous constituents in the different foods, fully justify the conclusions drawn from them more than forty years ago, namely, that taking food stuffs as they go, *it is their supply of the digestible non-nitrogenous, that is, of the more specially respiratory and fat forming constituents, rather than that of the nitrogenous or specially flesh forming ones, that regulates both the amount of food consumed by a given live weight of animal within a given time and the amount of increase in live weight produced.*

But as it seems to have been tacitly assumed in recent years, since much attention has been paid to the investigation of the digestibility of the different constituents, of foods, that conclusions founded on the determined amounts in the foods of the crude substances only can not be relied upon, we have had the whole of our early results, both with sheep and with pigs, recalculated, making correction, as far as practicable, for the amounts of the constituents in the different foods which are assumed to be indigestible or otherwise not of food value, according to the tables given by Emil von Wolff in the edition of his work published in 1888. He there gives for nearly two hundred different articles of stock foods the percentages of water, mineral matter (ash), crude protein, crude fiber, non-nitrogenous extractive matters, and crude fat, and then the percentages of digestible albuminoids, digestible carbohydrates, and digestible fat. In applying his data to our results, the amount of the crude substance in each description of food is reduced in the proportion which his figures show of crude to digestible in the same description of food. Further, in the case of the so estimated amounts of digestible fatty matter, the figure obtained has been multiplied by 2.4 to bring it approximately to its equivalent of carbohydrate, the amount then being added to the other digestible non-nitrogenous substance, so reckoning the whole as carbohydrate. Lastly, as Wolff makes no correction for the non-albuminoid condition of a large portion of the nitrogen in succulent roots, it has been assumed, in accordance with results obtained at Rothamsted and elsewhere, that in Swedish turnips only 45 per cent and in mangels only 40 per cent of the total nitrogen will exist as albuminoids.

There are obvious objections to some of the modes adopted for the determination of the digestible constituents of the various foods which render them inapplicable, without considerable reservation, to the estimate of the amounts of the constituents which will probably be actually digested in the case of ordinary liberal rations. But, if accepted as approximations only, they undoubtedly afford useful data for some general conclusions.

Neither space nor time will permit of either the record or the discussion of the recalculated tables. It must suffice here to say that the results are so recalculated, that is, making correction as far as present knowledge permits for the probable amounts of the indigestible or nonavailable constituents of the various foods, not only fully confirm the conclusions drawn on a careful study of the circumstances of the experiments and of their results more than forty years ago, but they bring out the points then maintained still more clearly to view.

(1) Only 4 sheep in pens 1, 3, and 4.

"FARM NEIGHBOURS."

There is no occupation which gives better opportunities for neighbourly acts of kindness than that of the farmer, and there is none where unneighbourly conduct is more annoying and injurious.

It is interesting to notice how "a little leaven leaveneth the whole lump" in respect to the social condition of a locality. One or two examplary families seem to give a healthy moral tone to the whole; while on the other hand, let a few selfish, suspicious, morose individuals commence a contention, and the whole parish will be in a ferment, each combatant having his partisans, other quarels will result, and no good neighbourly sentiment will remain—so powerful and penetrating is the force of example.

And why is it that, in farm communities, it is more important to cultivate a neighbourly spirit than in cities? the answer is because the interest of the farmers is identical, a family can occupy a house in town and not know his next door neighbour, without any detriment to either; but in the country it is not so, and although, men occupy, each his own farms, one cannot neglect any one of his duties as a cultivator without causing his neighbour to suffer loss and inconvenience.

For instance a good neighbour will bring up his family well, teaching them to be respectful and kind to all, and it is amongst the young that the force of example is most potent.

In some localities I have visited, I wanted no better weather gage of the general morality and good or bad neighbourly position of the people, than the street urchins I encountered.

To some a stranger is a good target for jeers, abuse and sometimes stones or mud; and if a neighbour becomes unpopular his case is lamentable. In other places the children are taught to be respectful to all. On a recent visit to Gaspé, I was much impressed with the difference I noticed in this respect to what I had seen elsewhere. On one occasion I met three boys, two carried nothing and had no difficulty about making a salute but the third poor little fellow had some parcels, which after a moment's considera

tion he set down and followed the good example of his companions. The man who teaches his children habits of respectfulness will reap the reward himself and will be a good neighbour; where the youth are taught good behaviour I have always found a state of harmony and a certain degree of refinement among the elders.

A good neighbour will see that his cattle do not run astray and mix with others indiscriminately, thus preventing the possibility of systematic breeding, beside subjecting them to fighting each other, or the communication of disease.

A bad neighbour will neglect to keep his fences in repair, so that it is not difficult for the cattle to break out, and thus raise the ire of the farmer adjoining. A poor fence keeper can, and often does, make things hot for the whole neighbourhood. A good neighbour is he who keeps his own fences well, and, if the next man to him does not, kindly expostulates with him, and even puts a rail in its right place rather than, at first, impound his cattle, or not until the repeated offence compels him to do so, for the preservation of his rights—remembering always the golden rule "Do unto others as you would they should do unto you."

A good neighbour will not allow bad weeds to mature on his land, not only because they will injure his own crops but also because they will seed the whole district. Few look at this as they should, but it is a consideration that should enter into every good man's calculations and practice, he may not do it so deliberately, but he is as bad as the enemy who sowed the tares among the wheat.

Since spraying has been proved to be effective for the prevention of fungus, diseases of fruit and other crops, a man is not a good neighbour who does not study and adopt the system. It has been discovered by scientific research that the spores of the fungi are floating about in every direction, and it is a duty every man owes to his neighbour, beside being for his own interest to use every endeavour to expugn them. The same argument applies also to insects destructive to vegetation and injurious to animals; all efforts to decrease their members is a public good.

Bad roads make bad neighbours. It is to every farmer's interest to see that the roads in the parish are well kept, and if the system, (a bad one) is for every occupier to keep in order the road opposite his farm, and he neglects to do so, his neglect is most culpable, because he makes it no less difficult for his neighbour than for himself to pass a heavy load over them, and endangers the life and limb of the traveller

More of a spirit of thoughtfulness for the good of others should characterise the conduct of many and they would soon find that it would return to their own advantage.

In some neighbourhoods, where the right sentiment exists, it is delightful to see how willing each one is to render assistance to the other. An accident happens to a horse, a fire destroys the harvest of the season, or some other calamity occurs, and all the good neighbours flock to the assistance of the unfortunate one. A neighbour is a little late with his crop, rain threatens to fall and his friends rush to his help to secure it. This is as it should be, if the owner of said crop is not a chronic late bird, and then perhaps he does not deserve the help, nor will he get it; for, as a rule, God helps those who help themselves—and so do neighbours.

Be you to others kind and true,
As you'd have others be to you.

One who is continually fault finding and opposing all good measures of reform and improvement is not a good neighbour; to be one he must be public, spirited and take his due share in the public duties which are involved in the progressive development of the resources of his parish, contributing cheerfully of his means for the support of the educational and religious institutions of the place, and taking an interest in the proper administration of all public funds.

No man lives for himself alone, and if the idea was better understood and acted upon, we should see more prosperity and more contentment in the great agricultural community.

GEO. MOORE.

CLIMATE AND FERTILISERS.

It is now many years since the fallacy of Jethro Tull, that tillage is manure, was conclusively disproved, yet we frequently hear statements made to the effect that as the chemical analysis of a soil shows it to contain ample quantities of the fertilizing principles, further application of same is useless. There is not a doubt but that the method and thoroughness of tillage has a very considerable effect upon the availability of plant food stored in the soil; such is the object of soil manipulation, almost the sole object, but that this may be depended upon to supply the drains of continued cropping has long been known to be untrue.

Twelve years of experimental research in the State of Pennsylvania, U. S., made on the same soil with practically unchanged conditions demonstrated the value of tillage as a manure. Plots of normal soil were cultivated precisely alike, one without fertilizer or manure of any kind, others with various forms of manure including chemical fertilizers. For the crops removed in the period of twelve years, the analysis or the soil showed that ample quantities of phosphoric acid and potash were present. The results of the experiment made clear the fact that the unmanured soil gave continually diminished crops, while the average of the manured plots showed an increase over the unmanured of nearly 50 per cent.

To a certain extent, the stores of plant food existing naturally in the soil may be made available at least to a limited extent. Much depends upon the nature of the soil, but perhaps the most important single factor to this end is the climatic condition. Where the soil is subjected to many thawings and freezings, the disintegration of soil particles is much more rapid than if the winter is long and cold, with few changes involving such warm weather as to permit the soil to thaw and partially dry out Under the latter conditions, the decomposition of potash-bearing rocks is very slow indeed and, though a soil may contain a large percentage according to a chemical analysis, very little of it may be utilized as a manure in any single season of plant growth. There is no doubt but long continued periods of freezing weather tends to preserve rocks, that is the disintegration of the soil particle is retarded, and the small quantity of mineral plant food contained therein is not made available to the cultural process.

It is not deemed necessary to enter here into the consideration of the value of chemical fertilization. So many field trials under competent supervision, have demonstrated the agricultural value of commercial fertilizing materials that there is no longer any reasonable question in the matter. The point which the farmer wants to understand is how to obtain a supply of fertilizing principles in his land within the season of plant growth In the more southern of the United States, the natural supplies of minerals in the soils are made rapidly available, largely through natural causes, but as we travel North we find the manure-of-tillage less efficient. As a general proposition, the soils of Canada are more *intractable in this* respect than the northernmost States of our neighbor. We have long winters with little thawing and freezing weather. Our soil suffers decomposition more slowly; it is not a good climate for the manure-tillage doctrine.

The predominating feature of fertilizers *for use in the Dominion* should be a ready availability, which in this climate means pretty nearly the same thing as water solubility, unless perhaps in the case of *organic* ammoniates. Phosphates should be preferably in the form of superphosphate, unless they are of animal origin, potash should be in the form of water soluble salts, such as kainit, muriate, etc. Ashes are also valuable, but they vary so widely in potash content through the leaching for the manufacture of American potashes, that their use is always a speculative procedure; one never knows that he has given his land, a very unsatisfactory method of fertilization. Also, the cost is frequently very high if the actual amount of potash contained therein is known.

This is not meant to cast any reflection upon Canadian ashes as such, but the potash in wood ashes is in the most valuable form for chemical processes aside from agriculture, and the potash of crude potash-bearing salts is cheaper in price though equally efficient as plant food. (1)

As to the quantities advisable to apply, much depends upon the soil and the thoroughness of tillage. Many formulae have been prepared by the Experimental Stations. If a leguminous crop may be grown in a rotation, the ammonia applied should be about half the quantity of potash, and the phosphoric acid about fifty per cent more than the ammonia. A good working formula in a four years rotation would be based upon an application per acre of 100 pounds of actual potash, applied twice during the rotation. For continuous wheat cropping, the potash and phosphoric acid should be applied in about equal quantities, with the ammonia about half the amount. For meadows, potash is the principle factor.

The formula given here must be understood to be approximations. The proportions of materials are practically those of the more successful actual field trials, modified to answer the differences of climate. The guiding principle must be understood to be that a condition of water solubility is more nearly absolutely essential than is the case with a climate less rigorous. Also, the quantity of plant food in the soil naturally, is less readily made available through purely cultural processes.

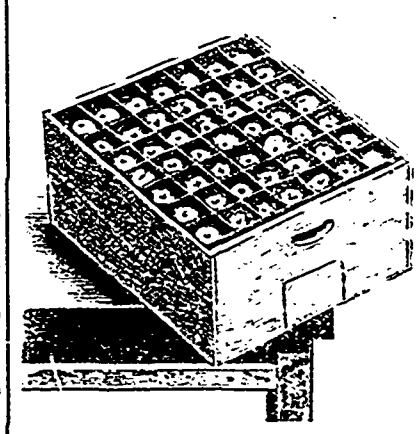
(1) But hard wood-ashes contain from 1.9 (oak) per cent, to 5.6 (beech) per cent of phosphoric acid.—ED.

THE APPLE IMPORT TRADE

REFORM NEEDED IN PACKING, GROWING, ETC.

The apple supply and the packing and shipping of it to the home markets is attracting the attention of the English and Scotch importers. The following letter, written by Mr. John MacLean, of Glasgow, to the Glasgow "Evening Citizen," should be interesting to the apple-growers and packers of this country:—

"There is," says Mr. Maclean, "a railway race for a record attracting attention at present, but there is a far more stupendous and important race for a record going on amongst the soil-producing nations of the world to ledgerize Britain as their special customer for their respective products, and Britain is the best customer for many of their products—in many cases the only one - to whichever of them can monopolize her orders. Her import for her pantry use figures up to about £180,000,000 annually, of which



sum about £6,000,000 is for fruit, and this sum might be doubled by care against waste and by methodical dietary application of it to the expressed wishes and wants of the people here who consume it, and are both able and willing to pay for it.

"Now, in the item of apples the *Canadians have the mile a-minute of* the race for record on their hands if they would judiciously and honestly use it. Dishonesty in the packing of these barbarous barrels is stupid; (1) because right-down honesty would serve all purposes better for financial profit of the growers and shippers in Canada, and with much less trouble if backed with fraternal admonitions by their consignees in Scotland. Moreover, the empty barrel, costing in Canada about half a dollar each, is only firewood here, whereas the cheap square wicker hamper, holding upwards of a bushel of apples, when empty would find ready purchasers in grocers, delft dealers, and other shop-keepers for use in carrying parcels to their customers, and would cost, primarily, less money than the barrel.

"And the intelligent fruit-growers and shippers of apples in Canada know all that, but they are handicapped by the barrel custom. Mr. Shepherd, of Montreal, of long standing and reputation, who makes apples in season one of his specialties in his home trade, *refuses to make consignments to Britain* on his own risk of return. He has done so to Liverpool and Edinburgh in fifty-pound packages, but always with irritably unsatisfactory results. His recent test consigments, he says, of select fruit in such packages to

(1) Sorry to say this shabby work is still going on.—ED.

commission merchants in the latter city were realized by the hammer in the characteristic rough and-tumble, adjective and hilarious f rm to an appreciative audience, no doubt, but regardless of quality, merit avoirdupoids poundage or careful packages; with results pleasing to all but Mr. Shepherd. He would consign no more for sale in that manner.

"The result of the desirable reform in the classification and package of the Canadian apple fruit trade would be all round productive of fair remuneration — profit to the grower, shipper, consignees, and their subsidiary dealers; and not less so to the family-man purchasers in Glasgow, who might thereby have a reasonably-sized hamper of apples in the corner of his kitchen, at a reasonable price, for handy family use, and the empty h mper into the bargain for the housewife's clothes-holding purposes on the washing green. A bar el of apples is too much for a small house, and is often simply a barrel of irritation and disappointment."

In connection with the above, we might add that reform is needed in the growing and general treatment of the apple crop in this country as well as in the packing and shipping. Only those kinds that will stand the voyage and keep in good order for several months should be forwarded. Having consulted Mr. Shepherd on the best kinds to cultivate, he suggests the Duchess, Fameuse, Wealthy. Canada Baldwin, Canada Red, Golden Russett, and Winter St-Lawrence.

The writer visited St Hilaire Mountain recently, which is considered next to Montreal mountain for its apple growing qualities. From St-Hilaire Village to the crown of the mountain, a distance of three miles, orchard after orchard could be seen as far as the eye could reach. The trees for the most part were heavily laden with apples, but unfortunately they were nearly all more or less damaged by fungus. This might be avoided by spraying the trees with Bordeaux mixture two or three times during the growing season. The difference between those who spray and those who have not tried it yet, is very marked One apple grower, as a test case, sprayed half is orchard and left the other untouched. The result was so convincing that he sprayed every tree in his orchard this year, and so far has sold nine hundred barrels of Fameuse at three dollars per barrel laid down in this city all sound and without spot or blemish.

We have heard of some people who damage their trees by using too strong a solution. Care should be taken to avoid this and to follow the instructions given by Prof. Craig of the Experimental Farm; 5 lbs. sulphate copper; 5 lbs. lime dissolved in 50 gallons of water, and ¼ oz. Paris green added for the destruction of insects that feed in the foliage. Tar paper tied round the lower part of trees in the fall, prevents mice from eating the bark off during the winter. Some people tramp the snow around the roots to keep the mice from getting under it. The scrapings of printer's ink from the empty barrels, and the residue from paint cans are also considered a preventive when they are used paint like on the tree close to the ground, and about eighteen inches high all round the tree.

Mr. Maclean suggest that the apples should be packed in hampers or baskets for the home market. Mr. Shepherd, having had personal experience in this business for the last twelve years, finds a box with strawboard compartments in it, something similar to the boxes in which eggs are packed, more suitable.

The accompanying illustration gives an idea of the box which holds half a barrel of apples, and costs about half a dollar when supplied in large quantities.

The demand for Canadian apples in the home market has been gradually increasing, as will be seen by the reports of the large shipments that have been recently made. No doubt the box plan of packing is the best for the tenderest kinds of eating apples, such as Fameuse, St-Lawrence, etc., but barrels are considered more suitable for winter or "keeping" apples. They can be taken to market and shipped more expeditiously and with less cost than the box arrangement.—*Witness.*

Household-Matters.

THE NEW YEAR.

At this season of the year, it is a poor heart that does not rejoice and take a little rest from the dull routine of every day life.

Now is the time for the gathering of friends and relations, who sit and talk over the past and form plans for the future.

The old people tell wonderful stories of what happened and what was done in the long ago.

And the merry festivities go on till the time comes for the scattering of these friends and relations each one to his or her own home, to take up and carry on their different callings with, let us hope, renewed energy after the relaxation:

The farmer to his long winter evenings, which he can use to cultivate whatever taste he may have: and the wife following in the old routine of every day work feeling cheered up by the sympathy of others situated like herself, and once more buoyed up to do all she can to make her house a cheerful dwelling place for those that live in it.

COOKING.

A boiled Turkey, which is every year becoming a more favourite dish, should, when served hot, be well covered with thick creamy white sauce, and be just lightly sprinkled with very finely chopped hot parsley, the garnishing round about being simply slices of fresh lemon and sprigs of parsley placed alternately; but when served cold the decoration should be rather more elaborate, the following being an exceedingly pretty style: — As soon as the bird is cold, coat it thickly with a layer of rich sauce mixed with a small proportion of French sheet gelatine, and just before this sets, press in lightly on the breast of the turkey a very tastefully arranged device composed of julienne shreds of cooked tongue or lean ham, thin slices of pickled walnuts stamped out in small fanciful shapes, and tiny leaves of spread parsley; garnish round about with a full close border of picked parsley upon which slices or quarters of fresh lemon are placed at equal distances, and serve. Here again the colours—red, black, and green—contrast most effectively with the white sauce as a background.

A Boiled Ham, which forms the most popular accompaniment to turkey either roast or boiled, may be very tastefully and inexpensively garnished in the following simple manner: — When done enough, care fully remove the rind; trim the ham neatly round the edges, and cover the surface with a coating of fine brown raspings; then ornament it prettily with tiny patches of sifted egg yolk. finely minced parsley, and lobster coral; and, when quite cold, fix a dainty frill round the shank; place the ham upon a dish-paper, garnish round about with a full close border of fresh green parsley, and serve.

A Boiled Tongue is another most delicious accompaniment to turkey, or fowls of almost any kind. To make it look very dainty and appetising proceed as follows.—Prepare and boil (1 the tongue in the usual manner; then, when sufficiently cooked, take off the skin very carefully and fasten the tongue on to a chopping board by means of a couple of strong skewers pierced through the root; put another skewer through the tip of the tongue and draw it out until a good shape has been secured, then fix it very firmly. and leave it so until quite cold. Before serving, trim neatly, glaze thickly. and arrange a pretty frill round the root, which is always a rather unsightly part, then place the tongue on a fancy dish-paper, and garnish it round about with a plentiful supply of fresh green parsley. This is, of course. if the tongue is to be served cold. When served hot, either as a separate dish or as an accompaniment to hot turkey or fowls, the tongue should be boiled or stewed in the usual way; then, when done enough, it should be carefully skinned and trimmed, and returned to the liquor in which it was cooked, in order to get thoroughly hot again, after which it should be nicely glazed and garnished round about with plenty of daintily curled bacon, interspersed with sprigs of hot fried parsley; or, if preferred, as tastefully-arranged border of carefully-prepared vegetables, such as cauliflower sprigs, glazed turnips and carrots, Brussels sprouts, spinach balls, potato croquettes, baked tomatoes, grilled mushrooms. &c., may be used instead, good taste being indispensable in the selection of the various items.

Note. — Chickens or fowls of any kind, whether served hot or cold, may be treated in every way as directed above for the serving of a turkey.

Galantines (2) of every kind, whether of turkey, fowl, veal, or beef, always appear to the best advantage when served on a large, prettily-shaped croûton, or foundation of properly-prepared rice, this being formed of rice which has been first boiled in the usual way until quite soft, then beaten to a smooth paste, pleasantly seasoned, and pressed on in the form of a flat cake about 1½ in. thick, until quite cold and firm, after which it may be stamped, or cut, out in any dainty shape that is preferred. Glaze the galantine as already directed for cold roast turkey, then, when the coating is quite firm, place it upon the rice croûton, garnish with sprigs of fresh green parsley, and serve.

MARIE.

(1) Take care to boil a smoked tongue for at least five hours.—ED.

(2) The following recipes are intended for people who know a little about the fine art of cooking.—ED.

A very good Modern Mince Pie.— To 2 lbs. of currants add 2 lbs. of raisins, which must be the large ones and stoned, 1 lb. also of sultana raisins, 2 lbs. of apples, ¾ lb. of sugar, 2 lbs. of suet (beef). The apples and suet must be chopped fine. To these add the juice of two lemons and the grated rind of one, and such spice as is desired, cinnamon, nutmeg, and ginger. Then put to three 2 oz. of candied citron, and blend all together with two wine glasses of brandy, and, if liked, also a little sherry, which is an improvement. This will keep for a long while if covered up.

Ancient Christmas Pies. — In the days long ago, when our foremothers were very superstitious and very good (?), the exact shape of their pies at this season was a subject of grave consideration. They did not use some commonplace oblong or circular dish bought in the nearest town, as we degenerate people do, but they formed the pastry solid, according to what they considered to be orthodox for the precise day of feasting. Whether we (and our oft belauded grandmothers, too, for that matter) have become idle and careless it is difficult to say, but we certainly do not take the trouble and pains that used to be taken some hundreds of years ago. And then not only was the shape of pies a matter of concern, but the composition and mingling of ingredients were also. (1)

For this grand occasion of Christmas we find on research that the favourite form was that of a long and narrow shape, which was supposed to represent the sacred cradle or crèche of Bethlehem, and was carried out in a number of different cakes and pies—for instance our familiar friends the mince pies, which were almost universally made that way. This will lead up the recollection of many persons to the Yule-cakes and Yule-dough, and so on to the sweet meats that are still met with on the Continent, all formed in the image of a baby, as another allusion to the Nativity and its celebration.

In discussing our ancestresses' cooking we must not go further without mention of their "plumb porridge," which we degenerate people call pudding. What we all endeavour to make as light as possible they must surely have preferred solid and heavy. Let us imagine it for a moment, and realise that it was customary to eat it as a first dish as a whet to the appetite. It was a thickened kind of soup, made rich with "plumbs" (raisins) and spice. It must have been the original of our plum pudding of modern times, only, perhaps, one of our more enlightened cooks was inspired with the idea of putting the loose mess in a cloth or basin, and so evolving the well-known Christmas pudding "happy thought" as we may say.

I mentioned that mince-pies were formerly made in the shape of a crèche. The word, as we have it, is a corruption of "minched" (chopped), (2) and the pies were also called "shridpies," and consisted, pretty nearly as they now do, of dried fruits mingled with a little suet or meat, the whole being made sweet. Apparently in the old days there were more wine and spirits added, and very frequently a neat's tongue was chopped up as well as the other ingredients, thus rendering it much richer. Some writers aver that the concomitants were int-

(1) These large pies were called *coffins*. ED.

(2) The Scotch still speak of "minched collops," or did 48 years ago, when we were shooting near Loch Lomond.—ED.

ended to represent the offerings of the Magi, being chiefly formed of the dried fruits of the East, but as I am not able to give a very ancient recipe for making these pies, cannot corroborate the statement. It is very likely it was so.

In all ancient images the Magi were represented by a triplet of some kind, but certainly the composition of mince pies was more than threefold. At the same time the notion is deserving of consideration, for experience teaches us that legend has always some foundation if we care to sift it. The orthodox and common figures and symbols on all confectionery and pastry made at the Feasts of the Epiphany and Twelfth night were those of the Magi, and so, although we may not now be able to trace the origin of the above-named, it is quite pardonable to credit it.

CUTTINGS.

Strawberries eaten after meals make the best dentifrice known. Besides cleaning the teeth, there is just enough acid to make an antiseptic. One berry crushed and used on the brush will leave a deliciously clean taste in the mouth.

Iced coffee flavored with lemon juice is more refreshing than tea served in the same way?

In turning a roast or broil, the fork should always be stuck in the fat?

Never slice apples for making pies; quarter, core and cut each quarter in two pieces.

A small vegetable brush is the greatest kind of help in cleaning the graters, strainers, seives, &c. in dish washing?

Don't wash green peas, it destroys their delicate flavor. Shake well in a colander remove the fine particles and prepare in the usual way.

Flat-irons will not yellow linen if they are first rubbed on a cloth saturated with kerosene?

When ironing women should sit instead of stand, and work in a cool room.

Weak spots in a black silk waist may be strengthened by "sticking" court plaster underneath.

Efface scratches on furniture by rubbing on some linseed oil and then following with a little shellac dissolved in alcohol.

It will be well when cane seated chair bottoms have "sagged," to make them as tight as ever by washing them with hot soapsuds and leaving them to dry in the open air.

Sheets folded across, bringing the wide and narrow hems together, then folded again, then ironed across both sides, are finished quickly and look as well as if more time were spent on them.

The scratches which so often disfigure and spoil the appearance of varnish will entirely disappear if a coarse cloth that has been well saturated with linseed oil be laid over them. This simple remedy is invaluable to those who have the care of highly polished furniture.

New conveniences. — A coffee pot with a strainer of aluminium that will not rust or corrode, a bread knife with a cutting edge in reflex curves, that is warranted not to crumble or crush warm or very light bread, and chocolate in pound cans ready for use in layer cake, are some of the conveniences offered by the shops.

FOR THE CHILDREN.

GAME OF CROKINOLE.

This resembles the popular old English game of squails, and is a game of skill, but is easily understood, and its leading features can be learned in two or three minutes by any one. The game consists of a large, circular, polished board divided into three parts by concentric circular lines, in the centre is a small hole, and around the inner circle are placed a row of small posts—twenty-four small polished discs accompany the board—and the game is to shoot or slide the discs across the board by a snap of the finger, the object being to drive the opposing players' discs away from the centre and at the same time place one's own as near it as possible. Any number from two to eight may play and each may play for himself, or sides may be chosen. Great interest and amusement can be got from this game.

SOME STORIES OF MISUNDERSTANDINGS.

THERE is an amusing paper in *Cornhill* entitled "Misunderstandings," which contains many good stories, some old and some which we do not remember to have seen before:

The following intimation, which appeared some years ago at an English watering-place, was really alarming: "Visitors are cautioned against bathing within a hundred yards of this spot, several persons having been drowned here lately by order of the authorities." An Irish tramway exhibits the misleading warning: "It is dangerous to walk on the line by order of the directors." A tricksy sprite seems to be ever at the elbow of the framer of warning and threatening notices. The following specimen was to be seen by the side of the high road near Canterbury a year or two ago — it is probably still there: "Traction engines and other persons taking water from this pond will be prosecuted."

Even churches are not always free from slips of this kind, or, at least, from the use of words capable of a very different interpretation from that intended. What can be thought of this awful suggestion which appears on the book-ledges of a suburban church: "All kneelers should be hung up at the end of the service"?

Still more liable to misunderstanding are such interesting adornments of shop windows as "Superior butter — one shilling per lb Nobody can touch it"—probably not '—or the tempting notice of the dealer in cheap shirts. "They won't last long at this price!" Worse still was the admonition which appeared in the window of a cheap restaurant: "Dine here, and you will never dine anywhere else!"

The most straightforward sentences, or the plainest question, may be misunderstood, either purposely or through ignorance. It was recently related of Mr. Toole that not long ago he entered a dairy, and solemnly remarked to the shopman: "I will take a boy," with a glance at the shelves. "A boy, sir?" asked the puzzled dairyman. "Yes, or a girl," replied Toole. The man never doubted but his visitor was a lunatic, and said mildly: "Pardon me, this is a milk shop." "Come outside," said the joker, and taking the dairyman by the arm, led him out of the shop and pointed to the sign. "I'll take a boy and a girl," he solemnly repeated. "Read what your notice states. 'Families supplied in any quantity!'" Ignorance only is at the root of misunderstandings such as the reply of a witness in a Midland police court, who being asked, 'Are you an agnostic?' replied, 'No, your worship, a shoemaker!' Another witness at a county court was asked lately, as he appeared in the box, "Have you sworn?" and replied, "Well, not much, but I *have* sworn a little this morning," an answer that affected even the gravity of the judge.

In a recently published volume of essays, of unusual brightness and interest, Sir Herbert Maxwell tells a tale of a former Earl of Mayo, who had imported some emus, and, going to London, left strict orders that he was to be informed when they began to lay. In a few days he received the following letter from his bailiff: "My Lord,—I have the honour to inform your lordship that one of the emus has begun to lay. In the absence of your lordship, I put the eggs under the biggest goose we have."

A visitor to Niagara once got a reply which was by no means the answer he expected. He was watching the car start which is raised or lowered on the inclined plane by steam power, but, not liking the look of the track, did not go down himself. After the car had started, he turned to the man in charge, and said: "Suppose, sir, that the rope should break?" The visitor was thinking of possible danger; the man only thought of business, and replied, "Oh, they all paid before they went," which was not quite so soothing an answer as the querist might naturally have expected.

COMPETITION OF AGRICULTURAL MERIT.

The Report of the Judges.

MR. JOHN NESBITT'S SYSTEM OF CULTIVATION.

Mr. Nesbitt lives near Montreal, and grows vegetables for that market

The soil is light. No cattle are kept, but dung and artificials are bought.

1st year.—After meadow, hoed crops for two years, with interred dung each year.

3rd year.—Grain, with 8 lbs. of clover and 2 gallons of timothy to the arpent.

4th year.—Meadow, for only one year.

Mr. Nesbitt, as soon as possible after the hay is carried, ploughs in the dung with a shallow furrow. In spring, the land is worked with a spring-tooth harrow, along and across, two or three times, and then rolled with a heavy roller. *Drills* are then drawn out and planted with potatoes, which are covered by splitting the drills Shortly after planting, the drills are (1) harrowed with a double drill-harrow. earthed up twice, and again harrowed with the double drill-harrow after the potatoes are up.

Mr. Nesbitt buys yearly:

1,000 loads of dung;
1 ton of superphosphate $40 00 (1);
35 barrels of plaster;
5 barrels of lime.

He carts 100 loads of loam on to the sand, and each year, ploughs in 2 *arpents of buckwheat for green manure*, on which land he sows his early crops.

(1) *Saddle-back* in Scotland.—ED.

There are no weeds on the farm; it is a model for any gardener.

One noteworthy fact is that Mr. Nesbitt declares that he grows as much on the 63 arpents he now farms as he used to grow on the 126 arpents he formerly used.

Many farmers would be far better off if they used less land. They would find that it would pay them better.

M. J. D DESCARRIES' FARMING.

M. Descarries lives near Montreal, and as he has an orchard of 30 arpents, he is obliged to carry on two distinct lines of farming.

In the orchard, 30 arpents.

1st year.—Potatoes, with 25 loads of dung to the arpent;

2nd year.—The same as above;

3rd year.— " " "

In the fall of the third year, he cleans the orchard thoroughly, harrowing along and across until the surface is perfectly level, and sows clover and timothy, which he rolls when the land is dry enough.

4th year.—The hay is left down as long as it yields well, but no longer

The apple-trees in the orchard stand 30 feet apart every way. As we saw, M. Descarries does not leave his grass down too long in the orchard, and his potatoes turn out very good crops.

In the field, 30 arpents:

1st year —Cabbages or potatoes with 50 loads of rotted dung to the former, and 25 loads to the latter, per arpent.

2nd and 3rd year.—Onions.

This year, 1895, there are on M. Descarries' farm;

Arpents:
9 of cabbages,
14 of onions,
1 of cucumbers,
1½ of melons,
16 of potatoes,
14 in meadow,
3 in pasture,
1½ in garden and buildings.

M. HORMIDAS LAPOINTE'S FARMING; LONGUE POINTE.

Very heavy land, near Montreal. Vegetables grown for market.

1st year.—After pasture oats; when the oats are carried, the land is cleaned, and a heavy coat of dung is ploughed in five inches deep.

2nd year.—The land is cross-ploughed, thoroughly harrowed both ways, and rolled with a heavy roller before drawing out the drills for, in part, potatoes. The rest is sown broadcast with corn, for green fodder, which is ploughed in shallow. When the potatoes are nearly up, they are well harrowed, and, again, three or four days afterward. They are then horse-hoed and sold as "new-potatoes" in Montreal.

3rd year.—Hoed-crops, with interred, dung as in the second year.

4th year.—Oats or barley with clover and timothy seed, which lies out in meadow and pasture 2 years.

When the land breaks up well, M. Lapointe sows roots, &c., immediately after the pasture, instead of taking an oat-crop.

This system of farming is noteworthy on account of its being an instance of the cultivation of vegetables on heavy land. We shall give other instances of this system.

The other descriptions of farming-practice that follow, are from the country districts, at a distance from any large towns.

M. CHAUBET'S FARM, STE-GENEVIÈVE.

1st year.—After pasture, hoed-crops with dung interred at the first summer ploughing. The growing of roots after pasture is by far the best way of

ridding the land of weeds. If the cultivation is sometimes more troublesome, the land is all the more improved.

2nd year.—Oats or barley, with 12 lbs of clover to the arpent.

3rd year—Clover, cut twice. In autumn, M Chauret ploughs up this piece, rich with the abundant roots of the clover, and the

4th year, sows wheat or barley, with 8 lbs. of clover and 2 gallons of timothy to the arpent.

5th and 6th years—Meadow; for 3 years, sometimes, and 2 years in pasture.

An admirable system of cropping (1) It clears the land of weeds and enriches the land without expenditure.

M. Chauret's farm reminds us of M. Champagne's farm at St-Eustache. It was literally covered with stones; so much so, that at present all the line-fences, as well as the cross-fences, are of stone, well and solidly built, of 3, 4, and even 5 feet in breadth. Through the middle of the farm runs a splendid straight road, the fences on each side of which, up to the last field, are of stone; and over the whole farm not one single yard of wood or wire fence can be found. The work that has been expended in all this is perfectly astounding! What a difference between a farm like this, where so much labour has been bestowed to bring it into shape, and a farm where ploughing and simple cultivation is all that is required to make it yield good crops! (2)

Selection of Seed Grain, etc.

To the Editor of FARMING:

SIR,—Having for some years made a specialty of growing seed grain, I am continually asked: "What is the best variety of certain kinds of grain to sow?" So much depends on the kind of land the grain has to be grown on that, unless a person knows, it is impossible to tell what variety to recommend. One variety will often do very well on heavy land, while the same will hardly be worth cutting on light soil, and *vice versa*. As a rule, I think long strawed varieties go best on light soils, and shorter-strawed kinds on heavy. Late varieties of oats often do better on the former soil than early kinds, especially in dry seasons, as they are often benefited by rains which arrive too late to help the early ones. On heavy land early varieties often escape rust. In selecting seed grain try to get it with these qualifications: Large yield, good quality, stiff straw, and freedom from rust and smut It is a good plan, if your land is heavy, to get seed that has been grown on light soil, or, if your is light, the reverse.

Some farmers say: "I have a piece of poor land, and I want to put oats on it. What variety shall I sow?" I have often seen advertised and read of certain kinds of grain being adapted to poor land, but have not yet known a good crop off a really poor piece of land. My answer to the above question is: Feed your land first, as it is impossible to raise a good crop otherwise. It is something like expecting a horse that is practically all skin and bones to do a good day's work

Another very important point in selecting seed is to get it pure and free from fouls seeds. It is very easy to sow the latter, but it is a very different matter to eradicate the weeds that grow from them. Professor's Shaw's book, "Weeds, and How to Eradicate Them," should be in the home of every farmer.

I would also advise farmers to carefully look over the reports of the Experimental Farms on grain, etc., as so many different varieties are reported on which have been grown on the above farms, and also in different sections of the province.

J. E. RICHARDSON.

Princetown, Ontario.

(1) Except the too frequent repetition of the clover, which will inevitably end in its refusal to grow at all—ED.

(2) Which pays the better?—ED.

THE HARVEST AND THE PIG.

This season will afford an enormous amount of cheap feed available for pork raising. It is all a delusion to think that the best pork is made from corn. The Witshire and Yorkshire bacons, the best in the world, are made from barley meal and skim milk.

It is a matter worthy of note that the hog products that command the highest prices in the English market come from countries that are not noted for the production of corn—England, Ireland and Denmark. The high price of English, Irish and Danish bacon, is due first, to the feeding of the hog, and second to the manner of curing. The finest quality of bacon is produced by feeding barley, rye, wheat, peas and boiled potatoes, skim milk, butter milk, and whey. The hogs should range in weight from 180 to 220 lbs. and should be long and lean, with well-developed hams, thick, straight bellies and the fat on the back should not exceed one and one-half inches in thickness. The shoulders, sides and hams are cured in one piece. The over-fat corn-fed hog does not make the finest bacon and does not bring the highest price. By attention to these requisites the Danish farmer have increased their sales of bacon in England from 4,000,000 lbs. in 1881 to about 200,000,000 in 1892, and the price has steadily increased.

Nor'West Farming.

MANAGEMENT OF YOUNG PIGS.

By W. Roberts, Iowa.

I would like to begin about two weeks before the pigs see day light. For two weeks before farrowing I feed as near the kind of food as possible I intend to feed afterwards. I have well arranged, roomy breeding pens, with good fenders, in which I put the sow a day before farrowing time. When the time is up for her to travail, I am on hand, but to tell you just what I do I will not attempt, for my doings are various, to suit the case. One may need no attention; another may need all the skill of a breeder. I put water in a clean trough a few hours after the sow has farrowed; that is all the first day. The next day all the feed I give her is a handful of shorts in water, and increase from day to day until she has had shorts 5 days. I then take mother and pigs to a one-eight acre lot of grass in which there is a nice house, eight by seven feet; dirt floor. Now is a critical time, and no iron-clad rule will do; of a dozen sows, no two are exactly alike, hence the necessity of having them in lots to themselves. One may have a voracious appetite and will need holding in, or you will soon have a patient on your hands with dyspepsia. Another may have but little appeti, generally occasion by fever in bag. She will need close attention. I bathe the belly with cold water, and have a bottle of flax-seed oil with a little carbolic acid in it, and with a turkey feather put this over her teats. The washing with water cleans off all the dirt and allays fever, the oil and acid preserve the pigs from sore mouths. I try to coax up an appetite sometimes with little scraps of meat, milk, mush, etc. I now, if they have good appetites, increase the feed, clear fresh water, shorts and a little oil meal mixed, as feed, and give all they will eat up clean At this time I commence on one-half ear of dry corn, increase from day to day until on a full feed. I keep on in this way. At about three weeks old the pigs will begin to come up to the through. It is fixed low so they can eat all they will. Then soak oats and corn and put it in a shut-off corner. Stand and look at them eat and grow and feel happy. At five weeks of age I open the door of each pen or lot, and have the sows, from six to eight come up to a common feeding place. Of course the pigs too. Toll the pigs into a clean floored house and feed slow as heretofore, and soaked oats and corn, all they will clean up—always sweet. At eight or nine weeks old I turn the sows in back pasture and leave the pigs in their pasture and keep right on giving same feed and care. When fair time comes we select what we want to exhibit. After the round-up of the fairs we separate the sexes, castrate what males appear to be below the standard, put them with such of the sow pigs as we do not want to retain either in our own herd or to ship for breeders, push these as fast as possible and try and have them in Chicago before the first of February, at from 200 to 250 pounds. After selecting what I want to retain, I try to have the rest in other hands by the time they are six months old.

This year I have had the personal care and oversight of 130 pigs. There has not been a single case of scours, but one case of thumps and only three or four with sore mouths. There is not an unhealthy-looking pig in the bunch. They are in five groups and kept separate. If I could so arrange it I would prefer smaller groups.

Nor'-West Farmer.

FATTENING OFF SOWS.—Sows kept for breeding pigs for fattening pay best if they are fed for bacon after their second, or, at most, their third, litter is weaned. If kept longer, their meat will not be so good, and will not bring as good a price.

POOR MILKERS.—A sow that has proved herself a poor milker and unable to rear her litter in good shape should never be bred again, but should be sent to the shambles as soon as possible, and none of her litter should ever be reserved for brood sows.

THE ESSEX PIG.—The Essex Pig resembles the small Yorkshire and the Berks, but is altogether black. Though not so widely known, it is well bred, and possesses many excellent points. In figure it is compact and symmetrical, and has a small, well formed head.

WARM PENS.—All sties and places where pigs are kept should be built so as to keep out cold weather. No animal is more subject to injury from cold and dampness than the pig. We often see pigs crippled by rheumatism, brought about by sleeping in cold, draughty, and damp pens.

PORK.—Pork made from pigs that have been feed on peas or beans is much firmer than that from corn-fed swine. There is a special flavor or sweetness about it which cannot be obtained by feeding other grain. The fat does not fry out so much in cooking, and this alone makes such pork desirable for family use.

AGE FOR MATING.—A young brood sow that has made good growth may be bred to the boar at six months old, but it should be to a young boar, as she may be unable to stand up under a mature hog. If she "misses" first time, she will come in season again in three weeks' time. When only one sow is in the yard, the owner can generally tell that she has "come around" again by her restless actions, and the enlarged condition of the vulva.

The Flock.

SHEEP AND WOOL.

SHELTER FOR SHEEP.

It is a wise farmer who takes good care of his live stock during winter by providing warm, dry stables. To succeed in feeding and breeding, comfortable outbuildings will save food and improve the condition of the animals. I fed 100 sheep, kept under a shed, on 20 lbs Swedish turnips per day, and another flock of 100, kept in the open air, on 25 lbs per day. After a few weeks the sheltered sheep, although being fed 5 lbs less, had gained an average of 3 lbs more than the unsheltered. Five sheep kept in the open field from Nov. 11 to Dec. 1 ate 90 lbs of food per day, the temperature averaging 44 degrees, and when weighed were 2 lbs lighter per head than when first exposed. Five sheep were then placed under a shed, temperature at 49 degrees. At first they consumed 82 lbs food per day and later only 70 lbs. Another five were placed in a shed as before and not allowed to exercise. They ate at first 64 lbs, then later 58 lbs and increased 30 lbs in weight. Animals confined in a warm and moderately dark stable will thrive on the least food and those running at large and exposed to the inclemencies of the weather will consume the most. However plenty and cheap the forage, it will always pay to provide shelter from storms and wind during winter—(D. W. Thomas, Columbiana Co. O.)

F. and Home.

Six Sheep and ten Lambs Per Acre were kept by Prof. Thomas Shaw of the Minnesota experiment station as follows: The acre was divided into four portions. Nos 1 and 2 were sown last fall to winter rye, No 3 with peas and oats and No 4 with rape in early spring. Sheep were alternated on Nos 1 and 2, which were eaten down three times by June 1, when the animals were changed to Nos 3 and 4, alternating from one to the other. Early in June Nos 1 and 2 were plowed under, harrowed and planted to corn and rape. No 3 was eaten down twice and then sown to rape and sorghum. No 4 eaten once, was then

harrowed and sorghum planted. July 18 there was enough food on the ground to maintain the sheep six weeks and the forage was of such a character that it continued to grow on the plots that were not being pastured.

Breeder and Grazier.

THE FRENCH CANADIAN CATTLE.

ED. HOARD'S DAIRYMAN: — These cattle, of which I have made mention in a former letter to the *Dairyman*, the only herd of which at present in the United States belongs to Charles Colburn & Son, Portlandville, N. Y., was selected for those gentlemen by Mr. Henry Van Dreser, of Cobleskill, N. Y., last March. Mr. Van Dreser had previously seen them near Quebec, and, after a careful examination of a large number of individual animals, and a thorough inquiry into their origin, became satisfied that the breed had no superior, in this or any other country, as butter producers. Not being prepared at the time to invest in them, he came home, and, after much talk and hard work, induced the Messrs. Colburn to make the venture of introducing them. With the elder Colburn he went to Canada, and made the selection; — two bulls, five cows, and a heifer nearly one year old While in quarantine, at Buffalo, three calves were dropped, and all so nearly alike in color and form, as if they were triplets of one mother. Six, two, of the cows, all are alike in color and formation. They are a beautiful light fawn color, and have the true dairy form Following is Mr. Van Dreser's description of them. Head, small and fine, beautifully tapered and balanced, and is carried rather proudly, indicative of vigor of constitution. The cheeks are lean, the muzzle is somewhat firm, and the nostrils high, well placed, and rather open. The eye is mild, full and lively. The horns are well sprung, rather upstanding, smooth, yellow at the base, and nearly black at the tips. The ears are small, fine, and of a rich orange color within. The neck is straight, light and fine, and the body well rounded. The back is straight and even, and the ribs well sprung for a dairy type. The chest is fairly deep and broad; shoulders sloping, and withers fine. The hind quarters are moderately large; and the tail long and fine. The udder is well rounded, full, and capacious, in line with the body, and well up behind. The teats are of good size, in proportion to size of animal, and are well placed; quarters well balanced. The milk veins are very prominent. The skin is light, soft, and of an orange tinge, which is distinctly marked about the muzzle, eyes, and ears. It is a skin that handles pleasantly, and has the oleaginous touch, indicating butter fat; and the navel is wonderfully developed, another indication of great constitutional vigor."

Following are the names, number, ages, etc., of each of Mr. Colburn's herd, a copied from his Canadian certificates of registry, which he kindly loaned me for the purpose. It will be observed that the calves dropped while in quarantine are included in the registry:

COW, BELLA, No. 192 — Dropped May 29, 1887; sire, Belvoir; dam, Ladouce No. 191; color, fawn.

COW, JOSE, No. 193 — Dropped March 26, 1888; sire, Belvoir; dam, Ladouce No. 191; fawn.

COUNTESS, No. 551— Dropped June 13, 1891; sire, Bamston's Tom, No. 65; dam, Bella, No. 192; fawn.

BULL, BELVIN 2D, No. 99—Dropped July 16, 1891; sire, Bamston's Tom No 65; dam, Ladouce No 191; fawn.

COW, LOO, No 728 — Dropped May 2, 1892; sire, Bamston's Tom No 65; dam, Bella No. 192; fawn.

COW, TRIXIE, No. 923 — Dropped August 7, 1892; sire, Bamston's Tom No 65; dam, Jose No 193; fawn.

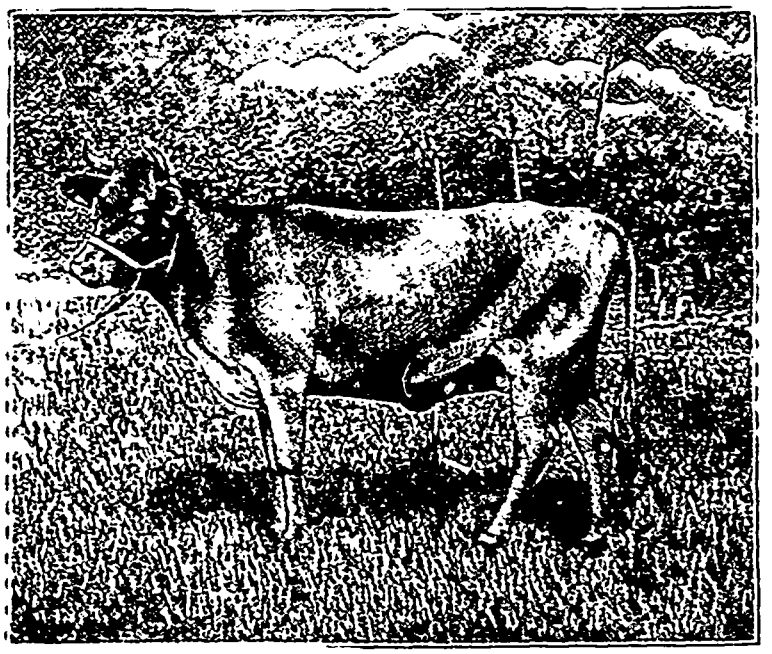
BULL LUNDI, No. 185 — Dropped Oct. 31, 1892; sire, Bamston's Tom No 65; dam, Bel'e of Maple Ridge No. 338; fawn.

HEIFER, LADOON, No. 1,484 — Dropped May 1, 1894; sire, Bamston's Tom No. 65; dam, Bella No. 192; fawn.

BULL, CALF DUKE, OF PORTLANDVILLE, No 392 — Dropped May 14, 1895; sire, Belvin 2d No 99, dam, Trixie No 923; fawn.

BULL CALF, BLACK ROCK, No. 390— Dropped May 18, 1895; sire, Belvin 2d No. 99; dam. Loo No. 728; fawn.

BULL CALF, COMPTON PRINCE, No. 391 — Dropped May 28, 1895; sire, Belvin 2d No. 99; dam, Countess No 551; fawn.



"FRENCH CANADIAN" COW, TRIXIE, No 923.

All certificates dated June 19. 1895, and signed J A. Couture, Secretary of Commission, 49 Garden Street Quebec, French Canadian Cattle Book.

Notwithstanding our tariff laws admit free of duty cattle imported for breeding purposes, and that the certificates of registry of Mr. Colburn's cattle were shown in evidence that they were members of a distinct breed, Mr. Colburn was forced to pay a 20 % duty before he could get his cattle through the custom house at Buffalo.

Mr. Colburn immediately wrote Prof. Robertson, submitting the matter to him, who at once submitted the letter to the Council of Agriculture of Quebec, which brought out the following reply:

L'ANGE GARDIEN (near Quebec), April 9, 1895.

C. R. COLBURN, Portlandville, New York.

DEAR SIR: — Prof. Robertson has referred your letter of March 19, 1895, in reference to the French Canadian cows.

In answer, I beg to state that this distinct breed is recognized by our Provincial Statutes as being the direct descendants of the first importations of cows, etc., sent by the French Government with the first settlers more than three centuries ago. Our herd book is under the immediate superintendence of the officers of our Department of Agriculture, of which I am a member.

I read in the *Canadian Stock Journal*, published at Toronto, December No. 1894 that this special breed of stock, when registered in our Provincial stock book, is admitted for breeding purposes in the United States, free of duty. I have no other information on the matter of fact.

We have nearly 2,000 animals registered in our books so far. They are certainly as good dairy cows as I know of, and I have made a specialty of the study of the best dairy breeds Respectfully Yours,

ED. A. BARNARD,

Sec'y Council of Agr'l, and Director of the Journal d'Agriculture.

The matter is now under consideration by the treasury officials, at Washington. Doubtless the money paid nearly $100, will be refunded at an early date.

Last November, Mr. Couture, Superintendent of the Levis quarantine, Quebec, in a letter to a Canadian newspaper concerning "The Milch Cow of the Future," said: "The Jersey, Guernsey, Holstein, Ayrshire and Canadian cows are the only good milking breeds in Canada. The others, such as the Durhams, Hereford, Angus, and Galloway are essentially beef cattle, though one of them — the Durhams — are sometimes good milkers. I say sometimes, for, in the generality of cases they have no aptitude for milk production.

Within the last thirty years, strange things have happened in the Province of Quebec, in regard to our cattle. At the outset, we had only the Canadian cow here in all its purity, dwarfed it is true, by bad feeding, but still yielding remarkable results, considering the little food it received, and the hard treatment to which it was subjected. In those days, cattle were simply tolerated on the farm, and they were denied, I might say, even nourishment necessary for existence. And let us admit that actually a large number of our farmers still entertain the same ideas.

We had only these Canadian cattle, when some English Canadians began, at great cost, to import Durhams and Ayrshires. They exhibited them everywhere and astonished our local farmers, who had never seen such large, fat and well kept animals. A great noise was made over these importations, which carried off all the prizes at exhibitions, and popularized these important breeds All who had the means purchased them. Most of our religious communities and seigneurs, and all the English, Irish, and Scotch started to cross their herds with Durhams and Ayrshires, and before long the quantity of Durham and Ayrshire blood in his cattle became the standard by which the farmer's intelligence, means, prospects were judged. The Council of Agriculture encouraged the transformation movement by all the means at its command, and it finally succeeded in excluding from competition at all exhibitions, the bulls of the pure Canadian breed. This, for two reasons: Firstly, because Canadian cattle were considered good for nothing; and secondly, because, in reality, the breed no longer existed in its pure state. Already extinct, the race which for two hundred years had been the only one in the country! Good for nothing, this race! Yet the Jerseys and Guernseys, its own sisters are reckoned among the greatest milk and butter producers.

These assertions were admitted as a matter of course by the very great majority of your population, who form public opinion. However, advised by a man who saw clearly on such matters, the Government refused to sanction the deliberations of the Council of Agriculture, decrying the disappearance of the Canadian breed of cattle. Surprise, astonishment, murmurs, and even reproaches followed on the part of the admirers of imported stock It was the first check to their ideas and designs It was also the beginning of the downfall of the Durhams. A movement was organized under the direction of a few individuals who still believed in the existence and usefulness of the Canadian breed, a movement for the purpose of making it better known, and to induce those who still had it pure, to feed it well, and publish its yield of milk and butter. The result was a general surprise. The Canadian breed, with average feeding, was found to be capable of producing 10 to 14 pounds of butter a week * * *. All this coupled with the very natural disappointment of those who had crossed their herds with the Durhams, the increase in the number of butter and cheese factories, and the establishment of ranches in the Northwest has fixed the doom of the beef producing breeds in general, and the Durhams in particular. In ten years there will scarcely remain a trace of them.

I add that the Canada breed is the breed of the future. Those who denied its existence are beginning to perceive their error. In fact, it is to be found all over the country, and one can hardly make a step without coming across a representative of it Those who denied its useful qualities are beginning to admit that, well fed, the Canadian breed is superior to all other milking breeds. I might cite numbers of letters which I have received recently from persons, who were all their lives the out-and-out enemies of this race of cattle, but who now recognize its superiority. In 20 years the Ayrshires will be regarded as a curiosity in the Province of Quebec, and Canada cattle will be recognized as the best in the whole of America.

In the Second Annual Report of the Dairy Commissioner of the Dominion of Canada, Prof Jas. W. Robertson, 1891-92 Assistant Dairy Commissioner, J. C. Chapais, St-Denis, P. Q., under date of Dec. 31st, in speaking of the various dairy breeds in his department, says of this breed: "The Canadian cow of French origin, is truly the best for the Province of Quebec.

Small in size, hardy, a good milker. she possesses all the qualities adapted to our severe climate. Well taken care of, she gives an abundance of very rich milk, and is equal to the best Ayrshire, while being much more easily and economically kept."

Mr. C. C. MacDonald, another of Prof. Robertson's assistants, in the same report speaks of the little fawns, as follows: "At St-Norbert I had the pleasure of seeing one of the finest specimens of the Canadian cow that I ever saw. So much did this little beauty take my fancy that I went twice on one day to visit her. I took a sample of her milk and under very unfavorable circumstances it tested 5 % butter fat. The fat came to the surface so quickly, before I could get at the test, that quite a stiff cream had gathered, and became quite tough, so I did not get a fair sample.

At St Jerome, in the Lake St John region, another sample of milk was brought in for a test; it contained 8 % butter fat. I expressed a desire to see the cow that gave that milk, and was directed to where she was feeding. I saw her milked in the evening at 6 o'clock, the milk was weighed and tirped the beam at 15 pounds; this was on the 27th of July. I was informed that the little cow had milked as high as twenty five pounds at one milking. She is red in color, very dark colored hair around the eyes, very strongly built, weighed about 650 pounds, and five years old The cow was for sale at $25. I also found a very valuable herd owned by———, of St-Denis. The average per cent of fat for this herd was four."

At my request Mr. Colburn had four of the cows tested with the Babcock machine. Mr. E. D. Gifford, of Oneonta, who has had the benefit of a short term at Cornell, made the test, doing the work very carefully, and reported as follows: "Trixie No. 923, 28 lbs. of milk, Aug. 6th; 9.6 % butter fat. Loo No. 728, 29½ lbs. of milk; 8.6 %. Countess No. 551, 31 lbs. 4 ozs; 8.2 %. Jose, No. 193, 34 lbs. milk, 8.2 %—an average of 8.625 %."

Mr. Colburn writes. "I had the test made August 6th. The milk tested was taken from each milking, night and morning, after being thoroughly stirred. I was feeding at the time nine pounds of grain per day, equal parts by weight of cotton seed meal, corn meal, middlings and wheat bran, with oats cut green and cured like hay. I do not consider my yield of milk nearly as large as I can get from these cows, as this is their first season here, and it was in fly time. They are and have been constantly improving since I got them. Their weight is about 1,000 lbs. for cows, and 1,400 for the aged bull, and is, I think about their maximum."

I have been thus lengthy in describing these animals, because they are the only representatives of the breed in this country, and because they give great promise as butter producers. (1)

C. W. JENNINGS.

Belleville, New-York.

THE SIMMENTHALER CROSS.

A chief of Jersey Breeders, with a herd three hundred strong, after nearly twenty years' experience makes the following statement:

"I have had constantly brought to my attention the fact that owing to persistent inbreeding the stamina and health of the Jerseys was on a yearly decline, and from the losses in our herd I found that if I wished to retain my dairy and furnish absolutely pure milk and butter on the lines that we have always used, to make each animal pay for the food consumed and the care given, we must do something to put new life in the Jersey cow." (Breeders' Gazette, Oct. 9, Interview with Havemeyer.)

This, no doubt, is an uncolored statement of facts. Mr. Havemeyer evidently has been bound to succeed with his Jerseys. He has imported from their native land, he has bought from the best herds, he has bred from the best strains, he has availed himself of the best appliances and the best markets—now, without turning from his purpose he frankly confesses that if he wishes to retain his dairy and furnish absolutely pure milk and butter (by pure he evidently means healthful—free from disease germs) he must do something, to put new life in the Jersey cow.

Had this statement come from some unintelligent breeder, without means or opportunities for success, it would have little weight. Men without ability or without sufficient means are liable to fail, whatever breed they may handle. Mr. Havemeyer's failure is not from such causes. He is, no doubt, right in ascribing it to the lack of health and stamina in the Jersey cow—a lack of constitutional vigor to resist climatic influences and to ward off contagious diseases lurking in every section of our country.

This is not a matter for rejoicing by those who handle other breeds. Breeders worthy of their calling wish each other mutual success, and now they will wish Mr. Havemeyer success in his new undertaking.

He proposes to put new life in the Jerseys by crossing them with Simmenthalers, a breed from Switzerland.

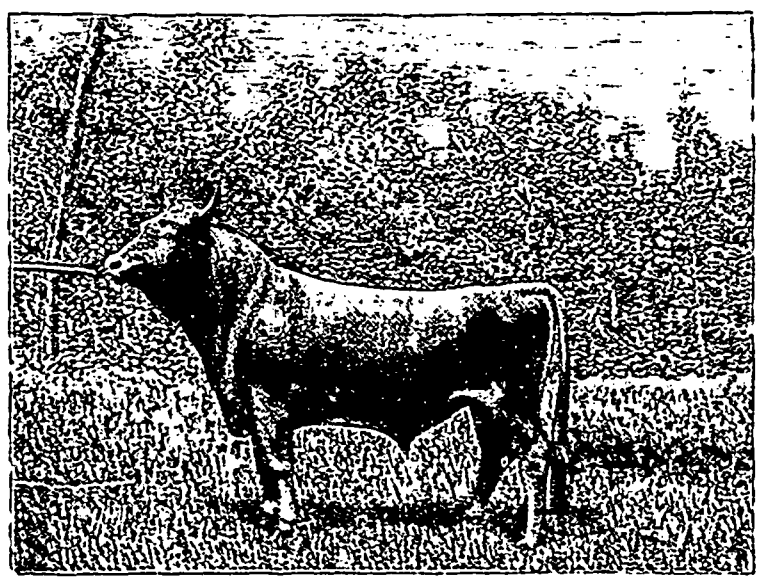
What are its characteristics? From a report on this breed to our State Department. by Consul Mason of Bosle, Switzerland, I quote and condense: "A cow exhibited at Lucerne in 1831 attained a weight of 2,494 pounds,... the average weight of thoroughbred cows being about 1,400 pounds, though many choice herds average 1.700 pounds, and cows of 1,900 and 2,000 pounds weight are not uncommon... At Roseck, the insane asylum of Canton Soleuse, I have seen a herd of twenty choice cows, kept by the Cantonal government to supply the asylum with milk... From careful records kept by Superintendent Marti it appears that these cows average 21 pounds of milk daily or 7,665 pounds each during the year. This is a maximum record for an entire herd... In the Alps where the grass is savory and richest 25 pounds of their milk yield a pound of butter; in the valleys the quantity required for the same purpose varies from 28 to 30 pounds...

They grow rapidly and are mature in their fourth year. They are of enormous size, compactly and cleanly built, and their flesh is fine grained. tender and savory."

This breed will undoutedly be a valuable acquisition to our country, but the wisdom of the proposed cross is questionable It will be a violent one, especially if such enormous bulls are used.

The impression is strong that Mr. Havemeyer might have found breeds nearer home more suitable for his purpose. The Ayrshire is a beautiful animal of unquestioned health and stamina, the cow gives nearly or quite as much milk as the Simmenthaler, and it is as rich. The Red Polled, with equal stamina, is not behind in any dairy quality. And last, though not least, the Holstein-Friesian gives as rich milk and more of it.

A private letter lies before me from one of the largest breeders in California He writes that he has largely crossed the Holstein-Friesian on other cattle.



"FRENCH CANADIAN" BULL, BELVIN 2nd No 99.

He says, "I have a half-bred Jersey and Holstein, thoroughbred on both sides, which produced 662 2-4 lbs. butter last year by Babcock test."

I have advocated the crossing of breeds for several years, and have made inquiries on the subject. From what information I have been able to gain, and from my own very limited experience, I am led to the tentative conclusion that a cross of medium-weight Holstein-Friesian bulls with Jersey cows is a success. A cross thus made by me resulted in no difficulty of birth, and the produce was a large and very rich milker. I sold her to a large dairyman who has often said to me. "She was the best cow I ever owned." I cannot recommend the opposite cross — that of Jersey bulls on Holstein-Friesian cows. (1) As breeders say, "It does not seem to be a nick. (2)" I think our agricultural societies might confer a boon upon our dairy interests by a liberal offer of premiums for cross-bred cattle.

S. HOXIE.

Yorkville, N. Y.

(1) So, if fat, the cows should give 600 lbs. of carcase and the bull 840 lbs.—ED.

(1) The true principle of breeding is that the purer bred of the two animals should be a-top. For instance: in crossing a Leicester with a Southdown, the ram should be a Southdown.—ED.

(2) Metaphor from the game of *Hazard*. ED.

REPORT OF MM. G. A. GIGAULT AND J. D. LECLAIR

(*Continued*)

The practice of examining the older packages of butter before shipping them and remedying the defects in them, if any exist, is highly laudable. The apprentice should attend this examination that he may learn to judge of the defects of butter. The maker should try, when possible, to meet the purchaser, to examine different kinds of butter, compare them with his own make, and endeavor to discover where the defects lie, and what remedies to apply to them.

Men able to judge have declared that the cow's food is the chief cause of the defects in butter, and now they assert that they all lie in the process of ripening the cream. We shall not enter into explanations on this matter.

It is past doubt that the idiosyncrasy of even a cow, the length of time since she calved, her food, water, the means employed in skimming the cream, all have great influence on the quality of the butter, as have the ripening and working, and we believe it may be said with truth that the same defect may be attributed to many causes.

BELGIUM.

HENRI POISKET, Glons, Belgium:

The farm contains 100 hectares about 247 acres, nearly 300 arpents); stock: 20 cows, 18 horses, 12 heifers, 200 sheep, 12 pigs, 150 head of poultry

The dung is not sheltered, but the stance is away from the roues or rain-shoots and the bottom is water-tight, as are the floors of the stable and cow-house. The dung stance communicates with the liquid manure tank by a trench, and in the same way the urine from stable and cow house reach it. The winter's dung is carted to the fields in the spring.

There are roues to lead the water from the roofs away from the manure. A cask about 6 feet long is used to cart the liquid manure over the meadows and pastures. It is right to say that in all European farm buildings in Denmark as well as elsewhere, great attention is paid to the ventilation and lighting.

Mr. Poisket's farm is at present let, and the rent paid is 9.500 francs a year (about £1 10s. an *acre*).

Rotation.—1, mangels; 2, wheat; 3, rye; 4, oats, partly sown with clover; 5, potatoes and clover. Twelve hectares (30 acres) in permanent pasture, and 4 hectares (9.88 acres) in permanent meadow, which are fed after the hay is carried.

This season there are 7 to 8 hectares (17½ acres) in clover, 6 to 7 (15 to 17 acres) of mangels, 1½ acres of carrots, and 2½ acres of turnips. The permanent meadows and pastures are treated either with liquid manure or with compost, many heaps of which have been made near the buildings and in the fields. Ditch cleanings and lime form part of these composts. The food of the hogs consists of milk, potatoes boiled, and mangel leaves.

In summer the cows pass the night in their stalls, where they have green clover; in winter, they have hay, mangels, grain, cake, and straw previously moistened. The stubbles are cleared after harvest, in August, and ploughed up in the fall. Liming is done periodically, clover is generally cut twice, the first crop about from the 1st to the 15th June. The value of sugar beets depends upon the richness in sacharine; last year they fetched

22 francs (18 shillings) the 1 000 kilos (about 2 200 lbs.), when the contained 12 per cent. This year, sugar being cheaper, it is supposed that those farmers who have no contract with the factories will not get more than 15 francs.

The high-roads are kept in order, by a tax, by a road-master acting on behalf of the commune.

MR. OSCAR BOLLE, Chief Clerk in the Ministry of Agriculture, Brussels, Belgium:

In 1885, Belgium sent to Denmark and France several boys and girls to study dairying. Some of the girls went to the dairy-school at Coëtlogon, near Rennes, others attended the Fribourg school, Switzerland; the lads sent to carry on these studies had received diplomas as agricultural engineers.

Belgium possesses dairy-schools for girls, where there are specially taught the mode of making the different sorts of soft and firm cheese. In this country, the home manufacture of cheese is the peculiar business of the wife.

Nine state agronomes and 10 assistants are employed to give information on all agricultural matters to the farmers; they deliver lectures at the farmers' meeting and at the agricultural *comitia* (*comices*). Each *comitium* has to have one or two small experiment fields, of about 20 acres each; it selects a farmer who agrees to cultivate these fields, but it is the duty of the agronome to point out the experiments that are to be conducted there.

The state supplies the farmer with the seed and chemical manures needed for the experiments; the farmer, having done the work and furnished the dung, remains proprietor of the crops.

Belgium is divided into provinces, and in each of them, the state has established experiment gardens.

Every State agronome receives annually 3 500 francs (£140), in addition to his travelling expenses. He has to make an annual report of the results obtained on each experiment field.

During the last few years, the value of farm property has diminished by 20 %.

From time to time, the government publishes bulletins indicating the best methods of agriculture; one of them, published lately, treats of the management of manure; it advises the farmer to keep the dung moist and well tramped, to keep it away from the drip of the eaves, and to regulate the fermentation carefully.

During winter, the dung is usually carted away, and put in large heaps, carefully made, laid on a bed of clay and covered with the same. The *beau idéal* of the system is to have the dung thoroughly rotten and to preserve every drop of the urine.

In same parts of Belgium, the manure is allowed to accumulate under the cattle, but in this case lots of straw is used for litter.

Barley, wheat, rye and winter-barley (*épéautre*) may be sown in the fall. On the permanent meadows, especially on those that are sour, lime and phosphoric acid, in the form of *basic-slag*, are used for the purpose of adding their fertilizing properties and destroying weeds. The meadows and pastures are manured with urine and earthy composts; these latter are prepared with lime.

In March, both meadows and pastures are lightly harrowed and rolled: harrowing favours the tillering of the grasses and destroys the moss. In north Belgium, they sometimes put on the meadows a ton of *basic-slag* and half a ton of *kainit* (potash), to which are perhaps added from 380 to 440 lbs. of nitrate of soda (*to the hectare?*) The *lathyrus sylvestris* (*wood vetch*) has yielded well on some light lands, but it is bitter in taste, and many animals do nor care for it.

The *prickly comfrey* is not approved of. Crimson clover (*trifolium incarnatum*) and the *hairy vetch* mixed with rye, do well here, and are much liked by the stock. In some districts of Belgium, giant spurrey is sown, and is said to impart a fine flavour to butter.

As soon as the grain crops are harvested, the stubbles are cleared, and a deep furrow is given in the fall.

The average yield of milk from each cow is from 9 to 10 kilos (19 to 22 lbs.) a day during the 9 or 10 months they are milked: it takes, on an average, 27 kilos (59½ lbs.) of milk to make a kilo (2.204 lbs.) of butter.

Mr. Proost, professor and inspector general of agriculture:

In the Duchy of Luxembourg, there have been founded, with excellent results, parish agricultural societies. Government has encouraged there the building of liquid manure tanks, and this has greatly contributed to the increase of agricultural products. The experiment fields are more or less successfull, according to the management they receive.

Mr. Proost attaches great importance to the labour and lectures of the State agronomes, and contends that these are more beneficial to the farmers than the experiment fields. In one of these fields it was proved that some sandy soils contained a notable dose of potash. On poor land, the *lupine* gave good crops: it might be tried in Canada. As cleaning and improving crops, hoed crops are to be highly commended, for without them it is difficult to keep a farm in a productive state.

Fallows, too, are desirable in many cases.

In rich land, a triennial rotation is: 1, beets; 2, clover; 3, wheat; or, 1, clover; 2, wheat; 3, oats; 4, potatoes. As a rule, the dung is not under cover, is kept away from the eaves and the urine is carefully preserved. On moist meadows kainit and basic-slag answer well.

Liquid manure always produces excellent results on clay meadows, but these should receive dressings of lime occasionally. M Proost strongly recommends the attentive control of the work of agricultural societies, if we wish to reap much benefit from them; the officers of some of them are energetic and earnest, and do their best conscientiously, for the improvement of agriculture; but unfortunately, all the officers are not alike.

As to the theory of M. Deherain, about the waste of manure, M. Proost says that it may possibly not be correctly founded; but he is not prepared to give a definite opinion on the subject.

THE ANTWERP (BELGIUM) EXHIBITION.

As an agricultural show, the Antwerp exhibition was far from being complete. Very few agricultural implements were shown, though there were some ploughs, winnowing machines, potato, and beet diggers. The Belgium system of *farm instruction* was well represented, especially the pieces of work exhibited by the pupils of some of the schools of domestic economy of the farm-house among others the exhibits of three schools kept by the nuns of the country. There were vestments, dresses, and the repairs of clothing done with care and taste. A variety of preserves where shown by these pupils, prepared by themselves: marmarlades, apple jelly, plums, etc., in fruit preserves. Most of the utensils used in the dairies of these schools were there, as well as grain and seeds gathered by the pupils, and bills of fare for dinners and breakfasts. In these schools are taught accounts, confectionery, laundry work, bread-making, butter and cheese making, the utilizing of waste products, and horticulture. There were to be seen photographs of nuns and their pupils in the dairy, in the creamery, the bakery, the laundry and washhouse; peeling vegetables, cooking, and in the fields as well, when the course of zootechnie is being given.

In these schools, too, veterinary subjects and domestic maxims are studied. Among the exhibits the following maxims are placarded.

"*One day's mending is better than one year's spinning.*"

"*A house neglected is a house ruined.*"

"*Love a country life; it is the most conducive to morality; it is the guardian of the Christian traditions.*"

One of these schools is kept at Virton, one at Brugelette, under the management of the Sisters of the Infant Jesus.

Each pupil who passes a satisfactory examination receives a certificate of study and of agricultural practical work.

The dairy industry was hardly represented at all. There were a few utensils for sale, but positively nothing new, except a mechanical butter-worker (*délaiteuse*), which we should have liked to see in operation, but which was not set to work at the time appointed by our request.

FRANCE.

M. TISSERAND, Director of Agriculture, Paris:

There are co-operative creameries, especially in Normandy. At Coëtlogon, near Rouen, there is a dairy school for girls. The making of Gruyère cheese is taught at the Poligny school, in the Jura, and at Mamirolle school. It is proposed, too, to teach the way to make Cheshire cheese. Formerly, 20 % of cheese made in France was of inferior quality, but there has been a great improvement. Pains are being taken to improve the pasture by phosphate of lime; superphosphates are found to answer best on clays.

For this purpose liquid manure is being used, but many farmers lose a great deal by not taking care of it.

More than 400 experiment fields have been established in France, and for their maintenance the government expends 200,000 frs. ($40,000) a year. There are 300 professors of agriculture, whose business is to give lectures to the farmers.

SCHOOLS OF ARTS AND TRADES.

We received the following information at the *Ministry of Trade and Industry*:

The French government keeps up schools for instruction in clock making weaving, dyeing, and iron and wood working. Many of the former pupils of these schools have now good situations.

At Paris, there is a school of shoemaking founded by a trade syndicate, and aided by a grant from the State.

At the Cluses school of clock-making there are usually from 100 to 120 pupils; they study everything connected with clock and electricity. A certain number of them receive from government an allowance, the maximum of which is 600 francs ($120.00). At the schools foundries, mill-works and clock-making, the course is 3 years. Some of the pupils attend, at the expense of the government, for 2 years foreign institutions of the same class, and are obliged to make reports to the home government every three months.

VISIT TO THE SCHOOL OF SHOEMAKING AT PARIS.

Thirteen pupils are now attending the practical course of this school. They work for Parisian "bosses" (*patrons*) who pay in proportion to the amount of work and the quality of the shoes, etc., they send in. The cash received is generally sufficient to pay for their keep, besides, they receive wages from the directors every three months; and these wages are more or less in amount according to the application evinced by the pupil and his progress in the trade. A theoretical course is given by professors among whom are to be found the masters of some of the leading shoemakers' shops in Paris. Besides the above pupils, many apprentices, who work outside the school, are allowed to attend the theoretical course.

This course is of 2 years, but many pupils leave before the expiration of that time, having learnt enough to become skilful workmen. The pupils seem perfectly satisfied with the management of this school; one of them, an Algerian, who had attended the course for 5 months and had previously made shoes for 4 years, told us that he had greatly improved there in the art of cutting out and making shoes. There were an Austrian and a Swiss, there; these foreigners were also preparing, by learning all the details of the trade, to become competent master-workmen in their own countries, or proprietors able to superintend and direct their own manufactories.

VISIT TO THE AGRICULTURAL INSTITUTE AT BEAUVAIS, UNDER THE DIRECTION OF THE REVD. BROTHERS OF CHRISTIAN SCHOOLS.

Last year, there were 93 pupils at this institution; the course is one of 3 years. The weaker pupils work on the farm from 1 to 6 o'clock 3 days a week; the strong ones work 3 days a week on the farm. They have to transcribe the theoretical instruction they receive; board and instruction cost each pupil $320 a year.

The cows kept are Bretons, black and white, and small. Yorkshire pigs are kept and the progeny sold as breeders. The grain harvest takes place at the beginning of August. The permanent pastures are so divided that they may be fed in turn for about a fortnight each time.

The food of the cows, in winter, includes mangels cut-straw, lucerne, sain-foin and bran.

The yield of milk is 12 *litres* (10 quarts 1 pint imperial) a day, a cow, during seven months; the cows calve at all seasons. A Normandy bull is kept. The dung is not under cover, but in the middle of the yard, so that it gets no drip from the buildings. There is a tank for the urine from the

cattle and to catch the drainage from the manure. The rubbish of the farm is composted with the weeds, pomace, etc., to which are added lime and marl.

The tank-liquid is sprinkled from a a cask, and the effect, according to the manager, is immediate.

Rotation.

1. Hood-crops with dung; 2. wheat; 3, oats; 4, 5, 6, 7, lucerne. Modifications of this rotation occur in parts of the farm, *i. e*, clover takes the place of lucerne, and wheat follows. The cattle-droppings are knocked about in the pastures. After wheat, a bastard fallow is made.

There is only one small silo; for experiment purposes. Superphosphates are mixed with the farmyard dung. When the pastures become old, they are harrowed with a light harrow, and if needed, a small quantity of clover is sown on them, and this treatment never fails to produce a thick, close bottom, especially on low, damp land, as part of this farm was. We also admired a troop of Anglo-Norman brood mares, the progeny of which are very fine indeed; some of them won prizes at the last competition.

In our opinion, such horses as these, with their gay carriage, high and powerful build, are the finest stamp of coach-horse.

We saw a fact worthy of remark, above all by market-gardeners — the effect of electricity on the ripening of vegetables. In a field of potatoes, all planted the same day, were set, in a regular circle, a certain number of posts, at a regular distance apart, and from each of these posts started a wire, under ground, that electrified the whole circuit. The spot thus electrified bore, very clearly, a different look from the rest of the field; the stalks of the plants showed that the crop was getting ripe, while the others were quite green.

(To be continued.)

Dressed Lambs are not wanted in hot weather and sell poorly at $1.75a2.25 each, in leading wholesale markets.

Canada Is Sharply After Export Trade in dairy products, making more of a success in cheese than in butter. In the last named Denmark and other dairy countries are, sharp competitors of all America. Canadian exports of butter were 10,500,000 lbs in '68 and only 5,500,000 lbs in 94, a loss of nearly a half, yet the decline in price was only 30 per cent, pointing to improvement in quality of goods shipped. Cheese exports in '68 were 6,142,000 lbs and in '94 nearly 155 000 000 lbs.