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THE ILLUSTRATED  
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Notes by the Way.

LOOK OUT FOR SQUALLS.

PROF. WIGGINS SAYS HIS STORM IS COMING.

Ottawa, Sept. 21.—Professor Wiggins states that his storm will certainly reach here to-day, when it will sweep over this part of the country at the rate of seventy miles an hour "I have no doubt," continued the doctor, "but it will arrive, and then I will be on top, and the scientists who have been disputing my contentions will not be in it."—(What English!)

"This here gentleman," said Sam, "was a prophet." "What's a prophet?" inquired Mr. Weller. "Why a man as tells what is going to happen," replied Sam.

And the unfortunate Dr. Wiggins attempts to tell what is going to happen; fails most lamentably; and whereas his predecessors in the charlatan business made lots of money and found heaps of supporters, the very Montreal papers that backed the two se' deceivers, have not a word even of pity for the deluded Wiggins. A great storm on the 21st of September! Why, do not the equinoxes generally bring gales? And did not Wiggins predict a storm in 1883, which storm actually kept its appointment? Bah! It is high time we gave up listening to this nonsense.

Here, again, is another poor creature who sends us a book all the way from Chicago, with a request that a favourable review of it may appear in this periodical. Such trash! entitled "The Cultivator's Hand-book," principally on the effect of planetary law—whatever that may be—upon crops and nations. Well may Goldwin Smith say that "we are on the eve of marvellous manifestations;" though we trust they will be more useful than those put forward in the following passages from the book we have in hand:

"Africans are black, coarse in features, and ungainly in form, because Africa is in general under Cancer and governed by the Moon."

"Large fields of potatoes, that cannot all be harvested in two or three days, should be dug during the last half of the Moon; if gathered in the new to full Moon, they will be watery, insipid, unwholesome. Sweet-potatoes dug before full Moon, will not keep.

Mr. Weekes' experiments—the same, pretty nearly as those of Mr. Cross—were an attempt to "create" a new species of insect by the action of the voltaic battery upon a saturated solution of silicate of potash. "Living insects did emerge, after every care that ingenuity could devise to exclude the possibility of a development of the insect from ova. The wood of the frames was baked, &c., &c.;" but, as Charles Kingsley says in that charming book "The Water Babies": "You may see mites (*acar*) in the Moon quite plain in a telescope, if you will only keep the lens dirty, as Mr. Weekes did his voltaic battery."

"It is a fact of common knowledge that the dead have been restored to life by electricity. A newly killed animal having the brains removed, and a substance that produced electric action placed in the cavity, digestion, that had ceased by death, was resumed and carried on, showing the absolute identity of the brain with a galvanic battery." The above will show that we cannot conscientiously recommend "The Cultivator's Handbook" to the attention of our readers.

Imports of Manures into England, in the first 6 months of 1894, were :

	Tons.	£
Bones.....	44,825	value 212,003
Guano.....	19,440	" 93,318
Nitrate of soda	83,558	" 790,574
Phosphate of		
Lime & Rock.	175,051	" 317,444
	322,874	" 1,413,339

for it shows that, both in the North and the South, British farmers are alive to the necessity of growing crops that have some chance of turning out profitable, and are giving up the old favourite wheat-crop as no longer the safe investment it used to be. The statement of the whole acreage of farmed lands, exclusive, we suppose, of the Downs of the South of England is as follows :

1895 COMPARED WITH 1894.

CROPS AND LIVE STOCK.	1895.		1894.		In-crease.	De-crease.	In-crease.	De-crease.
	Acres.	Acres.	Acres.	Acres.				
Wheat.....	1,417,641	1,927,962	.....	510,321	.....	.....	.....	28.5
Barley.....	2,166,279	2,095,771	.....	70,508	.....	.....	.....	3.4
Oats.....	3,295,905	3,253,401	.....	42,504	.....	.....	.....	1.3
Potatoes.....	541,217	504,454	.....	36,763	.....	.....	.....	7.3
Hay :— Clover, and								
Rotation Grasses....	2,303,431	2,121,904	.....	181,527	.....	.....	.....	8.6
Hay :— Permanent								
Pasture.....	4,760,889	4,852,442	.....	91,553	.....	.....	.....	1.9
Hops.....	58,940	59,535	.....	595	.....	.....	.....	1.0

The imports in the first 6 months of this present year were somewhat less bones, but about the same of the other items; total diminution of imports 1,500 tons, value about £23,000.

Hops.—This plant seems to be going up, in England, instead of down; there were 2,740 acres more in hops this year than in 1892. Curious to see how very partial the crop is as regards locality: Nottinghamshire, that used to grow a nasty, heavy-yielding, coarse hop, only fit for the "Potteries' chaps," who like their ale as red as blood, only grew 14 acres in 1892, and none at all in '93, '94, '95; Gloucester remains constant to her 38 acres; Hampshire, does not vary much from her 2,850 acres; Surrey, including her excellent Farnham's, has some 50 acres less than usual; Worcester, with her pleasant mild-flavoured hops has planted 4,024, against 3,369 in 1892; and our own natal county, Kent, has 35,018 against 34,058 in 1892; while Sussex, prolific in yield but only fit for "country ales" and porter, has 7,489 to 7,124 in 1892. The quality this season is such as has not been seen for many a year.

Acreage of wheat.—We spoke some few weeks ago of the wisdom of the Scotch in sowing so small an extent of land with wheat, seeing that their soil, and particularly their climate, is so much better adapted to the growth of oats. We have recently received the September No. of the Journal of the Board of Agriculture of England, from the Secretary, and in it we find a return of the acreage of all the crops grown in the United Kingdom in the years 1894 and 1895. In England, the extent of land in wheat, in '94, was 1,389,806 acres, of which the chief producing counties were :

Lincoln.....	139,230 acres
Norfolk.....	106,812 "
Yorkshire.....	92,969 "

And in Scotland :

Fife.....	7,075 "
Forfar.....	6,578 "

down to Aberdeen, Selkirk, and Sutherland 1 acre each; the whole extent of the Scotch wheat-crop being only 33,706 acres, in round number 11,000 acres less this year than in 1894.

This decrease of wheat-crop is very interesting to an impartial observer,

Two items in the above are important: the decrease of the Wheat-crop 510,321 acres, equal in an average of years to something like 15½ million bushels; and the increase of the Clover and Rotation-grasses, 91,553 acres, equal to about 136,000 gross tons. We are happy to add to all these statistics that since harvest, the condition of the stacked wheat that has been threshed is so excellent that the weight of the bushel is quite a pound more than the weight of a bushel of last year's wheat; consequently, millers are only too anxious to get the home-grown wheat, whereas usually, at this time of year, foreign wheat has the preference. The yield too is far better than was expected, the average per acre being calculated at, say, 28 bushels.

Apples in England are an enormous crop! Any keeping fruit is fetching a decent price, but early apples go for nothing, and in counties like Kent, where cider is rarely made, as the farmers there only grow dessert-fruit, presses are being sought for; wind-falls are quite neglected, not being considered worth picking up. The dessert-fruit will not make really good cider, but it will be better to utilise the fruit thus than to let it rot in the orchards.

Clover-seed.—In spite of the enormous second cut clover-crop, the yield of seed will be slight in England. The heads seem to have but little in them, as the sunny weather came too late to set the seed. Wherefore, we strongly advise farmers here not to be in a hurry to sell their clover seed, if they have any to spare.

Potatoes, in the old country, are like apples this year, i. e., too heavy a crop to be worth much. There is hardly any disease, and the quality is capital. In the neighbourhood of Quebec, too, we see by last night's (Sept. 28th) paper that farmers are selling at 18 cents a bushel! Well, it may be so, but the last sack we bought from a St-Catherine St. butcher's market cost us 75cts. = 50 cents a bushel, even if the sack was full weight, which it was not! At 20 cents a bushel, potatoes pay better to feed than to sell.

Splendide Mendax! is the compliment our old friend Horace pays to an illustrious lady who saved her bridegroom's life when her forty-

nine sisters slow their husbands. Well, at the Exhibition, I heard a tale that very nearly made me burst out with the above exclamation. Now the mendacious statement in question was this: *A* dying left two sons—*B* and *C*; *B*'s share of the farm on the demise of *A* was good land, *C*'s share was inferior. *B* bred Hampshire downs; *C* bred Southdowns. The two brothers *B* and *C* disagreed about the relative merit of the two breeds, and to test it, they agreed to feed off a piece of turnips on either farm with a certain number of sheep from their flocks. *B*, whose turnips were very good, put 100 Hampshire-downs on his piece; *C*, whose turnips were very inferior, put 200 Southdowns on his piece—both pieces being of course of exactly the same size. The 100 Hampshire-downs had finished their piece of good turnips before the 200 Southdowns had finished their piece. From this was deduced the axiom that although the Hampshire-downs lambs may be in a trifling more expeditious in maturing than the Southdowns, that goes for nothing, as it is easier to feed two Southdowns than one Hampshire down. A more wonderful statement we never heard. We have bred both sorts, and that within a mile of the farms of *B* and *C*, whom we knew; and we are well assured that the story is absolutely untrue.

At the Exhibition, at Montreal, the show of sheep was very good indeed, particularly the *Shropshires*, *Southdowns*, especially Mr. Jackson's, and *Dorsets*. One Dorset ram, from Hillhurst, struck us as being equal to anything we ever saw in England. We may as well mention here that the ewes of this breed had begun to drop their lambs at Dorset-fair time, i. e., about the 12th September! As they do not kill lambs weighing six or eight pounds apiece, but let them go till they are 13 or 14 weeks old, these newly dropped lambs will be in good condition for the Christmas Smithfield market. We have known them fetch a guinea \$5 00 a quarter at that season. They are housed most of the time, and the only difficulty is to keep the house at a uniform temperature.

A couple of useful pens of *Hampshires*, but the *Shropshires* were the pick of the lot, though the *Oxfords* were very good.

The horses were superb, but we were surprised to see only one *Suffolk*.

In *cattle*, the *Shorthorns* were better than of late years, and we were glad to see the Hillhurst herd represented once more after a long interval. Mrs. Jones headed the list of prize winners in Jerseys, though the herd of the Dawes of Lachine was fairly successful. None of Mr. Reburn's stock present. The *Flower show* was not so good as usual, the grasshoppers having played the very mischief with the outdoor plants. Why on earth do these beasts select the pansy for their especial food? Is it, possibly, because it is the only flower we have room for in our border to grow? Our bunch of rape, too, which we grew to show enquirers, has been the object of their earnest attention—but it beat them, is flourishing, and will continue to flourish till the snow buries it.

Why sell your oats, Messrs. farmers, at present prices, or your pease, or your barley? Here is what the papers quote as their selling value at Montreal.

No. 2 new oats..... 30½ to 31 cts.  
Pease, per 66 lbs... 66 " 00 cts.  
Barley, feed..... 43 " 44 cts.

Take the average price of the bushel of the three as 47 cts, and you have a

feed of 6 lbs a day per head of your cows for 5 cts. or thereabouts, besides saving the time of sacking up, going with loads to market, &c. And why send the grain intended for your stock to the mill? A kibbling machine—one that cracks the grain into small bits—is not a costly article; and as most of you have a horse-power of some kind, it would pay you well to use it in conjunction with your chaff-cutter and the kibbler, rather than send to mill.

**Rape.**—Our excellent contemporary, *The Farmer's Advocate*, very sensibly remarks that, "when sheep are on rape, they should always have some dry food with it to prevent bloat or hoven. In this purpose we recommend pease and clover-chaff; straw we never have found eaten in sufficient quantities till the cold weather arrives. As for turning cattle of any kind on to rape, we would rather not risk it; besides, we consider this plant to be the special property of the flock, growing it being as much for the purpose of manuring the land for the succeeding crops of the rotation as for making mutton. There is but little danger of sheep 'blowing' on rape if they are turned on for the first time in the afternoon with their bellies full, and removed after an hour or so to a dry pasture. The next day, they may be let in again to the rape, in the afternoon of course as before, and will be thenceforth safe enough."

**Price of cheese.**—A great fall in the price of cheese took place in the Cheshire district of England on or about the 14th September. At Crewe Market, the best lots only sold for 40s. to 43s. per 112 lbs. fair cheese, at 30s; and common for 22s. to 26s. This must not be attributed to foreign competition, for the imports have been during the last 8 months less by 72,765 cwts than in the same period in '94, when best Cheshire sold for 65s and medium for 60s per cent. The real reason of this heavy fall is the temporary glut of cheese that would not be likely to keep owing to the terribly hot weather. We remark with pain that here the best qualities of Cheddars seem to be unable to reach 8 cts a pound, and butter does not appear to be doing any better. Does the Revd. owner of the Canadian cow "La Major" remember what we told him on this matter some eight years ago?

**A splendid garden** is that belonging to the Seminary in Sherbrooke street Montreal, but the management of the farm is not quite what it ought to be. For instance, a piece of pastured land was ploughed in early August and left in an untouched state till the furrows had all grown together with timothy and couch-grass. It would have been far better to have cross-ploughed it as soon as possible, and then the grabber and harrows would have had a chance to clean it. A lot of rough dung is now (Oct. 1st) being ploughed in, and it will be in a nice mees next spring if the weather keeps mild for another month. We sadly want a good "broad-share" of some kind to pare off the top two inches of the land; whereas, now, we are obliged to use the plough and then the grass is buried just deep enough to grow again. We call the process in England "paring" or broad-sharing, and a team will get over at least twice as much ground with our implements as with a plough.

**Boxes.**—One of the essayists, in the late competition for agricultural crops, speaks of the *cattle boxes* as being of

German origin. Would he kindly let us know his authority for this? We used them for fattening beasts as far back as 1849, and we heard of them as being employed, at least 5 years before that, by Mr. Warnes, Trimmingham, Norfolk. If properly constructed, not only do the beasts thrive therein to perfection, but the manure is preserved in the most exquisitely complete fashion; for the animal being free to walk about, the pressure of his heavy carcass is felt everywhere, over every square-inch of the bedding, and neither is the smell of escaping ammonia ever in the least degree perceptible, nor is the least waste by leakage possible. The plan is so simple: 4 boxes for ordinary beasts may be made by digging out a trench 34 feet long by 9 feet broad and 2 feet deep; this is to be surrounded by a good wall, of any kind so long as it is warm, and well roofed in, with a Louvre for ventilation in the middle and at either end. The 34 feet trench will allow an 8 feet box for each beast, the divisions to be made of bars—any rough stuff will serve—with room enough between them to allow the animals to put his head through and to retract it easily—very easily, for a little sudden contest of strength between two bullocks will soon frighten one of them, and, if he once finds his head in difficulties, you will, unless you make haste to release him, soon have a skin ready for stripping.

The manger in each box must be made so that it can be raised or lowered, as the bedding and dung are never to be removed until the box is full, which it will be generally in about three or four months. The bottoms should be laid with puddled clay.

No animal will lie down in filth if he can avoid it. The cattle come out after 4 months of box-feeding cleaner than when they went in. Once or twice a day, an armful of straw for litter, and for food too, if the beasts like to eat it, should be thrown down in the most used parts of each box. It is the perfection of business: watch the cattle and see the neighbours performing each the other's toilet! One licking the other all over the places he cannot reach himself. Perfect quiet reigns, if the feeding hours are well observed, and no well trained children are more docile in their nursery than are rough Highland Kyloes, or Welsh rants, after a week's confinement.

**Sweating barley.**—However good condition barley may be in when put into the barn or stack, every maltster knows that it will "take the steep" better—i. e., imbibe more water—if it has undergone a gentle sweat after being carried. If this is not gone through, the maltster puts the barley on the kiln for a few hours, at a moderate temperature; therefore, do not be in a hurry to thresh your malting barley, as the operation of kiln-drying, costing, at all events, some outlay in labour, the buyers will always be willing to pay more for grain that does not need it.

**Daddy-longlegs.**—A correspondent asks "what do daddy-longlegs develop themselves into?" This is the *tipula*, is it not? And becomes a wireworm, does it not? We have not a single work on entomology, and our memory is hardly what it was; though at 72 years of age, we cannot complain much of its weakness.

**Green-manuring.**—A very sensible farmer, writing in *Hoard's Dairyman* on this subject, speaks as follows:

"**GREEN MANURES.**—Any man with the average amount of human nature, feels pleased when the correctness of his opinion is confirmed by high authority. Especially is this the case when he has been one of an apparent minority. This pleasure has just been mine. Within a week I have come across the reports of the results of work of some experiment stations in plowing under green crops for fertilizing the land. Each and all condemn the practice as wasteful. Just how anyone could figure out a profit from plowing in a heavy crop of green clover, for instance, instead of curing it and feeding it to a respectable cow, sheep, or hog, and then plowing in the manure resulting from the process, has always been a mystery to me. I have been much inclined to the opinion that the guilty man never did much figuring on the subject. My difficulty has been, and is, to get enough clover to feed, and I should as soon think of buying cotton-seed meal, at \$25 per ton, to plow in for manure, as to turn under clover. Nevertheless, not ever having tried the experiment I should have hesitated to condemn the practice, but now that the matter has been subjected to investigation and experiment, and the results accurately noted by competent men, I think readers of the *Dairyman* should be advised of the particulars before repeating the practice. Logicians wisely warn us against the assertion of a universal negative, and doubtless we are not justified in asserting that the use of green crops as manure is never true economy, but—figure on it before you try it again, my friend. You can easily find the necessary information on which to base a close computation."

"**Bogus**" Butter is being made in the State of Illinois after a pleasant fashion. Milk is subjected to a high temperature, and both cream and curd are taken from it. The commissioner of internal revenue being applied to, he decided that as it was not "a sophistication of butter and other substances not the product of pure butter or milk"—which strikes us as rather an awkward formula—"it is not a violation of the law to sell such a compound." Of course the American agricultural papers are up in arms about it, and think that, "in the interest of the purchasing public, a State-law should be secured, classing the new (old) compound with adulteration and forbidding its sale." Is anything gained by false statements? The "new compound is not sold as pure butter; and lots of the inferior dairy-butter has plenty of curd in it. One would think that, provided this "new compound" would keep for a reasonable time, it would be in the interest of the purchasing public that it should be at their service if they want it. If this, oleo-margarine, or any other commodity be offered for sale as anything but what they really are, then, forbid their sale by all manner of means.

Lambs are weaned here about the first week in August, and a very good time too, as it gives the ewe time to recover her condition before she is put to the ram. We observe that a writer, in a States' paper weans his lambs "when the sign is in the feet." Now Richard Dean, our instructor in the art of ferreting rabbits, some 60 years ago, taught us that rabbits would not bolt unless "the sign was in the feet." What mystic connection exists between the weaning of lambs and the bolting of rabbits, it would puzzle Mrs. Besant and Percy Sinnott to explain.

**Pease and clover.**—We do not think that any artificial manure will do any good on pease or clover, except perhaps, plaster. A regular course of good farming is the best thing for them. Top-dressing the young seeds the first autumn with well rotted dung is our English practice, but superphosphate, bone-dust &c., we prefer to apply to the root-crop.

**Ground phosphate-rock.**—We observe a statement in an exchange; the reference we regret to say is lost; to the effect that in certain experiments made last year on the relative values of different artificial manures, "the results seem to show that mineral phosphates untreated, no matter how finely ground, have little or no effect as a fertiliser, and that the effects observable, where nitrate of soda and wood-ashes are used in conjunction with the untreated mineral phosphate, are probably due entirely to the action of these added fertilisers." The fact, proved by innumerable experiments in Britain, is that Carolina-rock, the coprolites of the green-sand formation, and other non-crystalline forms of phosphatic rock, are, when finely ground, a most valuable manure, though of course not so rapid in their action as the soluble form of phosphoric acid found in the same rock when dissolved in sulphuric acid; but that the crystalline form, such as our apatite, is, as the late Augustus Voelcker, chemist to the R. A. Soc. of England, A. P. Aitken, chemist to Highland and Agricultural Society of Scotland, and Sir John Lawes, wrote me word in December, 1882 (v. p. 113, Journal of Ag. for that year): "It is in results, when not dissolved in acid, equal to the no phosphate plots. . . farmers should be warned not to use it in its undissolved state... it would indeed surprise me to hear that it succeeded better in Canada than it has done here." But if any one wishes to try to grow turnips or swedes with artificial manures alone, the addition of, say, 300 lbs. of finely ground Carolina-rock or coprolite, an acre to the superphosphate, &c., used, will prove very useful towards the end of the season, when the powers of the more soluble fertilisers have been mostly exhausted; and if the phosphoric acid in the mineral phosphate has not been entirely utilised by the growing crop of roots, it will not prove useless to the succeeding crops of the rotation.

As for the effects of the wood-ashes, spoken of in the passage cited, they were probably due to the phosphoric acid contained in them, for, as we have mentioned previously in this periodical, we have grown a fair crop of turnips with no other manure than about 30 to 40 bushels of lixivated ashes; the potash having of course been almost entirely washed out of them, the result can only be attributed to the phosphoric acid.

**Guernseys.**—Two years ago, a propos of the Guernseys at the Montreal Exhibition, we wrote as follows: "As to the place assigned to the Guernseys in the prize-list, we shall only say that we should hardly have dealt with them as the judges did." This year, at Toronto, the fine blood of the late Sir John Abbot's herd, now the property of Mr. McNish, of Lyn, Ont., shone out in its full splendour, as the following extract from report in the *Farmer's Advocate* will show:

"W. H. and C. H. McNish, Lyn, had the first prize bull-calf, and the first prize cow; J. N. Greenashiels,

Danville, Que., won second and third prize for cow, Messrs. McNish taking first prize for herd, and Mr. Greenashiels second. After all, the herd-prize is the great test of merit.

**Cheese.**—According to the *Farmer's Advocate*, the Quebec cheeses exhibited at Toronto "showed good workmanship, and scored high in texture, quality, and finish, but were very much lacking in flavour. They seemed to have a flavour peculiar to themselves, which could be noticed by smelling, but was more noticeable by tasting, invariably leaving a rank, bitter taste in the mouth." All the prizes were given to Ontario cheeses, and the lion's share to Western Ontario.

**The Phylloxera.**—It does not appear that the \$6,000 prize offered by the French government for the discovery of a means for effectually destroying the phylloxera and ridding the vineyards of this scourge, has yet been claimed under the terms offered. Our consul at Bordeaux says that flooding the vineyards temporarily with water, a thing which is impracticable on steep hillsides, has shown the best results. Treating the roots also with sulphureted carbon is finding favor with many. Just as land has got clover-sick with us, under a four-course shift, so it is evident that any vegetable production may be grown till nature itself cries out against it. We almost find it so in our own hop fields.

*Eng. Ag. Gazette.*

**Marvels of color from coal tar.**—Writing about that marvellous color producer, coal tar, a writer in *Longman* reminds us that it is only thirty-six years ago Perkin 'gathered up the fragments' in coal tar and produced the beautiful mauve dye. Now, from the greasy material which was considered useless is produced madder, which makes coal tar worth a hundred pounds a ton. This coloring matter alone now employs an industry of £2,000,000 per annum. One ton of good cannel coal, when distilled in gas retorts, leaves twelve gallons of coal tar, from which are produced a pound of benzine, a pound of toluene a pound and a half of phenol, six pounds of naphthalene, a small quantity of xylene, and half a pound of anthracene for dyeing purposes. According to Roscoe, there are sixteen distinct yellow colors, twelve orange, thirty red, fifteen blue, seven green, and nine violet, besides a number of browns and an infinite number of blendings of all shades. — *London Daily News.*

**Science as an aid to agriculture.**—Mr. Warrington, one of the best known and most modest (*O, si sic omnes*) of all the English agricultural chemists, has been lecturing lately the above subject. His idea is, that agricultural science should mean the best knowledge of the day on the subject of agriculture, and that a farmer will surely do well to obtain its aid in all his operations; a position no one will quarrel with. But when he goes on to propose that a complete agricultural library of agricultural and horticultural books should be formed, by the Board of Agriculture; a staff of officers representing all the sciences connected with agriculture, with laboratories for their use, appointed; &c., &c.; we feel sure that his proposal will not be appreciated by the English farmers as a body; and not only because the outlay of public funds

would in their opinion be too large, but because they have seen enough of the waste of funds devoted to this matter in other countries to feel very uncertain as to the advisability of the proposal being carried out.

The investigations carried on by the Department of Agriculture at Washington cost not less than \$300,000 a year, and the National Government contributes \$750,000 a year towards the expenses of the fifty-five experiment stations, which also receive considerable sums from the several States Governments. We do not think the American people get an adequate return for this large expenditure. "If," says the *English Agricultural Gazette*, the organ of the more advanced English Agronomes, and a most thoroughly unprejudiced and practical paper; "if agricultural science as been advanced to any considerable extent by the investigations of the Central Department, we should be glad to be informed of a few points in proof. As to the experiment-stations, with a few exceptions, their emanations are among the most striking examples of "much cry and little wool" that we can call to mind. Many of their trials are of the most trivial description, and not a few are intended to throw a light on questions settled a generation or two ago in this country." And then follows a most outting indictment of the uselessness of these costly establishments to the American farmers in general. "What have they learned of any importance from their endowed teachers in agricultural science to help them in their farming? Very little indeed, so far as one may judge from statements relating to their practice, or from articles and correspondence in their papers. Judging from some of these publications, we should say that American farmers, as a body, are almost as ignorant of the manurial requirements of crops, and the constituents of the manures they buy, as the most benighted peasantry in a country devoid of endowed scientific teaching. The best work done in the States is in relation to the feeding of animals, and Mr. Warrington says that the results of some digestion experiments have been published, thus obviating the necessity of relying solely on the German tables. Would he rely upon these American tables? We venture to doubt it; for, as a rule, American experiments appear to us to have been conducted in a slipshod manner, on too small a scale to inspire confidence, and without sufficient uniform repetitions to entitle their results to credit."

We reluctantly confess that our frequent perusal of the bulletins sent to us from the Department at Washington has landed us in the same state of distrust of the value of the institutions from which they emanate as above expressed by the paper we have quoted from.

**Lathyrus Silvestris.**—This forage plant is now well known in England, but is not considered superior to vetches. As for the *Sacaline*, we hear nothing about it, good or bad, but arguing from the silence observed, we fancy that it has not been a desirable acquisition as a *foeder-plant*, though we should feel inclined to try it as a *wind-break*.

Estimate of the world's wheat-crop in the years 1888 to 1895, inclusive:

1895.....	305,795,000
1894.....	318,607,000
1893.....	309,192,000
1892.....	390,448,000

1891.....	293,187,000
1890.....	279,864,000
1889.....	269,113,000
1888.....	281,344,000

The above is from Dornbusch's list, and is in quarters of 8 bushels measured. The United Kingdom's production during the same years was:

1895.....	5,000,000
1894.....	7,588,000
1893.....	6,364,000
1892.....	7,597,000
1891.....	9,343,000
1890.....	9,499,000
1889.....	9,485,000
1888.....	9,321,000

MARK LANE: PRICES CURRENT; OCT: 14th

WHEAT, per 504 lbs.; British s. s.	
White.....	25 29
Red.....	24 27
Household flour per 280 lbs...	25 —
Barley per 8 bushels.....	—
Malting.....	30 38
Grinding.....	16 21
Oats, English per 8 bushels...	—
White pease.....	32 36

FOREIGN.

Wheat - Manitoba.....	27 28
Canadian white pease.....	27 —

London Cattle market, Oct. 14th:  
Milch cows, per head. £15 to £22 10s.

BEASTS.

Herefords per stone of 8 lbs..	s. d.
Welsh ( <i>runts</i> ) " " ..	4 7
Shorthorns " " ..	4 4
Fat cows " " ..	3 6

SHEEP.

Small Downs " " ..	6 0
Half bred " " ..	5 6
Canadians " " ..	4 6
Calves " " ..	5 2
Pigs " " ..	4 0

BUTTER.

Fresh, (Finest factory) per doz. lbs.....	s. s.
English Dairy butter, fresh...	14 16
Irish (creamery).....	11 1
Danish .....	12 2

CHEESE.

Cheshire per 112 lbs.....	74
Cheddar, finest .....	56

BACON.

Irish.....	55
Canadian .....	46
Hams, Danish.....	54
American.....	54
Irish, small.....	98

HAY, per load of 2016 lbs.....	
Prime meadow.....	90
" clover.....	100
STRAW, per load 1296 lbs.....	
Best .....	38
Hops from 40s to 105s. per 112 lbs....	

REVIEWS

**Cookery;** By Amy G. Richards, of the Montreal Cookery School: E. M. Renouf, Montreal; 1895. (\$1.25.)

We do not eat well in this province of Quebec. Smearing the bottom of a frying-pan with fat or rancid lard; breaking a dozen eggs into it, and putting them on a blazing stove to cook at their will: that is not likely to turn out an appetising dish. In fact, the cookery in country inns and private houses is detestable, and hard-

(1) Extra fine, any prices. Where only one price is mentioned, it is the highest quotation.—Ed.



ly any improvement over the practice in the days of our mediæval English ancestors, when all the *entrées* or "made-dishes" were composed of meat or fish "hewed into gobbets," or "ground into dust," and after being boiled into a kind of mush with broth, eggs, and milk, were flavoured with an indiscriminate mixture of salt, sugar, ginger, pepper, cinnamon, cloves, and all sorts of herbs.

Wherefore, we rejoice greatly when any one who is mistress of her subject, as the author of the book mentioned at the head of this article undoubtedly is, undertakes to enlighten our people on this important matter.

For it is an important matter, considering that the proper preparation of food not only promotes health, but is highly conducive to the increase of cheerfulness and good humour.

Miss Richards has been for some years at the head of the School of Cookery, whose head quarters are in St. Catherine Street, Montreal.

Not only do ladies of the wealthy classes attend her demonstrations, but cooks, who are anxious to improve in their business, frequent the school in considerable numbers; and we hear that, this winter, pains will be taken to attract the attention of our poorer sisters, who, if they only knew and would put in practice the secrets that nine French women out of ten are familiar with, would not only find their husband's wages able to furnish a far better provision of palatable food, but would infinitely improve the temper and disposition of the household while passing the long winter evenings by the not too cheerful coal-stove. See, on this subject, Brillat Savarin's "Physiologie du goût," a book very well worth reading by all who can enjoy sound sense, and brilliant wit, conveyed in a most enchanting style.

This little book does not profess to be an original work, but as far as we have looked into it is a happy selection of receipts gathered from the works of both English and French authors. Here and there, we note certain counsels that we are inclined to reject; for instance, we are told to put salmon into lukewarm water; now, all fish of the salmon tribe, from the White-fish of the Lakes to the Brook-trout, should be plunged into strong salt and water in a tremendous state of ebullition, and if the fish is in slices, the water should be allowed to boil up again between the insertion of each slice. By this treatment, and only by it, can the end between the layers or flakes of the fish be rendered firm. As we had in England, on our family's estate, on the banks of the Severn, a salmon fishery that gave us a supply of this superb fish daily, from February 1st to August 31st, we had to try all sorts of ways to attain perfection in preparing it, and the above plan, that we ourselves gathered from Sir Humphrey Davy's "Salmonia," which, by the bye, ought to be *Salmoniana*, was, after many an experiment, decided upon as the most perfect.

The observations upon frying are particularly good. If the medium, be it fat, dripping, or oil, is not as hot as it can be made without burning, no good frying can be done. Frying must involve a deep pan with enough fat, &c.; smearing a pan with butter, and cooking fish, &c., on it, is *sauting*, from the French *sauter*, to jump.

Not to find fault, but to supply an omission, we give Sydney Smith's salad sauce; we quote from memory, but our version may be depended upon as pretty accurate:

"The pounded yellow of two hard-boiled [eggs].  
The muse advises, and your post begs.  
Next, *once* with Durham mustard fill the [spoon];  
Distrust the condiment that bites so soon  
But deem it not, thou man of herbs, a fault  
To add a double quantity of salt.  
Twice the full spoon with oil of *Lucca* [crown],  
And *once* with vinegar, *procured from* [Town].  
Let onion atoms lurk within the bowl,  
And, scarce suspected, animate the whole.

Bar the onions, the sauce is perfect: what man endowed with a discriminating palate would defile the delicate flavour of a Cos lettuce with onions? He who should so far err, deserves to be kept awake by indigestion for a

*Lucca* oil is the only olive oil used at the best tables, and Crosse and Blackwells malt vinegar is good enough for anything.

We congratulate the publisher on the "toilette" of the book; paper, print, and binding are all excellent of their kind; and the price puts it within the reach of most purses.

## LAWES ON MANURES FOR THE TURNIP.

(By the Editor.)

Judging from the analysis of the turnip, the specific manure for this crop should be an alkali of some sort rather than phosphoric acid; for root and top contain a proportion of alkalies to phosphoric acid of five to one. Is it so in common practice? By no means, and here is another case in which practice deviated theory. The striking influence of all kinds of phosphates on the swede or the turnip was well known to farmers long before Baron von Liebig wrote on the subject. It is true that, in many parts of England, wood ashes were used for catch-crops of turnips, but the produce from the ashes was really due to the phosphoric acid contained by all incinerated wood, particularly beech, rather than to their potash. We ourselves have shown that lixiviated ashes produce quite as many tons of turnips to the acre as ashes undeprired of their potash, but this series of experiments was tried on land which had been regularly manured with dung for many previous rotations, and where, therefore, there was present an abundance of potash.

Still, as Professor Liebig, in his Letters on Agriculture, persisted that the Rothamsted experiments were wrongly conducted, and that the deductions drawn from them were erroneous in the highest degree, Lawes and Gilbert were induced to repeat the experiments on a larger scale, with a view to the refutation of Liebig's assertion that: "It is certain that this incessant removal of the phosphates (by the sale of flour, cattle, &c.) must tend to exhaust the land and diminish its capability of producing grain. The fields of Great Britain are in a state of progressive exhaustion from this cause, as is proved by the rapid extension of the cultivation of turnips and mangels, plants which contain the least amount of the phosphates, and therefore require the smallest quantity for their development." And, as a commencement of the proof that the professor was utterly mistaken in his theory of the manure for turnips as we have seen he was in his theory of the manure for wheat, let us look at the following table, in which is given the amounts of bulb grown on the experimental plots at Rothamsted from 1843 to 1850, both years inclusive. They are divided into:

Years.	Plot continuously unmanured.				Plot with superphosphate alone every year.				Plot with superphosphate and mixed alkalies.			
	Tons.	cwts.	qrs.	lbs.	Tons.	cwts.	qrs.	lbs.	Tons.	cwts.	qrs.	lbs.
1843	4	3	3	2	12	3	2	8	11	17	2	0
1844	2	4	1	0	7	14	3	0	5	13	2	0
1845		13	2	1	12	13	3	12	12	12	2	8
1846					1	18	0	0	3	10	1	20
1847					5	11	0	1	5	16	0	0
1848					10	11	0	8	9	14	2	0
1849					3	15	0	0	3	13	2	8
1850					11	9	0	0	9	7	1	12
Totals.					65	16	1	1	62	5	1	20
Means.					8	4	2	4	7	15	2	20

First, the continuously unmanured plot;

Secondly, that with a large amount of superphosphate of lime each year;

Thirdly, that with a very liberal dose of potash, with some soda and magnesia (alkalies), in addition to superphosphate of lime. The superphosphate was entirely free from nitrogen, being made by the action of sulphuric acid on burnt bonedust.

After three years consecutive growing of the same plant on the same land, the crop became not worth weighing. Eight successive crops of turnips manured with superphosphate of lime alone yielded an average of 8½ tons of bulb. The addition of a large dose of alkalies—much greater than could be removed by the crop—to the superphosphate had no effect at all on the average yield; for the diminution of the crop by a mean of about half a ton— $\frac{1}{16}$  of the whole may be disregarded.

The deduction we should make from the above series of experiments is this as the value of the swede or the turnip in feeding cattle is due—as I have often insisted in this publication—not alone to the contents of the bulb, as determined by chemical analysis, being converted by the animal into its own flesh, fat, &c., but to some, as yet unknown, special agency which they exert in developing the assimilative processes of the animal; so, I believe the effect of the phosphoric acid on the swede or turnip is due to some special agency which develops the assimilative processes of the plant. And this is the more likely, because in the case where the superphosphate is immediately neutralised by the large dose of alkalies, we see that the efficacy of the manure is thereby reduced. And again, the effects of the phosphoric acid, as such, cannot be due merely to the liberation of the alkalies of the soil; for in that case we should expect that the artificial dose of these would at least have increased the crop.

Hence, we must conclude that phosphoric acid, though it forms so small a proportion of the ash of the turnip, has a very striking effect upon its growth, when applied as manure; and it is equally certain that the extended cultivation of root-crops in Great Britain cannot be due to the deficiency of this substance for the growth of grain, and to the less dependence upon it of the root-crops, as supposed by Liebig.

And what, now, are the conclusions we draw from what we have seen of the effects of nitrogen as a manure for wheat, and of phosphoric acid as a manure for swedes and turnips? First, that, taking into careful consideration the tendency of all experience in practical farming, as well as the collective results of the Rothamsted investigations, it is pretty certain that the analysis of a crop that is sold off a farm affords no direct guide to the

nature of the manure required to be provided for its increased growth from sources extraneous to the home manures of the farm, that is to say, artificial manures; or, in other words, if land is well and regularly manured with the dung of the stock kept on the farm nitrogen for the grain-crops, and phosphoric acid for the root-crops will be the only imported plant-food required. (1)

## Correspondence.

Richmond, 16th Sept. 1895.

To the Editor of  
THE AGRICULTURAL JOURNAL.

Dear Sir,

I should like to bring to the notice of the farmers, who are readers of the Journal, a few of the exhibits at the Richmond and Sherbrooke Exhibitions.

I will only mention a few of the parties that I am well acquainted with. Of course all the prize winners are mentioned in the different newspapers, but very few farmers know the parties, and imagine they are all great breeders or specialists, and that it is no use they themselves exhibiting.

Now the following prize winners belong to the class, styled—small farmers:

Mr. Robert Allen of Melbourne, took most, if not all of the first prize in Leicester owes, rams, and lambs; Mr. Franks, of the same place was a very successful prize winner; Messrs Stephens, Lyster and others of the same class were prize winners in cattle, pigs, &c. Mrs. Garone, of Melbourne, was a more than usual prize winner in Dorking fowls; a very favorite bird of mine; as also of the English housewife: (and of the Editor).

Highest scoring pair of Dorking chicks; silver cup.

Highest scoring pair of fowls on exhibition; diploma and \$2 00

Best pair of Silver Gray Dorking Chicks; special prize.

Best pair of Silver Gray Dorking Chicks; 1st prize.

Best breeding pen of Dorking; 1st prize.

My object in asking you to notice these prizes in your journal, is to show the small farmer that it is not necessary to be a specialist, or to be at any great expense, to be a successful prize winner.

The above prize winners have

(1) The use of nitrogenous manures for mangels, even where the dressings of farm-yard dung are superabundant, is and always been, a puzzle to me as far as regards the theoretical reasons for their adoption. As to their practical use, I have no hesitation in saying that any farmer who sows mangels without adding to the ordinary coat of dung a supply of at least 30 pounds of nitrogen, either in the form of nitrate of soda, sulphate of ammonia, or guano, is throwing away at least eight tons of his potential crop.—Ed.

gained their position, by a little extra care and selection in an economical way. They have done no more than what every farmer can afford to do, and should do. Every farmer cannot be a prize winner, but with a little care, selection, and proper feeding, he may vastly increase his income.

It is the same in all kinds of stock. Some farmers sending to the cheese factory realise forty dollars a cow; others not more than fifteen dollars.

These are facts, and you have only to visit the farms, to find out the secret of want of success; barn-doors down, or propped up with rail, and a general want of care all round; poor pastures, no green-crops for summer feeding, no corn for autumn, and many other things neglected, which neglect a small amount of labour would rectify.

Yours truly, AYLMER.

To A. JENNER FUST, Ed.

The above letter, from the venerable Lord Aylmer, hits a blot that we have many a time perceived but have hardly seen our way to obliterate.—Ed.

### Household-Matters.

In advising young girls who are coming to town in search of employment, I would say, take a situation as domestic help rather than in a shop or factory. In the former you have, as a rule, only one person to take orders from.

In a shop, you have the proprietor and the public too to please, and at first you find the salary very small, in fact not sufficient to pay for board and lodging for some time.

Factories are not to be thought of for young country girls, however fascinating it may sound to get nearly all the evenings free. The pay for this is small till they become exports in the business, and many girls who have tried it have found to their cost they are quite unable to bear the strain of it.

In the end they are obliged to give up and take domestic work, it being more suitable to a country bred girl; such being the case, let them be careful to take a place for which they feel pretty certain of being capable.

There is a well conducted "Home" for this purpose where employment, for respectable girls, can be found No. 2434 St Catherine Street, Montreal.

They have only to enter their names as wanting situations, and the matron will know at the sight of a girl what sort of one is suited to the applicant, thus saving much time and worry. At this place they can stay a few days and rest till they find what they want, and at very little expense. This home is not a charitable institution but has been established by ladies as a rest for those who have not much money to spare, and also to help those who wish to help themselves.

Let girls come with a determination to do their very best and they are sure to get on. Let them leave "soci" alone and remember they have for so many dollars a month taken upon themselves certain work, and try and do it the very best way they know how, never minding if they have to change their mode now and then to suit the desire of their employer. Town work and wages are very unlike country work; let girls try and not give way to bad temper when spoken to, but be firm and keep all signs of that to themselves.

Those who have been in the habit of depending on mothers to cover up any little short-comings will find it hard to be told of faults. Happy the girl who will take reproof kindly, and do better in the future, instead of giving way to temper, and may be losing a good situation.

Few people care to take girls who change places often.

**Curried rabbit.**—1 rabbit, 1 apple, 1 onion, 2 oz butter, 1 oz flour  $\frac{1}{2}$  lb. rice, 1 table spoonful curry powder, 1 cup of cream, 1 teaspoonful lemon juice  $\frac{1}{2}$  teaspoonful of salt, 1 pint stock.

Cut the rabbit into small joints, only using the best parts, the head and neck can go into the stock pot.

Wash, wipe dry, and dust over with flour.

Fry each joint all over in the butter, take out of pan and keep hot, chop the onions and apples up and fry after freeing both and coring the apples, fry a few minutes stir in the curry powder, and let it fry also. Now mix in the flour, add the stock; when it boils place in a stew pan with the joints of rabbit and simmer gently till the meat is quite tender.

When done add salt, lemon juice and cream, but do not let it boil after these ingredients are in.

Heap up on a hot dish, and send in a dish of boiled rice (dry) with it.

Every woman knows that house-keeping is growing less simple and more and more complex each year. There was a time in our history and the older of us can look back to it, when housekeeping was a pleasure rather than a burden. The kitchen was a study in simplicity; now it is fast becoming a bewildering of intricacies. The table was a pleasure; now it has become a care. A room was furnished in those times for comfort; now it is furnished first for show and then incidentally for convenience and comfort. The bedrooms were perfect heavens of inviting neatness, restful to the eye as well as to the body; now our sleeping apartments are what our drawing-rooms used to be. Our halls used to be halls; now they are practically rooms. The different departments of the home have not only increased in number, but in contents as well, and a woman who, years ago could rule a whole family comfortably, has now her hands full in properly governing even a single part of a home. We have in our domestic machinery what we call advanced. That is true, but have we really improved?

A home that professes to be well-regulated to-day is far more difficult to manage than was the same kind of a home fifty or sixty years ago. For a woman to be a housekeeper nowadays over such a home as a man will come to and remain in, is no small matter. The task is a difficult one, and is growing more difficult every day. The simpler methods of the past cannot be applied to the present. We have progressed in the art of home-making; things that were regarded as luxuries a score of years ago are now looked upon as necessities. But simplicity of methods has not kept pace with our growing wants. The easy part of the house is easier, but the hard part of the house has grown harder. And upon the women, of course, falls the burden of the latter. Complexities have followed almost every advance we have made. Science and mechanism have come in and

made, in a sense, certain specific arts in housekeeping easier of accomplishment. But while these mechanical contrivances have decreased labor, they have also been the means of introducing such a multiplicity and variety that care is augmented in far greater proportion than labor has been lessened. Improvements are often as dangerous as they are beneficial. While they may remove manual labor they often bring mental exercise, and deceive us into undertaking more than we can well carry out. Time is a good thing to save, but not at the expense of either mental or physical strength. The simpler a home the less is the strain; the more elaborate we make it the greater is the care, no matter how many time-saving devices we may call to our assistance. Somebody must supervise, and supervision is often far more wearing than actual work.

**Caring for What the World Says.**—Why will you keep caring for what the world says? Try, O try, to be no longer a slave to it! You can have little idea of the comfort of freedom from it—it is bliss! All this caring for what people will say is from pride. Hoist your flag and abide by it. In an infinitely short space of time all secret things will be divulged. Therefore, if you are misjudged, why trouble yourself to put yourself right? You have no idea what a great deal of trouble it saves you. Roll your burden on Him, and He will make straight your mistakes. He will set you right with those with whom you have set yourself wrong.

Here I am, a lump of clay; Thou art the potter. Mould me as Thou in Thy wisdom wilt. Never mind my cries. Cut my life off—so be it; prolong it—so be it. Just as Thou wilt, but I rely on Thy unchanging guidance during the trial. O, the comfort that comes from this!—Gxn. GORDON. F. A.

**A time-table for baking.**—Beans, 8 to 10 hours.

Beef, sirloin, rare, 8 to 10 minutes per pound.

Beef, sirloin, well done, 12 to 15 minutes per pound.

Beef, long or short fillet, 20 to 30 minutes.

Beef, rolled rib or rump, 12 to 15 minutes per pound.

Biscuit, 10 to 20 minutes.

Bread, brick loaf, 40 to 60 minutes.

Cake, plain, 20 to 40 minutes.

Cake, sponge, 45 to 60 minutes.

Chickens, 3 to 4 pounds, 1 to 1 $\frac{1}{2}$  hours.

Cookies, 10 to 15 minutes.

Custards, 15 to 20 minutes.

Duck, tame, 40 to 60 minutes.

Fish, 6 to 8 pounds, 1 hour.

Gingerbread, 20 to 30 minutes.

Graham gems, 30 minutes.

Lamb, well done, 15 minutes per pound.

Mutton, underdone, 10 minutes per pound; well done, 15 minutes per pound.

Pie-crust, 30 to 40 minutes.

Pork, well done, 30 minutes per pound.

Potatoes, 30 to 45 minutes.

Padding, bread, rice and tapioca, 1 hour.

Padding, plum, 2 to 3 hours.

Rolls, 10 to 15 minutes.

Turkey, 13 pounds, 3 hours.

Veal, well done, 20 minutes per pound.

**Recipes from old Virginia.**—Halibut

Steaks and Sauce: Lay the steaks for

an hour in iced salt and water; wipe

dry, coat with cracker dust and beaten egg and fry a nice light brown. Beat 4 tablespoonfuls of butter light, with strained juice of a large lemon; mix with this and whip to a green cream 4 tablespoonfuls finely chopped parsley. Fill the emptied halves of small lemons with this and garnish the dish with them, serving one with each portion of fish.

**Rebel Pudding:** One pint of fine bread crumbs in 1 pint of milk, 1 cup white sugar, yolks of 4 eggs, quarter of a pound of butter and lemon or vanilla extract. Whip whites of the eggs stiff with pulverized sugar; spread over the pudding a layer of jelly, then the whites of the eggs, and replace in the oven for a minute or two. To be eaten cold with cream.

**Sardine Toast:** Drain, skin and remove bones. Place on a hot dish in the oven for ten minutes, and then place layers of split sardines on slices of hot, well-buttered toast. Dust with pepper and serve hot with a sprig of oress and slice of lemon.

**Boiled Apple Dumpling:** One quart flour, 1 measure each acid and soda, 1 teaspoonful salt Rub into flour a piece of butter or nice lard size of an egg and 2 quarts finely chopped apple. Make into dough with sweet milk. Boil in a bag 1 hour and 10 minutes. Slice and serve with cream sauce. The water must be boiling when the dumpling is put in and not allowed to stop boiling an instant.

**Lobster à la Newburg:** Mash smooth the yolks of 4 hard-boiled eggs with half a pint of cream. Into 4 ounces of softened (not melted) butter stir 2 even tablespoonfuls flour and add to it the yolks and cream. Now add 1 pint of lobster meat picked fine—canned lobster will do—and place all in a stewpan over another vessel of boiling water until the whole thickens.

**Mock Terrapin:** Fry a calf's liver a nice brown. Hash it and dust thickly with flour, mustard, pepper and a little salt; add 2 hard-boiled eggs mashed fine, lump of butter the size of an egg and a teacupful of water. Boil up a few minutes. Cold veal is also nice cooked thus.

**Quince Syrup for Hot Cakes:** Grate three large quinces, add 3 lbs of granulated sugar and a quart of water. Let it simmer slowly for two or three hours after having brought it to the boiling point. (1)

**Chicken and Mushroom Patties:** Cut fine the meat of a tender chicken boiled. Chop a cupful of canned mushrooms, and mix with the chicken. Into a saucepan put a tablespoonful nice butter; add 2 level tablespoonfuls flour; and when smooth, a gill each of hot milk and cream. As soon as this boils, add the meat, and season with salt and pepper; and when all is very hot, add the yolks of 2 well-beaten eggs. This is prettily served in little baskets made of lettuce leaves tied with narrow ribbons, or in fancy paper cases.—Mrs. W. L. Wise.

F. A.

**Mr. Moore's Lectures.**—We note with pleasure that the lectures on farming given by our correspondent Mr. Geo. Moore are increasing in popularity and being well received and appreciated, as one or two of the excellent list of testimonials will show.

Brome Corner,  
County of Brome.

The representative farmers in this vicinity listened with marked attention, Mr. Moore's treatment of the important subjects connected with our dairy in-

(1) Curious how little the exquisite flavour of the quince is appreciated here.—Ed.

terests, and the successful cultivation of the soil, convinced me that the Hon. Commissioner of Agriculture had made no mistake in securing his services.

ORA. P. PATTEN,  
Chairman of the meeting.

Philipsburg,  
Missisquoi County.

Mr. Moore spoke easily sensibly, and sometimes humorously, enforcing his wise lessons with witty truths, with strong expression of common sense; the lecture was very satisfactory.

J. H. HILLS JUNR,  
Mayor of St. Armand's  
Chairman of Meeting.

Venice, Co. of Missisquoi.

Mr. Moore delivered a grand lecture that was highly appreciated and will have a tendency to improve farming in many ways.

E. M. WHEELER, Chairman.

We understand that Mr. Moore is now on a lecturing tour to Gaspé and will subsequently visit Ottawa and other counties—may his success continue.

## MONTREAL EXHIBITION 1895.

Montreal, Sept. 21st 1895.

TO THE HON. LOUIS BEAUBIEN,  
Commissioner of Agriculture & Col.  
Province of Quebec.

Honorable Sir,

In accordance with your instructions I visited the Exhibition of the Montreal Exposition Co. held at Montreal, September 12th to 21st and have the honor to report, that:

It is conceded on all hands that the Exhibition in every department is superior to any that has been held in Montreal. Not only the increased number of the exhibits but their superior quality show that farmers are appreciating, and acting upon the efforts made by the department for the advancement of agriculture and signs of more careful cultivation, and of more attention to the raising and feeding of stock are abundantly exemplified.

The dairy display is considered by persons well qualified to judge, larger and better than that of any previous occasion. There are upwards of 600 cheeses on the tables, all ranking high in quality. Brome County has maintained its position by taking the first prize for its Syndicate of 24 factories.

Butter is also well represented. The Revd Trappist Fathers of Oka, exhibit some of their cream cheese which is growing in popularity and for which they received a diploma.

Roots and grains are remarkable for their excellence, and although there are many fine specimens of mangels and turnips from Ontario, the Province of Quebec stands well to the front in respect to quality, and our farmers have succeeded in securing most of the prizes. Carrots are not so good as we have seen, the peculiar changes of weather we have experienced this summer no doubt being the cause. Potatoes are exceptionally fine, and the same may be said of onions.

With such a season as we have had, nothing but the most pains-taking and intelligent cultivation could have produced such results.

The horticultural and pomological department is far in advance of any previous gathering. The directors of

the Horticultural and Pomological Society have done their best to make their portion of the Exhibition a grand success, and grandly have they accomplished their object.

The plants and flowers are admirably arranged, despite the fact that the space is insufficient, and bespeak the skill and industry of the gardeners most creditably.

Fruits, especially apples, are very numerous and fine. It is doubtful whether a finer table of apples, taking quantity and quality into consideration has ever been exhibited under the auspices of the association.

The principal prize for the large collection was taken by Mr. Knight of Catarqui, it was very fine but contained many varieties that are not suited to our climate, and in this respect was rather misleading to would be orchardists. Would it not be well for the association, while offering prizes to all competitors, to have another class limited to the Eastern part of our Province?

The newer Russian apples do not seem to contain much to recommend them as compared with old standard sorts. They are not remarkable in appearance either as to form or colour with one or two exceptions, and are sadly deficient in keeping varieties, many of the specimens exhibited being already in a state of decay.

New seedlings were presented by Messrs. McKenna, of Côte des Neiges, and Mr. R. W. Shepherd, of Como. Mr. Shepherd's seedling secured the prize and well merited it.

The apple is not too large or coarse, is of good form and colour, and evidently a long keeper, firm, and juicy. Its keeping qualities recommend it as very valuable acquisition to our provincial collection which is deficient in hardy, late keeping varieties. Mr. Shepherd's collection to which fourth prize was awarded was also a very interesting exhibit and Mr. Hugh Brodie's second prize for 12 varieties well illustrated what could be done by apple growers in this Province.

Wealthy was conspicuous for its beauty in every collection, and a plate, perfect in size, form and colour, shown by Mr. W. R. Ramsay, was justly placed first.

Revd Canon Falton of St-Vincent de Paul showed some very fine Blue Pearmains.

To show the necessity of paying attention to the winter keeping sorts, while taking these notes I was asked by a shipper if I could tell him where he could buy a car load of good lower Canada winter fruit? I had to confess that I could not, and he said he had been enquiring for some days with a like result, and that if he could secure them, there was a splendid market for them on the other side provided they were grown in the Eastern part of Quebec.

Pears were not numerous or remarkable. Messrs Dun and Graves of Westmount had some fairly good plums.

Out-door grapes were well represented by local growers, and were generally fine and well coloured. Messrs. Ramsay, Somerville, Jack, Pattison, and Reid were among the successful exhibitors. In Mr. Pattison's collection was a fine looking black grape, "The Standard" with a Delaware flavour.

In-door grapes were scarcely as fine as usual.

The Revd Trappist Fathers of Oka exhibited some very fine young fruit trees, showing that with due care and attention, good, healthy and hardy trees can be grown in this Province, equally vigorous and more suitable for us than those propagated in the South or West.

A machine for removing large trees was on the ground from Messrs C. Watson & Co., of Montreal. Trees of considerable size can be easily transplanted by its use at any season of the year.

When they are in full leaf is not the worst time for their removal.

Some years ago I transplanted 20 large maples on the third of July, and by care as to damaging the roots as little as possible, thoroughly soaking them with water, once when planting, and heavily mulching them with stable litter, I did not lose a tree.

A still more severe test came under my notice three years ago. A M. Deschamps, of St-Pierre, Charlesbourg; took up 10 trees, birches, and maples, out of the bush while in full leaf; planted them near his house, and only lost one. The children's competition in the Horticultural Department deserves notice. It was a happy thought to interest the children by awarding prizes for plants grown by them, with which they had been presented by the society, and while they formed a most interesting feature, many a little one's heart was gladdened by their prizes and their taste well directed.

The most important lesson to be learned from the magnificent cattle display was perhaps the fact that the Ayrshires are established as the favourite Dairy cows. Here were 297 head of Ayrshires on show and not 50 of any other breed a most significant fact.

Another lesson as to the importance of good blood is given in the case of Mr. Hugh McLachlan's premier bull "Silver King"; this noble fellow distanced all competitors himself, and his progeny carried away many of the honours.

His son, a 2-yr-old bull 1st prize.  
A one year old bull, 1st prize.  
A half brother bull, 1st prize.  
Grandson calf, under three months, 1st prize.

Another calf, under six months, 1st prize.

Mrs. Jones was, as usual, head of the Jersey classes but some other good animals were shown.

M. E. P. Ball of Lee Farm came in first with his yearling bull, and, notwithstanding the keen competition, obtained three other prizes. His herd had made the circuit of the Fairs and were out of condition.

Is not this question of condition taken a little too much into account in making the awards? Is it not even easier to count the good points in a dairy cow when she is in a normal condition, than after she has been fed and pampered for the purpose of exhibiting her?

Then again *stocking* their udders! should it not be insisted upon that all dairy cows competing should be milked at their usual time?

Stocking is cruel, it is supposed to mislead the judges as to the milking capacity of the animal, which, when they know their business, it does not; and is therefore useless.

Guernsey cattle were not largely represented but contained some fine specimens, as also did Holsteins: both these breeds seem to be increasing in favour as milkers.

Of grade cattle, there were not many, thoroughbreds taking their place almost entirely, this may be a subject of regret, because there are some breeds that might be improved by judicious crossing, always supposing it were done with judgement and not indiscriminately.

The Normandy cattle sent by Mr. J. Beaubien of Outremont, were fine animals, and judging from appearances we may suppose that while producing a large quantity of beef their milking

quality would be good. The cow showing a splendidly developed udder.

The shows of sheep and hogs were equal to any part of the exhibition both in extent and quality and the poultry was not behind, every pen being occupied and a row of pens on the outside, the whole length of the building. The show of horses was equally good, a large number of the finest bred animals were there.

The beautiful pair of carriage horses belonging to Messrs. Osborne and Hardy were said by the best judges to be a very near perfection, and attracted universal attention by comparison with others as they were driven about the ground.

In implements and machinery, the Laval cream separator obtained the first prize. A curd mill was shown in the dairy building, and it is claimed that by its use the old method of breaking the curd is supplanted and that thus the whole of the butter fat is retained.

A circular hay rack for sheep, sent by Eugene Casgrain of P'Islet, is evidently a very sensible arrangement to prevent the waste of hay, and to give the sheep an equal chance to feed.

A very interesting exhibit was that of the Charlemagne Lumber Co., illustrating how well spruce lumber can be finished so as to take the place of other woods which are becoming scarce in the Province.

An excellent labour saving machine, where the farm is of sufficient extent, is the "Manure Spreader" from Mr. Jeffrey, of Montreal. It is claimed that it does the work thoroughly, spreading the manure more evenly than it can be done by hand, and very quickly, a load being easily distributed in a minute and a half.

Mr. Jeffrey has also one and two horse threshers, so arranged that there is no dust escaping, no side shaking, and no waste. Also new ensilage cutters and carriers (Ohio Standard) of simple construction, in three sizes, the cost of which has been taken into account, a desideratum, in as much as the expense of cutters and carriers is an objection in the minds of many, as to the adoption of the ensilage method of feeding.

Spring tooth Harrow, a great improvement upon that very useful implement is the one now made with a tilting lever, whereby the depth of the teeth run is easily regulated by the operator.

Mr. Vilas, of Cowansville, has some of his popular plows, which are made very light, yet strong and durable and of beautiful pattern, for work. Vilas' new hand seeders, corn huskers and cultivators have the advantage of being of simple construction and cheap.

Maxwell's of St-Mary's Ont., implements, especially the tilting cultivators, are well made, light to handle and decided improvements.

Massy Harris & Co and Frost & Wood have large exhibits of harvesting machinery, and Moody sends some potato planters and a digger, as to the working of which it would be difficult to form an opinion without seeing it in operation, but I may say that I think it will bear no comparison for complete and effective work with the one exhibited in Quebec last year by M. McLish of St-Foye. It is to be hoped that it will not be lost sight of. Messrs. Small of Durham received 1st prize for an improved sugar evaporator which is made to save time and fuel in the making of sugar. The inventor, asserts that with it only  $\frac{1}{2}$  the usual quantity of wood will be required with the present low price of sugar, anything that will simplify the pro-



ness of manufacture is of importance to those who have sugar orchards.

The "Dead look", or looked wire fence, set up on the grounds by the Jones' Locked wire fence Co., of Montreal, is doubtless the strongest and most durable wire fence yet introduced.

It has the great advantages of permanency, simplicity and cheapness, and there can be no danger to stock of injury or entanglement.

Spraying apparatus were not exhibited, which seems surprising, since spraying has been found to be so efficacious. It seems that a distributor of Bordeaux mixture or other liquid insecticides or fungicides has yet to be introduced.

M. Huot, of Charlesbourg, obtained a diploma for the beautiful collection of rustic garden furniture which he exhibited. Mr. Huot is to be congratulated for having introduced a new

bor of horrors, and a representation of the death chamber of poor murdered Mdo. Demors should be admitted, when all else was well calculated to raise the mind to a contemplation of the beauty and goodness of the world we are for a short time permitted to call our own.

Respectfully, &c.,  
Geo. Moore.

STATE OF THE CROPS.

All crops have been pretty well harvested by this time except roots and some corn. I advised farmers in my last notes to cut corn before the frost, but on this 9th of October there is some corn to cut yet! Why will people put up with such loss? the feeding value of the corn fodder can not be

making cider, and not over half of the trees bearing. They were sprayed 3 times with the Bordeaux mixture: not many spotted apples amongst them. The reports from all parts of the country where threshing has been done are very good, grain turning out better than expected.

FALL PLOUGHING.

Quite a considerable lot of fall ploughing has been done so far; splendid weather for such work, cool and dry. Only one association has advertised to hold a ploughing match. "The Chateauguay Valley" open to the district of Beauharnois for one class only—and before this appears in print many more will have taken place.

MONTREAL EXHIBITION

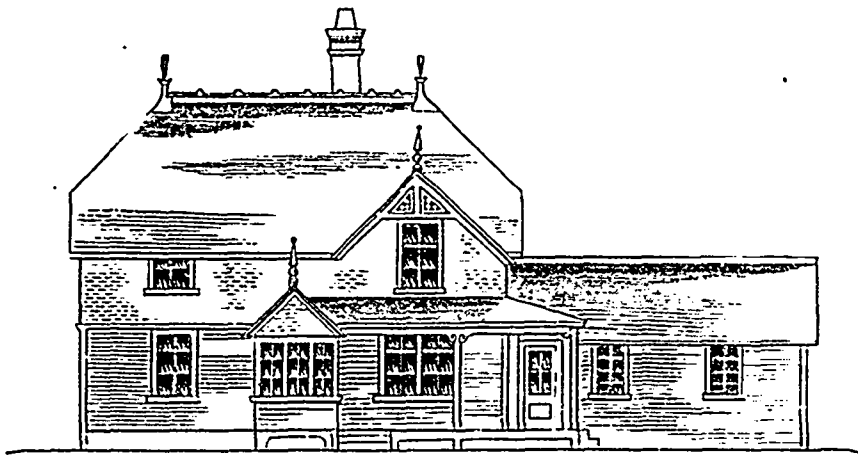
You ask writers to the Journal to give a few items in regard to the Ex-

marked improvement in the make and quality of our butter. Some lots scoring as high as 98½ out of a possible 100.

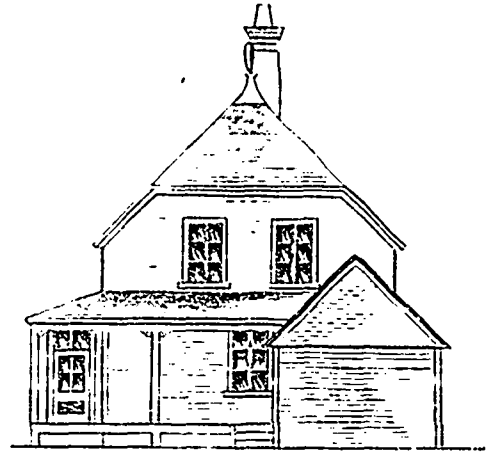
The show of cattle was also very fine, especially in the class of Ayrshires. Many who were present at the World's Fair said that the show of Ayrshires was better in Montreal than the show at Chicago. There were many fine specimens of the different breeds, in fact the tillers of the soil had everything of the best. Horses, cattle, sheep, pigs, fowls, grain, roots, apples, and fruits of all kind, along with the butter and cheese, made a fine display, had the manufacturers done half as well as the farmers it would have been a success.

Mr. Editor, I do not know whether you like praise or not, (1) I will only give you a little at first to see how it agrees with you. Your paper is gradually improving and I think the last

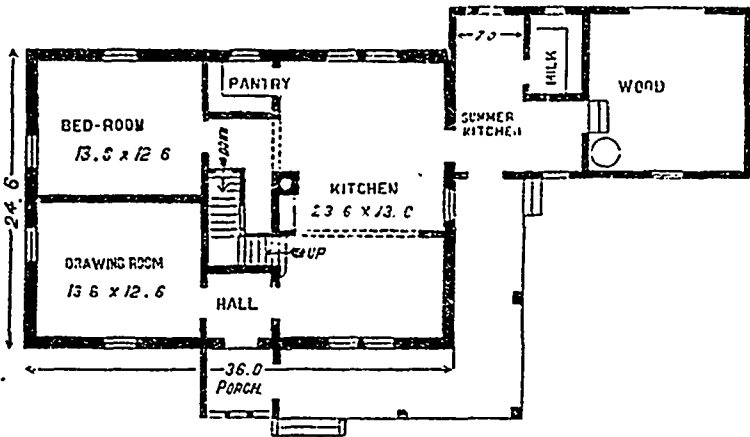
FARM HOUSE—CLASS "A"—DESIGN No. 1—\$800.



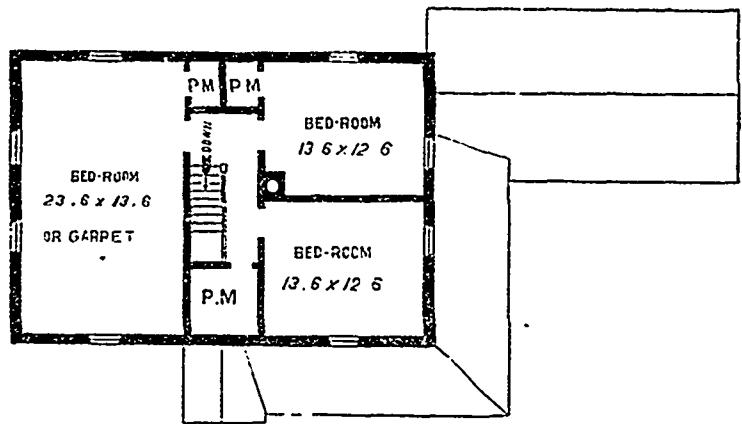
SOUTH SIDE.



EAST SIDE.



BASEMENT.



FIRST FLOOR.

feature into garden embellishments, and for his skill, ingenuity, and industry in turning to such good account the waste products of the bush.

It is gratifying to add that the arrangements to instruct and interest the public were complete, and in the horse and cattle parades placards were carried in front of each class, so that the veriest tyro could understand what he was seeing. There was a disposition on the part of the Directors to show that making money was not by any means their sole object; but that they were anxious to give an equivalent, and more, for the value received.

It is to be hoped that the day is not far distant when associations with an educational and ameliorating end in view, will not find it necessary to employ extra attractions (some of them of a degrading nature) to draw the masses, but that the Exhibition, as the worthy superintendant remarked, may be "pure and clean" and that no blot such as the miserable mock cham-

ber of horrors, and a representation of the death chamber of poor murdered Mdo. Demors should be admitted, when all else was well calculated to raise the mind to a contemplation of the beauty and goodness of the world we are for a short time permitted to call our own.

Potatoes did not suffer much with rot, they are nice and dry—but very cheap, 35 to 40c per bag of a bushel and a half, in Montreal, some places even less than that.

Roots, mangels have grown to a great size, some I saw at the Montreal Exhibition were more like cord wood, 8 to 10 inches in diameter and over 3 feet long. Turnips are very large also—some weighing 18 to 20 lbs. Carrots have done extra well, the last 2 months have been very favorable for all kinds of roots.

Apples, are turning out a great deal better than was expected. Many estimated that there would not be much over ½ of last years crop, but since harvesting began they are turning out much better. The apples are much larger in size; so there are more barrels than at first supposed. In one acre here, there were 80 barrels of apples, and not more than 3 barrels of small and useless fruit, suitable for

hibition, well I will say that the butter and cheese department was first class, nearly 600 cheeses on exhibition; and the judges pronounced it as fine as any cheese made in Canada.

Some in the class open to Inspectors of syndicates were off flavor, because there was a rule that all cheeses had to be made between the first and fifteenth of August, many of these cheeses were 5 to 6 weeks old when judged. Now it is a well known fact that many factories are not built with a view of being cool in summer and warm during the cold weather, so it was no wonder they were off flavor, what with poor water for cows to drink and many eating wild weeds. So putting all in all the exhibit was a credit to the province as a whole. Ontario had many cheeses on exhibition but only one lot got a prize. (1) The butter was a credit also, and M. Porlee, of New York, spoke of the very

(1) Very curious case of "quid pro quo" At Toronto, not a single Province of Quebec cheese got a prize!—Ed.

number the best of the lot, I see you are copying a lot out of *Hoard's Dairyman* now I believe *The Dairyman* to be the best dairy paper printed in the English language. I was much pleased with Mr. Moore's letter in your last issue. I hope he will continue to write in that strain; we want something to keep up the home interest, and keep our youths on the farm. I further hope you will continue improving the Journal until we have the best paper for the farmers and dairymen extant. More anon,

PETER MACFARLANE,  
General Inspector.  
Chateauguay, 9th Oct. 1895.

FARM HOUSE.  
CLASS "A"—DESIGN No. 1—\$800.  
By A. Raza, Architect, Montreal.

This house should be situated on rising ground fronting South, raised

(1) Don't we just? If we could only get a few more contributors.—Ed.



on platform of earth or stone foundation and soil sloping from it all round, if possible.

#### MATERIALS.

From ground to first storey clapboards, with 3 in. planking underneath, the upper story clapboarded, with shingles; using also tarred paper and roof of shingles.

May be constructed of balloon framing, or 3" planking on field stone foundation, and have a collar 6 0 deep under kitchen, with stair under the main stair.

Can be painted or stained three different colours. (1)

#### TRAPPIST FARMERS.

#### The Splendid Work they are Doing in Manitoba.

Rev. Principal Grant writes from Winnipeg:—"I drove up the Red River the other day for twelve miles, past Louis Riel's old home, and at St. Norbert had an object lesson that would show, to the dullest capacity what might be made of all those untilled or semi-tilled acres of loam. Three years ago a little company of Trappist Brothers came out from France and built a monastery on a Farm of 1,500 acres which Father Richot, of Bill of Rights No. 4 fame, gave to them. They cleared the ground of its scrub, laid off a garden and began breaking. This year they will harvest 12,000 bushels of grain, and their garden is a sight worth seeing for the marvellous quantity and quality of its vegetables, enough apparently to supply a town of moderate size. They have put up stables for cattle and for horses of the most approved modern type, a small creamery, a hennery with some hundreds of fowls, a pigery of the right kind, and they are building a large granary. Most of the work is done by themselves. As we drove up we noticed the Father Superior, a French gentleman of distinguished family, at work in the garden, and our local guide informed us that he was the humblest, the most hard-working, and the most accomplished of the band. It is well known that the rules of the order of La Trappe are of the strictest kind, but they are somewhat modified in Canada. The day's programme for a clerical member is as follows.—Six hours, that is, from 8.30 p. m. to 2.30 p. m., for sleep, six hours for chapel, six hours for manual labor, and six hours for the reading-room and private work. The lay member gives from eight to ten hours to manual labor. No fish or flesh food is permitted. All are strict vegetarians, yet everyone seemed physically strong, clear eyed, and clean-limbed. They number fifteen members at present, twelve of them French and three Canadians. The work of the whole establishment is done with military precision, without the slightest appearance of stiffness or restraint. There is implicit obedience, but as it is based on religion it has all the appearance of freedom. The work of the farm has increased so rapidly that they are obliged to hire farm laborers. To these, and to all the inhabitants of the parish, and to visitors, the success of this experiment is an object lesson of the greatest value. It is one of several demonstrations that have been given of the enormous wealth that lies hidden in the land round (2) Winnipeg."

(1) The abbreviations are almost unintelligible.—Ed.

(2) Glad to see that Principal Grant eschews the Americanism, ground.—Ed.

#### MONTREAL EXPOSITION COMPANY.

Provincial Exhibition 12th. to 21st. September 1895.

#### SPECIAL PRIZES FOR ESSAYS.

1. Prizes for the best paper on the making of Cheddar Cheese. 1st. J. A. Plamondon, St Hyacinthe, P. Q. 3rd J. A. Gaudreault, Bassin Latérière.
2. Prizes for the best paper on Butter Making. 1st. H. W. Parry, Model Farm, Compton, P. Q. 2nd. Harry Smith, Durham Station.
3. Prizes for the best paper on raising and fattening Swine. 1st. W. E. Butler, Dereham Centre, Ont. 2nd. Wm. Tait, St Laurent, P. Q.
4. Prizes for the best paper on feeding milch Cows. 1st. D. McLachlan, Petite Côte, P. Q.
5. Prizes for the best paper on Mangolds. 1st. R. R. Sangster, Lancaster, Ont. 2nd. D. McLachlan, Petite Côte, P. Q. 3rd. Dan'l. Drummond, Petite Côte, P. Q.
6. Prizes for the best paper on the cultivation of Carrots for fodder. 1st. R. R. Sangster, Lancaster, Ont. 2nd. W. Greer, Grande Prairie, P. Q. 3rd. A. B. Stalker, Dawe's Farm, Lachino, P. Q.
7. Prizes for the best paper on the making and care of Farm Manure. 1st. James Dickson, Tronholmville, P. Q. 2nd. Dan'l. Drummond, Petite Côte, P. Q. 3rd. J. W. Knight, Cataragui, Ont.
8. Prizes for the best paper on ploughing and subsoil ploughing. 1st. David Scott, Mile End, P. Q. 2nd. J. W. Knight, Cataragui, Ont.
9. Prizes for the best paper on artificial manures and their use. 1st. J. W. Knight, Cataragui, Ont.

#### The Poultry-Yard.

Work for November.—Early chicks and an early moult.—The country a great town draws upon for supplies.—Rations for early egg production.

(A. G. GILBERT.)

I only hope I am deserving of the very nice compliment you pay me in the issue of the *Journal* for last month. It is always gratifying and encouraging to a writer to have his efforts appreciated and it was both kindly and fraternal on your part to express the sentiment you did. What say our farmer friends? Are they acting on the practical advice given in the different departments of the *Journal*?

#### WHAT SHOULD BE DONE IN NOVEMBER.

By the time this reaches your readers the month of November will be on us and the farmer should see that his laying stock are in good condition and comfortably housed. Egg laying should now begin and continue, with proper management, all winter. Before this the early pullets ought to have commenced to lay. At any rate the early May hatched pullets will soon begin. It has been pointed out in previous issues of the *Journal* that the aim of the farmers should be to get their chicks hatched out as early as possible, so that the pullets shall begin to lay while the older stock are moulting, and the cockerels attain size to bring high prices as early market birds. As soon as the hens begin to moult throughout the country, egg production ceases and the

price of the new laid article takes a jump up. By proper management the farmer should have his one and two year old layers over their moult by this time. He does not want any older hens for layers. The reason has already been given: the old hens moult so late that before they begin to lay they will have eaten a great part of the profit they should afterwards make. So a farmer should make it a rule not to have any laying stock over two years of age. It is during the period of high prices, that the farmer should have his hens laying. His aim should be to have early hatched pullets, and to get his hens over their moult early. How can he manage to get this done?

#### EARLY CHICKS AND AN EARLY MOULT.

We are quite prepared to be met with obstacle number one, in the way of getting early chicks, by the statement! "Oh! we can't get our hens to sit early, so we cannot have early birds." Certainly—if your hens do not lay during the winter and only begin operations with the warm weather of April—they are not likely to get broody for some time. Of course, I presume that you have not got all non-sitters. But, if your hens have laid well through the winter, you will have plenty of sitters by the time you want them. And here let me whisper into your ear that the mission of the farmers for a wide district round about the great and rapidly growing city of Montreal is to feed the people in it, and the people with their varied tastes want fine, early poultry; new laid eggs in winter, creamery butter, or, the finest quality of hand-made print butter, early vegetables and plenty of them, the finest of beef, mutton, pork, milk, &c., &c. Do the farmers realise what a large extent of territory a great city draws upon for its supplies? Well, in connection with early sitters and early market chicks, fall layers and new laid eggs in winter let me tell you that if you do not take advantage of your opportunities, other people will.

If you cannot manage to get early sitters, try an incubator and brooder. There are several reliable ones sold in the city of Montreal and many are in operation with great success. A little experience with them will soon make you expert in handling them. Then you will have to so manage as to have your early eggs fertile. You must remember that neither hen nor incubator can hatch a chick from an unfertile egg. And to have fertile eggs I would keep the male bird separate from the laying stock until you mate him up with 11 or 13 of your best hens at the proper season. (1)

#### AN EARLY MOULT.

You can bring on an early moult by allowing your laying stock a free run and feeding them well at the approach of the moulting season. Your hens will lay few eggs during their moult and it is during that period that they will take their rest, which they well deserve if they have laid freely during the winter, spring and early summer. As to the best rations to feed, so as to bring on an early moult, we shall have something to say about that at the right season. We return to the work for November.

#### HAVE EVERYTHING SNUG FOR WINTER.

Your hens having got their new feathers are looking well. If the season is mild the run outside may still

(1) All the most successful poultry-men, in England, allow one cock to, at most, 5 hens. Ed.

be enjoyed. There is nothing so conducive to constitutional vigour than an unlimited run in the fields after the harvest has been gathered in. At the same time, rations, for making an egg supply, may be fed in moderate quantities as follows: Morning ration—Warm mash composed of ground grains, meat and vegetable scraps, small potatoes boiled, or whatever is in greater supply about the farm. Feed moderately. Where out green bones can be had, feed at the rate of 2 ozs. to every hen, three mornings of the week and the mash remaining mornings. Having the run of the fields no noon ration will be required. The evening ration should be liberally fed. If the hens are housed every effort should be made to keep them in exercise from morning until they go to roost. Remember grit, dust bath, lime to make shell, and all the little essentials. Take care of your layers and you will be rewarded with eggs for home use, or to sell in the Montreal market at prices ranging from 35 to 45 and 50 cents a dozen according to the time of season and severity of same. By all means have the poultry house in good order. No great expense need be gone to, but have everything snug and, if possible, give plenty of room to each layer. Do not keep too many together. More eggs will be got from 15 hens with plenty of room than 25 rather crowded. Indeed, where the laying stock are over-crowded no egg production will follow.

#### THE POULTRY SHOW AT THE EXPOSITION.

That was a Royal Poultry Show at the Montreal Exposition. I had the privilege of attending for a day and a half and I was delighted to see such a display, so great that the building could not contain all the birds shown. And what a sight were the turkeys, geese and ducks! As I looked at them I could not but keep feeling that we did not begin to realize our capabilities to bring to the country some of the twenty two millions of dollars spent by England alone, in Continental Europe for eggs and poultry last year. I am told that Boston merchants buy our best poultry and ship to the London market and so pocket the margin of profit that we ought to have. Amiability, or, indifference on our part most extraordinary? I had the pleasure of seeing Thomas Costen, Thomas Hall, W. H. Ulley, F. W. Molson and other old time friends and breeders. From other cities and places were many noted breeders, whose names may be seen on a great many of the red tickets of the great New-York Show. It was a happy thought of the popular secretary and manager, Mr. S. C. Stevenson, to get out printed circulars on the proper management and care of poultry for gratuitous distribution. The circulars were printed in both languages and were in demand. And the judging by an old friend, Sharp Butterfield, was most satisfactory.

A Good Sheep will make a growth of nearly  $\frac{3}{4}$  lb a day for its first 280 days, when it becomes excellent mutton. For 600 days it will make  $\frac{1}{2}$  lb. Such a sheep will net 60 p lb on the farm usually, and such sheep, having a large carcass, will have a proportionally large fleece, be it worth what it will.

A Shropshire Ram crossed with high-grade Merinos is said to produce an animal profitable both for wool and mutton. In sheep breeding there is but one way of keeping an ideal flock and that is by trying to improve it when it is seemingly at its very best.

## The Dairy.

### A CO-OPERATIVE DAIRY IN BELGIUM

Co operation and success go hand in hand in these days of division of labor. Baron L. Peers, who has a charming country seat a few miles from Bruges, Belgium, owns an extensive farm and co-operative dairy, which was visited by F. C. Loder-Symonds, and a description of which he gives in the journal of the Royal Agricultural Society of England.

The milk from the different contributors is hauled in churns to the dairy in carts by dogs. Every churn at its arrival is weighed and a sample for quality is taken in a small graduated and numbered glass tube. It is then emptied into a large vat which feeds the separators. The cream, which is separated by "Alexandra" separators, passes into a metal bucket in a recess in the floor. The skim-milk is raised by a centrifugal pump to a sterilizer, where it is heated to 185° Fahr., and from thence its flows over a "refrigerator" into a measuring apparatus, by which the churns of the contributors are refilled, each man getting skim-milk to the measure of 90 per cent. of the quantity of new milk sent in. The cream is kept in a cool cellar, with large windows open to the north, to ripen for 24 hours. Baron Peers lays great stress upon the ripening process being carried on in full light, as being favorable to the activity of the right kind of microbes and fatal to those which produce bad flavor. The cream is then churned in Dutch fixed churns, the operation taking 45 minutes, the proper temperature being maintained with warm water or ice, as the case may be. The fixed churn is preferred to any of the revolving English patterns, because the cream is always in free communication with the air, and is, therefore, not contaminated by the evolution of gas which has to be let off from time to time from close churns. The butter is removed in the granular stage, and at once made up on a circular butter-worker driven by steam, packed and sent off to London, Paris, or elsewhere.

Great importance is attached to the heating or "pasteurisation" of the skim milk, as this enables the contributors to receive it in a state fit for food. The buttermilk is also returned. A careful account of the quality and quantity of milk sent in is kept. The quantity multiplied by the factor of quality, obtained by the method described hereafter, is the "effective" of each contributor. The total cash received, divided by the sum of the "effective," gives the "factor" of profit. The "effective" of each contributor, multiplied by the "factor," gives the gross money value of the butter derived from his milk. From this is deducted about one-quarter of a cent as the cost of separating. The balance is then divided equally between the contributors and the Baron. Each farmer thus gets the whole of his by-products back and a trifle less than one-half the selling price of the butter. The butter, however, is quite 25 per cent. more in quantity and 25 per cent. higher in price than it would be if made up in the old-fashioned way by the peasant himself. He thus gets about the same pecuniary return and is saved the trouble of making and marketing.

The cows of an improved breed are being kept, the first cross between the Jersey bull and the common country

cow being the most valued. To assist this process two or three Jersey bulls are kept by Baron Peers. A "home herd" of some sixty pedigree Jerseys is maintained; these having replaced a former herd of Shorthorns, which gained many prizes in their day, but which have now been supplanted by the Jersey as a more profitable butter cow. The Baron lays great stress upon the "escutcheon" of a cow, and said he never knew it to fail as an indication. He finds the best daily winter ration to be:—

4½ pounds maize meal—boiled.  
2½ pounds rye meal—boiled.  
67½ pounds turnips.  
11½ pounds hay.

That such a large amount of turnips can be fed without rendering the butter unsalable will be a source of wonder to many of our readers. Baron Peers explained that this could be avoided by proper methods of conducting the fermentation. To get rid of the turnipy flavor it is advisable in the first place to separate the milk as completely as possible from the cream; hence, the cream produced in the winter, when the cows are eating turnips, is much thicker than that separated in the summer months, and the operation of separation takes longer. After separation the cream is "pasteurised" by being heated to 185° Fahr.; then cooled and passed into the ripening room, when a small quantity of the ripened milk of a cow which has been fed exclusively on hay is added. The effect of this is to start a healthy ripening; the bacteria associated with the flavor having been either killed or rendered inert by the "pasteurisation." This process is said to be so effected that no trace of turnipy flavor can be detected in the butter, and the factory butter therefore sells during the winter months at a price proportionately much higher than that of ordinary butter.

### TURNIPS AND BUTTER FLAVOR.

Turnips, if unwisely fed, will give butter a slightly acrid flavor. But the best judges claim that if fed say at or near to one milking they will leave no nip, and will in fact help the quality of the butter made from them. This question was recently put to three expert butter-makers, with the following results:—

No. 1 replied:— "We have always fed turnips in the autumn and winter when making butter, and have sent our butter to the best markets and have always obtained the best prices for it, with the statement, 'butter, first-class.' I have had the opinion of an expert on our butter, and he says if I want a certificate he will give me one stating that he could detect no turnip taint, that it was very fine in make, and of first class quality. The manner of making is this: We are very careful to have the milking attended to so that the milk shall be clean, and from anything that could in any way taint the milk, as this would be retained in the cream. As soon as possible after milking, we pour boiling hot water into the can until it attains about 125 deg. Fahr., then we set in the common creamers or pans. The creamers we run off every 36 hours, and the pans every 48 hours; and as soon as the cream is ripe or turned a little sour, we temper it to 60 deg., and about ten minutes before churning we dissolve a teaspoonful of prepared saltpetre in warm water and stir into the cream, and

then churn. When the butter is in granules, we let it stand a few minutes, and then run off the buttermilk and wash the butter in the churn, until the water is clear, and then salt with fine salt, one ounce to the pound of butter."

No. 2 wrote:— "As you request me to furnish your readers information as to the quantity of turnips fed, I would say that I give each cow about half a bushel twice a day, fed after milking. I have an underground stone milk-house with stone floor. The milk keeps sweet for three days in the hottest time in summer. We use mostly shallow pans; skim every twenty-four hours; pans kept well scalded and clean; churn in the autumn from 60 deg. to 64 deg. If I were giving each cow two bushels a day I would dissolve some saltpetre and put some in the cream."

No. 3 said:— "Beautiful butter can be made if the cows are given only a small allowance of turnips after they are milked, at first, gradually increasing the quantity. The milk was set in pans, and two or three quarts of ice-cold pure water put in the pan and the milk strained into it. The butter was beautiful; not the least unpleasant smell or taste of turnips was noticeable."

Nor-West Farmer.

## CHEESE, BUTTER AND MILK

### VII

#### The Principles of Butter-Making

EDS COUNTRY GENTLEMAN—Pure butter should contain no more than 10 to 15 per cent. of moisture, a good sample averaging about 12 per cent., and unless heavily salted, an almost infinitesimal proportion of casein and sugar. Theoretically, butter should contain nothing more than the fat of milk, the salt which is added during manufacture, and the moisture, which up to a certain point is inseparable from butter. Those who understand the manufacture of butter are well aware that both by the exercise of skill and carelessness a much larger amount of moisture can be added to the bulk than is essential, and it follows that the larger the amount of water, the greater the weight of the butter produced. To manufacture butter with excessive moisture is fraudulent for the consumer pays the price of butter for moisture; but it should be remembered that the perpetrators of a fraud of this character often defeat their own object, inasmuch as butter of high quality cannot be produced, nor will it keep, if the moisture is excessive. Excessive salting is equally deleterious to the quality—a minute proportion of salt improves the flavor, but a large quantity masks it, at the same time adding to the weight.

We have remarked that there should be no other material in butter than fat, moisture and salt. In practice, however, it is next to impossible to remove either the whole of the sugar or the casein or curdy matter, and this being the case, in the course of time—and it depends entirely upon the proportion of caseous matter left in the butter—a sample becomes rancid and unfit either for sale or consumption. The prime object, therefore, is to produce as large a quantity of butter as possible with the finest flavor, reducing the moisture and the extraneous curdy matter and sugar to the lowest possible proportion.

In the first place then, in order to produce quantity, it is necessary to use the cream separator, which extracts

more fat from the milk than is obtainable by any other process. If this is followed by treatment which has for its object the conversion of as much of this fat as possible into butter, a maximum quantity will be obtained.

As regards quality, it is first of all important that the milk should be obtained from carefully fed, clean cows which are milked by clean hands into clean vessels, the milk being subsequently strained before manipulation. The apartment in which the various operations take place should be perfectly pure. In this case the cream from the separator will in due course ripen properly, and the correct flavor will in consequence develop.

Having obtained quantity and flavor, we have next to deal with the conversion of the butter fat obtained in the churn into made-up butter. As we shall see, the grains of fat as they are first produced are floating in buttermilk, the particular constituent of which is casein. This casein is one of the most important foods of the lactic ferment; hence its removal is essential. Careful washing, therefore is the first process, and if the tiny grains are washed at a given stage, which is shown in every dairy school, the greater portion of the curd will be removed and almost pure butter fat left behind.

#### Bacteria, Good and Bad

Let us first of all assume that inferior butter is produced in a dairy and that the acquirer is unable to improve the quality. The thing is easy if the work is carried out with intelligence and thoroughness. The manufacturer must condescend to recognize a scientific fact. The alteration which takes place in cream—that is to say, its change from perfect sweetness to a condition of sourness, acidity, or ripeness—is owing to the presence of an organism of bacterium which can only be seen by those who are skilled in the use of the microscope. This organism rapidly increases in number when milk is warm and exposed to the atmosphere. It converts the sugar of milk into lactic acid, and hence the sourness of milk. If this change is allowed to continue unchecked, the curd of the milk will coagulate, and it is for this reason that cream when allowed to ripen in churns becomes thicker. If cream is churned while it is still sweet, it is frequently longer before it is converted into butter, it produces less butter, and the flavor is less full and nutty. The object, therefore, of ripening cream is to increase the quantity of butter and improve the flavor. In every dairy the lactic ferment is present either upon the utensils or in the atmosphere itself, but in some cases there are other organisms which have a very contrary influence, destroying the fine flavor and replacing it by a disagreeable one which reduces the value of the butter. The object of the dairyman, therefore, should be to maintain the apartment in which the milk or cream is placed, as well as the utensils employed, in as cleanly a condition as possible. There need be no fear about boiling water or lime destroying the lactic ferment. If it is removed from the utensils, it is present in the air and present, too, in a clean apartment in much larger numbers than any other organism is likely to be; it is, in a word, essential to the production of good butter. On the other hand, in a dirty apartment and on dirty utensils dangerous ferments are common, and if by conditions which suit them—and dirt is the chief of those conditions—they are induced to increase in number, they are able to grapple, as it

were, with the lactic ferment, which under clean conditions, obtains the mastery, and to increase and influence the flavor and quality of the butter produced.

Let us suppose that bad butter is produced in a dairy which has not been kept under the most perfect conditions. How shall a change be brought about? In the first place, the whole of the utensils, shelves and tables should be removed and thoroughly cleansed with boiling water. In this way every colony or nest, as it were, of the undesirable bacteria will be destroyed, and the clean utensils being returned to the dairy, may be employed both in the raising of cream and in the manufacture of butter without any fear whatever. If, however, the manufacturer desires to proceed upon definite lines and to omit no course of procedure which will ensure success, he may introduce from the most successful dairy with which he is acquainted a small quantity of the sour buttermilk which has been produced from the same days churning. This buttermilk will contain the germs of organisms which have been responsible for the production of butter of high class. If this buttermilk is added to the cream which has been obtained from the milk in the now thoroughly clean dairy, that cream will be inoculated, and when it has ripened, it will be sufficiently perfect to be churned with every hope of success, and from henceforth, so long as cleanliness is observed, there need be no fear as the maintenance and constant reproduction of the friendly bacteria which are so desirable as we have pointed out, in the manufacture of butter.

#### Some Details of Work

Let us now deal with the actual process of manufacture. The milk is drawn from the cows and arrives in the dairy at a temperature of about 90° or a little more. It may be at once passed through the separator and skimmed, or it may be poured while still warm into shallow vessels in order that the cream may rise by gravitation. Under such conditions the temperature of the dairy should not be more than 60°; if it is as low as 50°, so much the better. The reason is that the greater the difference between the temperature of the milk and the temperature of the dairy, the quicker and the more effectually will the cream rise. Cream is present in milk in the form of tiny globules; these globules are much lighter than the other portion of the milk; hence when the milk is at rest they rise to the surface just as a cork rises to the surface of a volume of water at the bottom of which it has been placed. The reason why the fat rises better in warm milk placed in cold apartment is that the fat feels the change of temperature less rapidly than the rest of the milk, inasmuch as it is a non-conductor of heat. This being so, the difference in the density of specific gravity of the fat and the liquid portion of the milk is greater; the one is relatively lighter than it would otherwise be where there is no difference in the temperatures. In hot weather the cream rises with far greater rapidity, but inasmuch as the milk becomes rapidly acid, both cream and milk thicken or coagulate, and for this reason the smaller globules of fat which are at the bottom of the milk vessel are not able to rise at all. They are impeded, as it were, by the coagulation of the casein, and a proportion of the butter-fat is lost to the churn. When, however, cream is raised upon a shallow

vessel, it is brought into direct contact with the air, it forms a thin layer and is oxidized or ripened with much greater perfection, on the other hand where cream is obtained through the medium of the separator it is kept in bulk and is less thoroughly oxidized, because in passing through the machine it has been in contact with the air for but a few seconds, and the air does not so thoroughly permeate the mass of cream which is kept in a particular vessel at it does when the same cream is raised over a large area on the milk in a number of vessels.

It is next to impossible to describe the exact flavor and appearance of cream which is just ripe for churning. Those who desire to know what it is like should take a lesson from an expert. When ripe, the cream is passed through a strainer into the churn, and churned at a temperature which varies in accordance with the season of the year. In summer it may be churned at 56° and in winter up to 64°, but the exact degree will depend upon the heat of the atmosphere. A little experience will enable the operator to understand this point. Mixed cream should never be used, i. e., sweet and sour cream mixed together. The churn should be well cooled in summer and slightly warmed in winter by the aid of clean cold water, and let us remark that nothing is of greater importance than pure water, if it is impure, containing organic matter, this matter will be imported into the butter, and will assist in decomposing it.

After churning gently for a few minutes, the carbonic acid gas which has formed in the churn may be allowed to escape by pressing the ventilator. Churning then continues until the grains of butter have formed to the size of rice. At this point great care must be exercised. Some excellent makers here add a few quarts of very cold pure water, which gives crispness to the grains and prevents their adhesion to each other so completely. The buttermilk is then drawn off through a sieve and more cold water added. It should be sufficient to enable the grains of butter to float in the churn and to partially harden. The water is then again drawn off and fresh cold water added two or three times, the churn being turned gently that the butter grains may be washed, although they should not unite and increase in size. Lastly, thin brine may be added, and in this the butter may remain for some little time before it is removed, or the floating butter may be removed from the brine with a scoop and placed upon the butter drier or *delactieuse*, from either of which the water is removed, by working in the one case and centrifugal force in the other. If dry salting, is now performed, the salt should be weighed, having previously been thoroughly rolled as fine as possible, dried in an oven and rolled again. It may be distributed by the aid of a dredger over the butter at the rate of half an ounce to the pound. If the butter is to be salted for keeping from three fourths of an ounce to an ounce may be used to the pound. The water having been perfectly expelled, the butter is made up for the market, or it may be allowed to remain in a wooden trough to drain still further, or as in Denmark, made up into rough rolls, allowed to harden for five or six hours, again worked, and finally made up for sale.

JAMES LONG.

Burleigh, England.

#### CRACKED CHEESE.—FLATS IN CHEDDAR HOOPS.

ED. HOARD'S DAIRYMAN:—I have been on a two weeks' trip visiting factories in Richland, Grant and Iowa counties. Makers seem to be having more trouble than usual, which I think is caused by the excessive dry weather. The cows have been starved in a good many places and the milk seems not to be working normal.

The market has been dull and buyers on that account are more particular about the goods they buy. There have been some high acid cheese and a good many cracked rinds. Instructors Noyes and Miles are doing good work.

I have been trying to find the cause of the cracked rinds. Sometimes the cracks are on top, and in other cases under the bandage. In a number of cases I found insufficient grease, which allowed the rinds to dry out rapidly and check. In some cases a poor quality of cheese grease was used. It would melt easily and not put a good surface on the cheese.

Again I found cheese cracked under the bandage and on the rind that might have been closed by taking out of the hoop and washing the first thing in the morning and then tightening in the press till noon.

Some cases of cracked cheese I traced to drafts of dry air passing over them. I have seen cheese put onto the shelves nicely closed, but after a week or two begin to crack, and that too when properly greased and drafts of air prevented from passing over them. In conversation with Mr. Jones, maker in the Basswood factory, he expressed the opinion that with poor milk the fat will collect on the outside of the pieces of card, preventing their cementing together well in the press. He had been troubled with cheese acting as just described and had practiced pouring a pail of warm water on the card just before salting. This would wash the fat off and the pieces would press together. He had not been troubled with cracked cheese since he had been so doing.

One thing that seemed a little ridiculous to me was to find nearly all the factories making flats in cheddar hoops, a divider being placed in the middle of the hoop so as to make two flats in the one hoop. The result is that the cheese are not even in size and quite often crooked. Sometimes where the maker takes particular pains he can get a nice looking lot of cheese, but a nicer looking lot of flats can be turned out with flat hoops with half the labor. Why is it that a factory in which so much money is involved will be only half equipped?

JOHN W. DECKER.

Wisconsin Experiment Station.

#### THE EFFECT OF FOOD ON THE RECOVERY OF BUTTER.

A good deal of discussion is had pro and con as to whether butter fat can be fed directly into the milk of a cow. But there is one phase of this question which we are apt to lose sight of. That is the effect of the food on the churning of the cream—whether we get more or less butter according to what we feed. If certain foods will produce milk out of which we can easily separate nearly all the butter fat, and other foods make the cream stubborn, it is easy to see how cow owners might deceive themselves easily. Fortunately we have certain *bona fide* experiments in the line which are profitable to remember. A writer in the *Agricultural Gazette* says:

Dr. Sturtevant found that out of 100 lbs. of fat contained in the milk the churn recovered very different quantities, according to the food which had been given to the animals. Thus the milk from hay, maize meal and brand, yielded up 84 per cent of its fat, that from hay and gluten meal only 64 per cent, or a difference of about 20 per cent. Armsby found that green grass and bran yielded up 91 per cent, while the same cows the next week on dried grass and bran fell to a yield of 81 per cent, where analysis showed the presence of the same total of fat to begin with. In fact, every change of food brings with it a change in the percentage of fat recoverable as butter, the residue going off in the buttermilk and perhaps in the skim-milk as well. In order, therefore, to fully test cows in trials of this sort the separated milk and the buttermilk should be analyzed as well, so that it be shown that the fat is there though the churn does not take it out. I am not arguing for more work at these trials, for they are pretty heavy as they are, but as a subject for investigation it is worth doing. It is worth finding out which of our ordinary foods yields the most churnable cream, for there is little use in producing rich milk if it will not show its richness in the cream gauge and the churn.

#### A RECORD OF FACTS CONCERNING THE EFFECT OF A COLD STABLE.

Every careful record of an experiment concerning any of the principles of dairy science, becomes at once valuable matter to the careful student. What we don't know is a big volume; what we do know is a small primer. The true dairyman is hungry for facts of experience. We have often spoken of the effect of cold on the milk giving function. Here is a little bit of an experiment which teaches a lesson.

The grain eaten per day, first, second and third days was corn and cob meal 6 quarts, wheat chop 3 quarts, a total of 9 quarts per day; fourth and fifth days, 2 quarts of corn and cob meal and 1 quart of wheat chop added, making a ration for the fourth and fifth days of 12 quarts feed morning and evening. Sixth and seventh days there was added a noon ration of 1 quart of corn and cob meal and 1 quart of wheat chop, making 14 quarts per day for the last two days. The first three days of the test there was drawn from this cow 146½ pounds of milk, the last three 139½ pounds, a difference of 7 pounds in favor of light feeding, but while there was a decrease in milk there was an increase in butter of one-fourth in favor of heavy feeding. I account for the decrease in milk by the fact that when the test began temperature was moderate, but on the third day began to fall and went down to 8° below zero, or it was cold enough to freeze manure behind cows in stable. Here is a pointer in favor of warm stables. As only 27 quarts of chop was consumed by the cow the first three days and 40 quarts the last three, 13 quarts was required to keep up animal heat from which I received but little return.—*Josiah Gibson in National Stockman.*

#### NOTES FROM THE WISCONSIN AGRICULTURAL COLLEGE.

We have been greatly pleased with the use of rape for sheep feeding. Last year was an exceedingly dry one yet from one measured half acre of land



Prof. Craig cut nine and a half tons of rape, or nineteen tons per acre. The land was an old sheep pasture and very rich. On some places in the patch the plant stood waist high and the lambs when turned into it were hidden from sight as they foraged down the rows. This rape was sown in drills, just as one would plant rutabagas. It is not yet too late to plant rape, and I wish some of the readers of the *Dairyman* would try it this season. Turn over a stubble field (1) and sow from three to five pounds of rape seed (which is not expensive) to each acre, covering with the drag or cultivator. Use dwarf Essex (2) and not the bird rape. Do not expect a very large growth this fall, for it is now too late to get a maximum crop, but if there is sufficient moisture, the rape will get high enough to afford considerable pasture and more than pay for the seed and labor.

Rape is pre-eminently a sheep feed, said in England to give mutton its finest flavor. It can be used for cattle food, provided dairy cows are not fed too heavily with it, when it is said to taint the milk (3). A rape field is excellent for young stock and for cattle going into winter quarters, in that it furnishes succulent feed and helps to get the animal into good condition. Our rape experiments have attracted attention among stockmen all over the country. The Experiment Stations of this country may be credited with introducing this plant, which though long known to the English and to our Canadian friends, strangely made no headway in this country until our Stations took the matter up and pushed it. (4)

Prof. Russell is making a great success of pasteurized milk for infants. We supply pasteurized milk only on Doctor's certificates to infants and invalids in Madison. At this time the Professor has some fifteen infants on his hands, some of which were in a bad way when they started to use this pasteurized milk. In general it has been most favorably received by the physicians, some of whom are growing very enthusiastic over its use. If you, Mr. Editor, could see some of the expressions of praise and commendation coming from the mothers of these babies, you would begin to realize what possibilities there are in pasteurized milk for ailing infants in these hot days. You and I could drink milk which we call sweet, with satisfaction, but this same milk in the delicate stomach of a child almost sick, may be quite another affair. The use of pasteurized milk, as we are sending it out, we regard as still in the experimental stage, but the data favorable to its use is accumulating now so rapidly that we are greatly encouraged.

You may say to your readers that Prof. Russell's bulletin on the Pasteurization of Milk for direct consumption will be gladly sent to any one upon request. Non-residents should send stamps to pay expenses of mailing.

To Build Up a Flock of sheep, the cheapest and best way is to secure the best ewes and to breed to a full-blood ram of the breed best suited to your purpose. Yearly select ewes in this way and yearly infuse the new blood from a new ram. Persistence will work wonders.

(1) Harrow thoroughly, sow 6 lbs. of seed, and cover by rolling.

(2) Or the *coltsed*.—Ed.

(3) Hardly the expression to be used by an experiment-station.

(4) We have done our part during the last 30 years.

## The Farm.

### AGRICULTURE.

#### THE ENGLISH HARVEST OF 1895.

The *Mark Lane Express*, in its estimate of the harvest of this country for 1895, based on the reports of above one thousand correspondents, spread over the whole of Great Britain, says:

Commencing with the wheat crop, we find that its condition in England is as low as 78.4 per cent. of an average of 100, which is a sad falling-off from the slightly over average crop of last year, and is 10 points below what was regarded in 1893 as an extremely light crop; what is more, it has the worse average of any portion of Great Britain. Wales with an average of 80, shows a falling off of 15 from last year, and of 7.1 from the condition in the previous harvest. Scotland, where the wheat crop is comparatively a small one, stands best in the list with 83.1; but this again is worse by 17.3 on the crop of 1894, and 12.4 on the small crop of 1893. There is not a great difference between the highest and lowest averages of the countries comprising Great Britain, only 4.7, and the figure for Great Britain is 78.5. Now, when we compare this figure with the estimate of last year, we find it not less than 22 per cent. decline, and with 1893 actually 6.2 per cent. lower than that at which it was then calculated. It is satisfactory, however, to observe that in the large wheat-growing districts several counties are above the average of the year, Lincoln coming out with 93.2, Norfolk with 85, Huntingdon with 86, Cambridge with 90.8, and the West Riding of Yorkshire with 82.5. Unfortunately a large number of what may be called the second rate wheat-growing counties are greatly under the average, and these have had their effect in reducing any good that may have arisen from the comparative superiority of the first-class counties. Taking the counties as a whole, twenty of them are at and over 78.5, so that there is pretty well an equal division of counties in which the crop is below and above that figure.

The estimate of the barley crop of Great Britain is this year 84.9, a figure better than that of 1893, when it was 6.7 lower, but unfortunately 17.2 per cent. worse than last year. Of the three principal cereals barley works out the best for the year. In barley, as in wheat, England is the greatest sufferer, and the relative positions of the condition of the crops are—England, 84; Wales, 86.7; and Scotland, 92.2. Last year England had the best of the barley crops, but this year it has the worst, whilst Wales, as it did then, takes an intermediate position.

We next come to the crop of oats, the area of which must be unusually large, in consequence of so much land being sown to this cereal after the failure of the wheat. Unfortunately, the drought has played great havoc with this crop, and has reduced its condition to 78.6 for the whole of Great Britain, which is 7 lower than in 1893. Last year at this time the average for Great Britain was a decimal over a full average. England now comes out with an average of 75.1, Wales 78.7, and Scotland 85.4. It is the most important cereal crop of Scotland, and it is there better than in any other part of Great Britain. All these figures are very considerably down upon last year, and except in the case of England lower than they were in 1893.

Both beans and peas show a large falling off in condition on last year—13.6 per cent. in the case of beans, and 19.8 in that of peas. Beans are considerably better than they were in 1893, and peas also a trifle to the good, but in neither case do they promise more than three-parts of a crop. England has an average for beans of 69.7, Wales 87, and Scotland 92.3, whilst for peas England has 75.7, Wales a full average, and Scotland 91.2. The frequency with which these crops are spoken of as failures would indicate almost a lower average, seeing that frost and drought had so affected the crops that they were either killed outright or were eaten off to sheep as giving no promise of coming to maturity. In the case of peas there seems to be a more prevalent practice of growing for the market, to sell green, but these crops have not been very profitable this year. Northumberland, Lincoln, and Cambridge have done best with beans, and in Cornwall, Lincoln, Wiltshire, and the North Riding of York peas come out best. It has been altogether a disastrous season for beans and peas.

The condition of the root crop in Great Britain is nearly 25 per cent. worse than it was a year ago, and 9 per cent. beneath the position occupied in 1893. England comes out with 69.8, Wales 71.8, and Scotland 79.7. The reports on roots form one continuous story of failure, and hundreds of acres are to be found where not a plant is to be seen. The rain has come too late in many parts to save the mangels and swedes, and it has been almost universal in every county to have re-sown with common turnips large areas which have failed with swedes. This will have entailed very considerable expense to the farmer, in addition to the loss which he must sustain in not being able to get such a crop of roots as he requires to carry him over the winter. It is hardly necessary to mention particular counties with regard to roots, as all of them more or less correspond, and the crop generally may be put down as less than three-parts of an average.

Everyone has been prepared for a bad report on the grass and hay crops, and these unfortunately come out for the whole of Great Britain at the low figure of 66 per cent. What this means can be seen by a comparison with the figures of last year, when the condition was calculated 111.8. But then, bad as we know the grass and hay crops have been, they do not turn out to be quite so low as in 1893, when the average condition reached no higher than 58.3. The figure for England is the worst, namely, 64 per cent., whilst Wales has 67.6, and Scotland 85.4. Scotland has very much improved its position with regard to grass, in consequence of the rains, which already have had a very important effect. Grass is growing most rapidly in many parts of the country, and there will probably be plenty of pasture, and in some cases hopes are strongly entertained that it will be possible to secure a second cut of grass. In Wiltshire a large acreage of second clover will probably be mown. The hay crop has been an entire failure, and in some cases worse than it was two years ago. From no single county is a good crop reported, but from many it is stated to be the shortest known for several years. Nearly the whole of the hay was stacked under the most favourable conditions, and is of excellent quality; but in Westmoreland and Yorkshire there is still hay to be carried, and from the latter district we hear of grass being cut for several weeks which has been quite spoiled by the rain. Scotland has also a light crop,

and has had a considerable quantity damaged by rain; but it comes out in a much better position than either of the other two parts of Great Britain. Wales offers no particular difference to the position which prevails in England.

It is not difficult this year to sum up the general position of the crops of this country. There are, of course, wide variations even in each county, but the differences are, unfortunately, less pronounced. There is too great a similarity in disaster, and the trouble ranges over the whole field of farm operations. Whether we turn to wheat, barley, or oats; to beans, peas, or hay; to potatoes or roots, we find the same story of injured crops, want of development, immaturity, and absence of both quantity and quality. Such a combination as this is ruin to the British farmer.

### THE WEATHER AND THE HARVEST

As it is now over three weeks since harvest began in the earliest districts, including several of the principal corn-growing counties, and during that period there have not been two consecutive days without rain, while in some districts there has been more or less downfall or nearly every day or night, the harvest must be accounted a wet one. The cutting of thousands of acres of over-ripe corn has been deferred, because almost as soon as a start was made after a crop had become dry enough to bind, rain sufficient to stop the work fell. Elsewhere wheat and oats, some bound and shocked, and some lying untied on the ground, have been out in the fields, exposed to the great aggregate quantity of rain, ever since the beginning of harvest. In a few favoured districts the intervals of dry weather have been long enough to allow of small quantities of wheat and oats being stacked, but the progress generally has rarely been as small for the time occupied. Few complaints of the sprouting of grain have yet appeared in farm reports; but after last week's heavy rainfall and close atmosphere this result may be regarded as inevitable. Discolouration in both wheat and barley is already commonly noticed. In relation to a great portion of the country, then, the misfortune of inferior quality must be added to that of deficient yield of grain. In those counties where harvest is only just beginning, or about to begin, the farmers, may be less unfortunate; but at present there are no indications of settled fine weather.

### THE HAY CROP OF 1895

(IN ENGLAND)

Our special inquiry made in all parts of Great Britain as to this season's yield of hay has brought to light a very deficient crop in nearly all sections of the country. In many cases, indeed (says the *Times*), the numbers which represented the minimum average yields last year would serve to denote the maximum produce this season. Taking the calculated averages for the English counties we find that the only ones which are likely to return an average yield of not less than 25 cwt per acre are Cumberland, Westmoreland, Northumberland, York, and Lancaster, with possibly Cornwall. The counties of Lincoln, Norfolk, Cambridge, Chester, and Durham will probably rank next for quantities between a ton and 25 cwt.

per acre. A yield of from 16 cwt. to a ton is likely to be recorded for the counties of Sussex, Hants, Wilts, Dorset, Devon, Somerset, Stafford, Notts, and Middlesex. As many as 13 counties will give an average yield of only about 16 cwt.; these are Berks, Bucks, Dorby, Essex, Gloucester, Hunts, Kent, Northampton, Oxon, Salop, Suffolk, Warwick, and Worcester. The counties of Monmouth, Rutland, Beds, Leicester, and Surrey are likely to fall below even this meagre average. Some of the best individual estimates we have received are 45 cwt. per acre from a district in Wilts, where a good yield of water-meadow hay has, no doubt, raised the average; 40 cwt. from Lincoln, Norfolk, and Cornwall, 35 cwt. from Cumberland, and 32 cwt. from Westmoreland. We have nothing, however, approaching the three tons per acre which we were able to record for several counties at this date last year. What this season has been for grass land may, perhaps, be gathered from the circumstance that in each of the following counties there are farmers who report to us *minimum* yields of only half a ton of hay per acre:—Berks, Derby, Dorset, Durham, Essex, Lincoln, Middlesex, Northampton, Notts, Surrey, Sussex, Warwick, Wilts, and Worcester. Worse than this, however, we have *minima* of 8 cwt. per acre reported from Oxon, Rutland, Salop, and Suffolk; of 7 cwt. from Bucks; of 6 cwt. from Leicester; and at the ruinous rate of 5 cwt. per acre from localities in Beds and Kent. For the whole of England it is doubtful if the main hay crop of the year will represent an average yield of more than 18 cwt. per acre. Not only is the average yield of hay in our island abnormally low this season, but the acreage mown will undoubtedly show a marked decrease as compared with last year's area. This is due partly to the fact that the great scarcity of hay in the spring of 1894 compelled farmers to put a much wider area than usual under the scythe last summer, and partly to the circumstance that the prospective scarcity of keep which was induced by the spring and early summer drought of this year necessitated the grazing of land which it was originally intended to shut up for hay.

## CONTINENTAL AGRICULTURE.

Paris, September 28, 1895.

The veterinary surgeons in France are a very highly cultivated body of men, many of them have taken their university degrees; several of them have graduated in medicine, but cease to practise it, because unremunerative and overcrowded. In the French army, veterinary surgeons have full officer rank. The International Veterinary Congress just held at Berne, was looked forward to with great interest. A pitched and decisive battle was to be fought, over the employment of vaccine, as indicator of and a curative agent for, glanders and tuberculosis. The most eminent friends and adversaries of the inoculation question were present.

**Diseases of horses.**—The total value of horses in France is estimated at 1,500 millions of francs, that of cattle, is about the same sum, and yet the existence of that vast wealth, is at the mercy of epizootics, that could be prevented or destroyed. Then there is the danger, that human beings can contract the contagion, because of its microbial origin.

**Glanders.**—Of all the diseases which horses are liable, that of glanders is the most deadly. It has existed, since time immemorial, in all European States despite the most vigorous application of sanitary laws. This is owing, to glanders like tuberculosis, being propagated by favoring lung lesions, or the commencement of centres of morbidity, often existing alone, and that no external symptom betrays their presence. Against that concealed latent glanders, there was not, until recently, any means of detection, till the discovery of *malleine*, which is the vaccine against glanders, as *tuberculine*, is that against tuberculosis, or the Pasteur vaccine, against hydrophobia. *Malleine* is an extraction from bacilli or seed germs of glanders, mixed with glycerine, having been previously sterilised or destroyed, by a temperature of 230 degrees. When a small quantity of the *malleine* is injected under the skin of the horse, two reactions set in, one, causing general trouble in the organism, and the other, an elevation of the temperature of the system, named respectively, the organic, and the heat or thermal, reactions. Both must be weighed, the former above all, in pronouncing a judgment.

Injected beneath the skin of a healthy horse, no reactions are produced. In a stable when the horses are inoculated, and when the tell tale *malleine* indicates a glandered animal, the latter must be at once isolated. It could be slaughtered immediately, but that would be onerous and farther unnecessary, when the external evidence of the disease, is not visible. But there is no necessity to take in hand animals so advanced. Ordinarily, when after several injections, the isolated horse displays no more reactions, it is cured. It can be allowed to return to its usual stall: the lesions, or morbid centres in the lungs, have been permanently healed. Science cannot explain how the cure is operated; it is as mysterious in its working, as the anti-hydrophobia vaccine. Veterinary professors Nocard and Roux, have inoculated 10,000 horses belonging to omnibus and other companies, and saved them from a heavy annual loss, to which they were subjected, from glanders, in the stables. It is estimated, that about 1960 horses are yearly attacked with glanders, and farey, in France. M. Nocard observed; take a healthy horse, that withstands the *malleine* test: mix up with its feed, a little of the liquid or dried pus, of glanders; in the course of 4 days, or 8 at most, apply the *malleine* test; the reactions will set in; kill the horse, and on examining the lungs, lesions will be discovered, exactly of the same nature as in the case of horses having contracted the disease by contagion. Hence, the importance of prudence in allowing horses to drink at public watering troughs. Also, that when a stable is infected with the disease, it would be well to make a second inoculation in fifteen days after the first; to ensure that no animal has escaped the test. The representative of Moscow alleged, that the experiments with *malleine* in the Russian cavalry, were not encouraging; many horses declared to be affected by the test, remained sound, were able to resume their work, and never had glanders. M. Müller, of Berlin, supported that view, but the testimony to the contrary was overwhelming. It would be well for governments to order experiments to be made.

**Tuberculine test.**—The discussion as to tuberculine being an indicator of tuberculosis, was very brilliant and practical. Here, the mass of evidence was so

gigantic in favor of the use of the tuberculine, that the vote of the Congress was next to unanimous; only two dissidents, but eminent authorities in veterinary science not the less: Messrs. Hess and Guillebeau. Professor Nocard has personally injected tuberculine under the skin of 3,000 cows; only on two occasions, did he fail, but these were cows far advanced in the disease. However, he has to his credit the compelling of the French government, to prohibit the sale of all milk-cows, that will not pass the test, while at same time to secure their isolation if already among a shed filled with animals and to ultimately have them slaughtered. M. Bang, of Denmark, produced the certificates of 45,000 cases, of successful injections, and but a few failures, due to the chronic stage of tuberculosis. M. Bang made a convincing statement; in his country, Denmark, the national industry was the manipulation of milk; it was also, unhappily, the country where tuberculosis most existed. Since 1893, the Danish government fought against the malady; now, since the application of tuberculine out of 45,495 animals operated upon, 18,399 were declared diseased, 40 per cent of the whole. Since 1893, the Danish government supplies the tuberculine, and has it applied gratuitously, by the State's veterinary surgeons, to all farmers who undertake to isolate those cows indicated by the test, to be diseased.

**Tuberculosis.**—Tuberculosis is propagated by contagion; heredity has but little influence in the matter according to Nocard, as the calves of tuberculous mothers, if taken away at once and reared on boiled milk, will not exhibit the disease, the cases to the contrary are very few. M.M. Hess and Guillebeau, courted a crucial experiment, they selected two cows that they declared to be healthy; they challenged professor Nocard to tuberculine them; he did so: and declared they were affected; one of the cows was slaughtered, but Mr. Hess and his colleague examined the lungs, and pronounced them sound, that is, exempt from lesions. While the second cow was being killed, Nocard, who is a patient and dogged investigator, went over the dissection work himself, and discovered the lesion. The laugh was now against professor Hess. They laugh best, the proverb says, who laugh last.

**Stallions.**—The Minister of agriculture has had to stop purchasing stallions for the breeding studs, owing to the cutting down of his estimates by parliament, and the decline—a happy result—in the receipts from the tax on the horse-racing gambling bets. But increased stimulus is being given to agricultural instruction and fresh life is being infused into the Farm-Schools. More attention is to be devoted to poultry raising, from the model breeds, to apiculture, and market gardening. As in other walks of life, it is by the small industries, backed by frugality, that France acquires and grips her wealth.

**Mutton.**—Agricultural depression has its capricious sides in France; the greater the fall in the price of wheat the greater the acreage under the crop, and the less the yield. Good corn, on appropriate land only, will produce many bushels of wheat, and that is one of the most feasible plans to combat low prices. For the moment, the trend of French farmers is a new departure to raise mutton. The demand for the latter is very great and constant, and neighboring nations are put under contribution for sheep, that France could as well produce. It is a

day dream to expect to be able to compete with Australia in wool, but she and Argentina can be fought over the supply of legs of mutton and of outlets. Save pork and ham, the French dislike salt meat; they are equally averse to tinned meat, and the only way they like the boiled down preparation, is in the form of extract, to make soup. Frozen mutton would meet with a sale were foreign shippers to provide centres for its distribution and prevail on the custom authorities not to cut up and disfigure the carcasses, as if they contained smuggled cigars or flasks of Cognac.

The precocious *Merino* is destined to replace the ancient varieties of that race. Flesh, is now required, not wool, but it will not be in a few years that the speciality of wool bearing can be bred out. Large, heavy breeds of sheep, on the other hand, can never become popular (1); the French desire a leg of mutton, that the family can consume at dinner; cold mutton is abhorred, and no cold meat is in much favour. Now farmers are occupied with the crossing of breeds, and hence the demand for English rams; only it is to be hoped, that breeders will not fall into the error committed some twenty years ago, forgetting to back good blood, by appropriate feeding, and not expect the blood to replace rations. The first necessity for a good crossing, is plenty of nourishment; hence, the aptitude to make meat, is nothing else than to secure the profitable assimilation. The Leicesters (2) is much employed in France for crossing: it is a heavy feeder, but less so than the Lincoln, which is not much utilized. The New Kent (3) is more easily kept than the Leicester, is more prolific and yields more fat, but it is not considered a good crossing breed for France.

The *Southdown* is the favorite race in France; it puts on plenty of lean meat, is precocious, and fattens easily. Its flesh is highly esteemed by gourmets, for its juiciness and flavour. It weighs less than the Dishley or New Kent, and varies in weight, from 130 to 170 lbs. at fifteen months old, and can yield 80 to 100 lbs. of dressed meat. (4) First class mutton fetches 4 sous more per pound, than the best beef, and the latter is sold at 2 fr. per lb. The farmer does not receive more than half a franc per lb. for his ox—the middle man and the butcher skin him; they obtain the fish, and he is secured next to only, the shells.

**Poultry.**—At the next agricultural show to be held in February, in Paris, a distinction will be made in the prizes for poultry: the birds will be divided into two classes, for eggs and table purposes. There is a tendency to give up the attempt to write these two ends in the same race. The cramming of fowls with food, in cribs, to cause them to put on fat in the shortest period, has received a check; such birds when dressed, look plump and very white, but when trussed, and roasted, they melt away to the chicken size, and lack flavour. The public declines to buy fowl so fattened: they prefer those fattened with a run in the farm yard; their flesh is pinky, well laid on, very juicy and grateful to the palate. They realize a higher price too, in the market.

(1) So, in England, small joints are wanted: hence, Southdown 60 to 64 pound sheep sell for higher prices than the 88 pound Hampshire-downs.—Ed.

(2) Too fat, as in the Lincoln.—Ed.

(3) Capital in August, from the lush grass of Romney Marsh.—Ed.

(4) Rather an exaggeration. An average Southdown wether, 15 months old, will not go over 16 lbs. a quarter. Hampshire, 16 to 20 lbs.

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The feeding of animals for the production of meat, milk, and manure, and for the exercise of force

INTRODUCTION AND HISTORY

By Sir J. B. Lawes Bart. and Sir J. H. Gilbert, M. A., L. L. D., F. R. S., &c., &c., &c.

It was shown in the last section (V) on the rotation of crops that any explanation of the benefits of rotation is quite inadequate which does not take into account the results of the feeding of animals on the farm. Thus in the discussion of the amounts of the produce of the various crops grown in alternation with one another, and of the amounts of the various constituents of the individual crops, or of their separate parts, it was pointed out that

only certain portions of them were at once available as salable products; a large proportion remaining for use on the farm in some way, and only eventually yielding a profitable return.

The extent to which the retention on the farm of the constituents accumulated in the crops may take place may usefully be illustrated by reference to a particular example, which will convey a clearer conception of the subject than any mere general statement can do. Accordingly, in Table 66 is given an approximate estimate of the proportion of certain selected constituents of the crops grown in the typical four-course rotation of Swedish turnips, barley, leguminous crop, and wheat, which will be at once sold off the farm, and of the amounts retained upon it; supposing that only the grain of the cereals is sold, and that the root crop, the leguminous crop, and the straw of the cereals are retained for further use. The estimates are founded on the average amounts of produce obtained over eight courses in the fully manured rotation, the particulars of which were given and discussed in the section on rotation above referred to.

TABLE 66.—Illustration of the proportion of the constituents of crops grown in rotation at once sold off the farm, and of those retained upon it for further use

	Per cent of total in the crops	
	At once sold off the farm.	Retained on the farm for further use.
	Per cent.	Per cent.
Dry matter.....	30.6	69.4
Nitrogen.....	43.4	56.6
Total mineral matter (ash).....	14.5	85.5
Phosphoric acid.....	56.2	43.8
Potash.....	20	80

It is true that the exact figures given in the table have only reference to a particular case, and that in practice there will sometimes be larger and sometimes smaller proportions of these constituents of the crops at once sold or retained on the farm. Nevertheless, the illustrations may be taken as essentially typical, and as so far conveying a very useful impression on the subject.

Referring to the figures, the question arises. To what beneficial or profitable purposes are about two-thirds of the total vegetable substance grown—more than half its nitrogen, nearly half its phosphoric acid and about four-fifths of its potash—retained on the farm? Briefly stated, it is for the feeding of animals for the production of meat, milk and manure, and for the exercise of force, that is, for their labor. It is, then, the facts and the principles involved in the feeding of the animals of the farm for these various purposes that we have now to consider.

It is obvious that so long as a country is only sparsely populated, and the needs of the people are amply supplied under a comparatively rude system of agriculture, in which extended areas precludes the necessity for improved methods, there would be little, either of scope or of inducement, to study economy in the feeding of animals or to systematic practice in regard to it. But as population increases in proportion to area, there

arises the necessity for increased production over a given area. It has already been pointed out in section V on rotation that, in our own country, gradually a greater variety of crops came to be grown; that first leguminous crops and then root crops were introduced, and finally the system of rotation became general. Thus, a much greater variety and a much greater quantity of home-produced stock foods became available, and in time foods of various kinds were imported from other countries.

Somewhat similar changes in their food resources occurred in various parts of the continent of Europe; and, with these, came the inducement, if not the necessity, to pay more attention to the subject of feeding. The end was however, sought to be attained by somewhat characteristically different methods in our own country and on the continent. With us, more special attention was paid to the improvement of the breeds of the farm animals themselves, not only to enhance the development of the most valuable characters in the final product, but to secure early maturity, and thus materially to economize the expenditure of food in the mere maintenance of the

much of the respective foods was required to substitute a given quantity of hay in the daily ration of the animals. His estimates were, at any rate, controlled by such experiments, and he states that their results, upon the whole, tended to confirm the conclusions arrived at by analysis.

Other writers also published tables of hay values, or hay equivalents of foods. In some of these the results of new experiments, sometimes analytical and sometimes practical, were embodied; but it is obvious from the identity of the figures in many cases that they were largely compilations, one from another.

Such was the condition of knowledge on the subject when Boussingault commenced his investigation of it, soon after 1830. Like Thaer, Boussingault had the advantage of being a practical agriculturist, but while Thaer looked at the question of the feeding of the animals of the farm almost exclusively from the practical point of view, Boussingault approached it mainly from that of the chemist and the physiologist; though he, at the same time, made direct experiments with farm animals, and so arranged and conducted them as not only to elucidate some points of special scientific interest, but also to afford data which might serve both for the explanation and for the improvement of agricultural practice.

Thus, besides contributing much toward a better knowledge of the actual and comparative value of different foods, he investigated the question whether animals either availed themselves of the free nitrogen of the air as a source of some of their nitrogen, or eliminated either free or combined nitrogen by the lungs or skin; also whether the fat stored up by the fattening animal was exclusively derived from the already formed fat of the food, or whether it was produced within the body, from other constituents of the food.

From the point of view of the practical agriculturist, Boussingault seems fully to have assumed the utility of attempting to arrange stock foods according to their nutritive value compared with that of hay as a standard; and, in fact, this idea has given a direction to much subsequent investigation also.

The first great advance made by Boussingault was, however, to determine the nitrogen in a large number of different foods; and taking the amount of it as for the time the best measure of nutritive value, on this basis to compare them with hay. That is to say—supposing 100 parts of average good hay to contain a certain amount of nitrogen, how much of each of the other foods would be required to supply the same amount of it. These amounts would, on the supposition adopted, represent the quantities by weight in which one food may be substituted for another, and they may be considered as the theoretical equivalents of 100 of hay. Accordingly he determined the nitrogen in about seventy-six different descriptions of food, which at that date involved a truly enormous amount of labor.

Further, he selected a few typical articles of food for comparative feeding experiments, so as to be able to compare the results obtained both with those indicated by theory according to their contents of nitrogen, and with the estimates of others founded chiefly on somewhat similar practical trials. He fully recognized the difficulties and uncertainties of such modes of experimenting and took great care to obviate error arising from them. He discussed the general results of some

living manure-making machine. As to the use and adaption of different foods, but little systematic inquiry was undertaken in regard to it, each feeder relying largely on his own judgment, or on the unwritten rules adopted in his locality as the result of practical experience.

On the Continent, however, and especially in Germany, much more attention was paid to the character of the food than to that of the animal, and toward the end of the last century and the beginning of this much was devoted to determining the comparative values of different foods, and tables were constructed in which, adopting hay as the standard, it was attempted to arrange all other foods according to their supposed value compared with that standard. The plan was to give the amount of each food which it was estimated was equivalent in food-value to 100 parts of hay.

The first comprehensive tables of "hay values" were constructed by Thaer, and were published by him in 1809. His operations, experiments, and writings were of an essentially practical character. His estimates of so-called "hay values" seem, however, to have been based to some extent on the determinations of the supposed nutritive contents of different foods which had been made by Einhof, but partly, also, on his own determinations, and partly on direct feeding experiments. In these he ought to ascertain how



experiments with milking cows but gave in some detail the particulars and results of ten experiments with the horse. The normal food being hay, straw, and oats, he in one case substituted half the hay by potatoes, in another by Jerusalem artichokes, in another by mangels, in another by ruta-baga, and in another by carrots. Again, in another the straw and oats were replaced by potatoes; in another half the hay was replaced by more oats and straw, and so on. In each case he noted the change in weight and condition of the animals in other respects, if any; and he judged accordingly whether the amount of the food given in substitution was too much or too little, and whether, therefore, the practical or the theoretical results were the most to be relied upon.

He brought together in a table (1) the estimates of the value compared with 100 of hay of the seventy-six different articles of food according to the amount of nitrogen he found in them; and side by side he gave the hay value of the foods according to the published estimates of others, and to the results of his own practical trials.

Subsequently, however, Boussingault was not satisfied with his results so obtained, and he pointed out that what was still wanting was the determination of the amount of the various nonnitrogenous constituents also, and of how much of them was digestible, and how much indigestible; and eventually he determined in ninety different food stuffs, not only the nitrogen, but the mineral matter, the woody fiber or cellulose, the fatty matter, and (probably by difference) the remaining nonnitrogenous matters, which he recorded as starch, sugar, and allied bodies. As to the nitrogen, he still, as formerly, multiplies the amount found by 6.25 to represent albumin, legumin, or casein.

He also still took 100 parts of hay as the standard by which to compare the nutritive value of other foods; as for ruminants and horses he considered it a good standard food, and that the relation in it of the nitrogenous and the digestible nonnitrogenous constituents was fairly normal. He now, however, modifies the meaning of the equivalent arrived at by taking into account the amount of digestible nonnitrogenous substance associated with the standard amount of nitrogen in each case; and, if there were a deficiency, he states how much of some food rich in digestible nonnitrogenous matters should be added to complete the equivalent, and so make it comparable with the 100 of hay. Indeed, he now laid it down that equivalent rations must contain equal amounts of digestible nonnitrogenous, as well as of the nitrogenous bodies.

In the case of the ninety descriptions of food which he analyzed as above referred to, he gives a table (2) recording the results obtained and then shows the amount of each food required to contribute the same quantity of nitrogenous substance as 100 of hay. Next he calculated how much nutritive nonnitrogenous matter, reckoned as carbohydrate of 42 per cent carbon, was supplied in the amount of each food containing the nitrogen of 100 of hay. If the amount were less than in 100 of hay he calculated how much straw was required to supply the deficiency, assuming straw to contain 45 per cent of such matter. The final result shows not only the same amount of nitrogenous, but as much of digest-

ible nonnitrogenous substances also as 100 of hay. If, however, the nitrogen equivalent of the food contained an excess of digestible nonnitrogenous constituents he did not make any corresponding deduction from the ration.

Boussingault fully recognized that food equivalents so calculated are only satisfactory in comparing foods of the same description, which he classifies generally as follows: (1) Hays and straws, (2) roots and tubers, (3) oily seeds, (4) cereal grains, leguminous seeds, oil cakes, etc. He pointed out that when the application of the tables is thus limited they are very useful in showing how one food may be advantageously substituted for another of the same class, according to relative abundance cheapness, and so on.

In conclusion, in regard to Boussingault, in giving a sketch of the history of the progress in our knowledge of the subject of the feeding of the animals of the farm it was only due to him to give prominence to his enormous, painstaking, and most conscientious labors in regard to it. This is the case, independently of any direct applicability of his results and conclusions at the present time, because he was essentially the pioneer, and his conceptions and methods have had a very marked influence on the direction of subsequent investigations.

It was in 1842, that is after Boussingault's first systematic discussion of the subject, but before his second, that Liebig published his work entitled "Chemistry in its Applications to Physiology and Pathology." In it he treated of food in its relations to the various exigencies of the animal body, and, apparently impressed as was Boussingault, with the fact that nitrogenous constituents were both essential and characteristic of the animal body, and that they must, therefore, be supplied in the food they consumed, and in the case of the Herbivora in vegetable food stuffs, he also, like Boussingault, indeed probably directly influenced by his results and conclusions, himself concluded that the comparative values of food stuffs, as such, were, as a rule, measurable by their richness in the nitrogenous, rather than in that of the nonnitrogenous constituents—that is to say, more by their flesh-forming than by their more specially respiratory or fat-forming capacities. Thus he says (p. 45):

"Chemical researches have shown that all such parts of vegetables as can afford nutriment to animals contain certain constituents which are rich in nitrogen, and the most ordinary experience proves that animals require for their support and nutrition less of these parts of plants in proportion as they abound in the nitrogenous constituents."

Again, at page 369 of the third edition of his Chemical Letters (1851), he says:

"The admirable experiments of Boussingault prove that the increase in the weight of the body, in the fattening or feeding of stock (just as is the case with the supply of milk obtained from milk cows), is in proportion to the amount of plastic constituents in the daily supply of fodder."

Liebig would probably be somewhat biased in favor of the conclusion here stated by the view he held, that the amount of force exercised in the animal body was measurable by the amount of nitrogenous substance transformed, and this again by the amount of urea found in the urine. To Liebig's views on this latter point, as well as on the question of the sources

in the food of the fat of the animal body, and on some other points of scientific, as well as practical interest, I shall have to refer further when considering each of these several questions independently. In the meantime, my special object is to show what were the prevailing opinions on the subject of the adaptation of foods according to their composition, to the sum of the requirements of the animals of the farm, which include not only those for the mere maintenance of the body, but those for increase in live weight, for the production of milk, or for the exercise of force, as the case may be. It was however, not only in regard to the foods of the animals of the farm, but to human foods also, that the system of estimating their comparative value according to their percentage of nitrogen came to be applied. Thus, different descriptions of flour and bread, and numerous other aliments, both vegetable and animal, were examined, and their comparative food values were assumed to be indicated by their richness in nitrogen.

(To be continued.)

## The Flock.

### ANTIQUITY OF THE COTSWOLD SHEEP.

In the course of an interview, with a representative of the *Cable* Mr. Arthur Acock (of the firm of Acock and Taylor, auctioneers, of Cold Aston, Cheltenham), gave the following interesting particulars of the history of the Cotswold sheep:—"The breed is supposed to be named from the cots (1) or sheds in which they were housed at night, or permanently in the winter, and the Wolds or open hilly grounds on which they pastured in summer. The breed is, of course, of great antiquity. It was distinguished as far back as the reign of Henry VI. In 1437 application was made to Henry VI, by the then King of Portugal for leave to export sixty sacks of Cotswold wool, in order that he might manufacture certain cloths of gold at Florence for his own use. Stowe, under date of 1467, wrote: 'Sheep transported into Spain.' In this year King Edward IV, gave a licence to pass over certain Cotswold sheep into Spain, by reason whereof it has come to pass at this day that the staple of the woollens, of Spain, except at Baycles (Bruges) in Flanders, is so great that our staple is not comparable to it. Markham, in Elizabeth's reign states that the Cotswold sheep were, as they continued in every period of their early history, 'A long woolled and large boned breed.' "There" (added Mr. Acock) "you get the feature." (2)

### BREEDS OF SHEEP.

The varied character of British stock is perhaps nowhere more strikingly manifest than in the number of breeds for which prizes are offered at the Royal Agricultural Society's show.

(1) The word, in the word "Cotswold" is the Anglo-Saxon word. *wald* = a wood. The *co* is the Celtic *coed*, also = a wood; two synonymous elements, like the river, mentioned in Rob Roy, the *Avon*, in which both *Avon* (afo); and *Avon* (dwr) are Celtic for water.—Ed.

(2) Master Slender chaffs Justice Shallow about his "Fallow dog" having been out-run on *Cotswold*. See "Merry Wives of Windsor."—Ed.

In 1893 prizes were offered at Chester for 23 distinct breeds as follows:

Leicester.  
Border Leicester.  
Cotswold.  
Lincoln.  
Oxford Down.  
Shropshire.  
Southdown.  
Hampshire Down.  
Roscommon.  
Limestone.  
Cheviot.  
Black-faced Mountain.  
Suffolk.  
Somerset and Dorset Horn.  
Kentish or Romney Marsh.  
Devon Longwood.  
Ryeland.  
Dartmoor.  
Exmoor.  
Wensleydale.  
Herdwick.  
Lonk.  
Welsh Mountain.

These are not sub-varieties caused by local crossing, but distinct local breeds handed down from father to son for generations and each with specific differences well known to experts. No doubt local peculiarities of soil and climate are influential in originating and perpetuating these distinctions, but they are well known to have distinct points that are maintained no matter where they happen to be located. The Leicesters and Border Leicesters may be mentioned as an example. The rival merits of these two breeds, which have been handed down for a century quite distinct were only last year very sharply contested by their various admirers. The number of distinct breeds is, however, gradually being curtailed, as the allied breeds show points of excellence that entitle them to preference. In 1839 the list for which prizes was offered at the Royal was as follows:

Leicester (D shley).  
Lincoln.  
Teeswater.  
Cotswold.  
Romney Marsh.  
Bampton Notts.  
South Ham Notts.  
Irish (polled).  
Southdown.  
Wiltshire.  
Shropshire Morfe. (1)  
Delamere Forest.  
Herdwick  
Cheviot.  
Scotch (black-faced);  
Merino.  
Dorset.  
Portland.  
Exmoor.  
Dartmoor.  
Cornish.  
Ryeland.  
Dean Forest.  
Mendip.  
Norfolk.  
Cannock Chase.  
Penistone.  
Shetland.  
Welsh Mountain.  
Wicklow Mountain.  
Kerry.

Spring Chickens Receive Attention at declining prices, but otherwise the poultry trade is about as dull as usual at this time of year. Turkeys quite neglected at low figures around 8a9c l. w. The season is so far advanced that spring chicks command only a small premium over hens. Country stippers should keep at home everything weighing under 1½ lbs.

(1) A very different sheep from the present Shropshire the latter was first admitted to the R. Soc's list at the Chester Exhibition, 1832.

(1) Rural Economy, etc. (English edition), 1845 H. Baillière, London.

(2) Economic Murale, Deuxième édition, 1851, vol. 2, pp. 356-363. Paris.

## GREAT FIRE IN LONDON

A fire, which rapidly developed into a conflagration of great dimensions, burst out between ten and eleven o'clock on Saturday night at a seed and grain warehouse at Hanbury's Wharf, Bankside, the nearest of the wharves west of Blackfriars' Bridge. Within a short time a large force of engines had reached the scene, and several steam floats played vigorously from the river. Owing to the inflammable contents of the buildings, the flames leaped forth in all directions, and very high into the air. The spectacle, as viewed by thousands of people on the bridges and Embankment, was most impressive. The estimated damage is £200,000.

During the fire a remarkable sight was witnessed by the vast crowds who had assembled on the Thames Embankment. A black mass was seen floating towards the Middlesex shore, and after a time it was found to consist of some thousands of rats, who, having found their quarters on the Surrey side attacked by fire, had taken to the water, and were attempting to swim across the Thames. The swiftly-running tide carried them a considerable distance out of their course. Some hundreds were drowned during the journey, but a number, computed at nine or ten thousand, of the rodents crossed from the Blackfriars to the other shore. Being unable to land owing to the wall of the Embankment, and exhausted by their swim, nearly the whole of the rats were drowned.

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

Bacteriologists have of late succeeded in sterilising milk, and have produced a pure culture of lactic ferments, which is employed in some dairies.

Last year, the question was agitated of learning what ferments are the best for use, and how to obtain them; for the fact is more and more recognized, that the maturation of the cream is the essential and decisive point as regards the quality of the butter; so it is most important to start with a good ferment if we wish to obtain a perfect ripening.

The ferments generally employed are: 1, the buttermilk of one's own creamery; 2, a freshly-made ferment; 3, buttermilk from a neighbouring creamery.

1. There are instances of creameries working very well for many years with buttermilk as the ferment; still, we must not form our opinion from such instances, since it has been proved that the defects in the ripening, when buttermilk has been employed, may be transferred from one tub of cream to another; it has even been proved, and very naturally, that the defects keep on increasing until another system of ripening has been adopted.

The ripening of cream with buttermilk from one's own creamery may be recommended so long as no faults in the ripening are detected. Instead of buttermilk may be employed sour cream, preserved for the purpose, this offers the same advantage, as well as the same risk, that is offered by the use of buttermilk, and is only to be preferred when, in churning or in cooling, there is a chance that the cream will absorb certain injurious micro-organisms or some other impurities. Whether buttermilk, sour

cream, or any other ferment be employed, when ready it must be kept cool lest it be spoiled.

2. These new ferments have only been in use during a few years. At first they were generally composed of a mixture of water and new milk; now they are a mixture of cream and new or partly skimmed milk; certain precautions are adopted to prevent the introduction of any impurities. When this ferment is freed from all foreign matter, some of it is warmed up and kept at such a temperature as is judged to be propitious to the development of those bacteria that produce the aroma of butter; on the success of this operation depend the more or less efficacious results of its employment.

The end held in view, when making a new ferment to take the place of buttermilk, was to improve the process of the ripening of cream; it should, therefore, be made of strict rule, when not sure of the efficiency of a new ferment, to examine its appearance carefully, to smell it, taste it, and above all to compare it with the buttermilk it is intended to replace; if it looks good, if the flavour, odour, etc., are better it may be used. But if the buttermilk seems better than the ferment, it should be used and the other put aside.

The only difference between cream and milk is that cream contains a greater proportion of fatty matters, and as these matters are inimical to the production of bacteria, there is no reason why cream should be preferred to milk. The great quantity of fat in cream, and perhaps the presence of other impurities, hinder us in trying to appreciate the taste of the ferment. Thus, for instance, sour milk, after having been stirred and cool, will appear to be turned, fermented, etc., while rich cream seems always to be uniform, even when it appears to produce effects unfavourable to proper ripening.

It is not everywhere that a good maker of a new ferment is to be found; local circumstances, more or less attention to cleanliness, etc., etc., are causes why in some places there are few proper bacteria, and why they are sometimes absolutely detrimental, injurious to the production of butter. Experience also shows that the milk of some cows, of cows, that is, whose period of lactation has been prolonged, is far from being so favourable to the production of a good ferment as the milk of other cows.

The taking of the first milk at hand to make a new ferment is by no means a matter of indifference; on the contrary, the maker must exercise great care in his selection. It is equally wrong to take the cream as it leaves the separator, without knowing whether it comes from bitter, salt or otherwise impure milk, which is good for nothing.

When preparing a new ferment, the maker should make experiments with the milk of the cows of different patrons, and try thus to find out that which suits his purpose best. He should then make arrangements with the patron that sends in the best milk, and engage that patron to send him the milk of fresh cows, in good health, well fed, and to take care that the milk arrive at the creamery while still warm, or that it be cooled at the farm. When arrived at the creamery, the milk is to be put into cans of a long conical form, after they have been cleaned with soda, scalded, or steamed; after which, and as soon as possible, they are to be plunged into iced water. In the afternoon, there will already be, on the surface of the

milk, some cream with the richest part of the milk, which is to be removed by skimming; the remainder, half-skimmed milk, is exactly what is needed for the production of a new ferment.

The milk must then be warmed; this is most easily done by putting the cans into hot water; during all the time the milk must be kept continually stirred by a proper tool—a plate or disc of metal at the end of a handle—which has been as carefully cleaned as the cans and skimmer.

It has been found that milk in different places, under the influence of local circumstances and varied seasons, must be heated up to from 77° to 86° F. for 18 or 20 hours, so as to become uniformly sour. In this respect, tests should be made from day to day, and from week to week. When the intended temperature has been exactly gained, the can is to be placed, without spilling anything, in a cask partly full of hay, in such a manner that it can be lowered or lifted through an opening; a cover is then put on it, on the top of which is laid a mattress of hay, and it is left untouched till next day.

The first thing to be done on the morrow is to examine the new ferment, and to watch for the moment when the exact and uniform degree of acidity is formed; the progress towards too great acidity is then to be arrested by immersing the can in cold water. It is best, in creameries, that the ferment be ready from 8 to 10 o'clock; the can is then removed from the barrel, the smell of the ferment is tried, the surface is skimmed off, for sometimes the air has a bad effect on the milk; after this, the ferment (*starter*) is stirred with the tool mentioned above, and is then put into cold water, where it remains until wanted for use.

On comparing the new ferment with buttermilk, it will be found that the former is not so acid as the latter; so a little more of it must be used.

A defect, that may be experienced in the use of the ferment, is that the ripening is not the same every day; consequently, the butter made on different days is not uniform, while uniformity in the quality of the butter is easily obtained by the use of buttermilk.

The making of the new ferment and its employment is recommended when the quality of the butter is found to be going off, or at least is not giving satisfaction; especially when the milk brought to the creamery is not fresh, clean or well flavoured; and when it is hoped to succeed in obtaining an average quality by using it by means of a new *starter* made from very fresh milk of perfectly good flavour. On the contrary, the new *starter* should never be employed when it is not so good as the buttermilk. When the quality of the butter is not satisfactory, and it is impossible, or almost impossible, for whatever reason, to make a good new ferment, it is better not to use it.

3. *Buttermilk* from a neighboring creamery. The butter, when buttermilk is needed, must be good and the ripening of the cream be conducted under the very best conditions. The practice of ripening cream with the buttermilk of another creamery is very old. It has been chiefly followed in places where churning was growing difficult, and when the cream, instead of becoming uniform, was growing bitter or taking on a bad smell.

It has been found that, when the maker got good buttermilk from another creamery, the ripening of the

cream went on well, and that afterwards he obtained good results by using his own buttermilk; but, on the other hand, it seems that this is not always the case, and that, after a few days, difficulties in ripening the cream occur. This is easy to be understood, for the same causes that previously produced bad butter had not been obviated, and kept on preventing the ferment from producing its proper effect. In such a case, recourse is had to a sovereign remedy: a general clean up; the cream barrels, the churns, and all wooden utensils are scalded out, several days in succession, and the rooms, &c., are white-washed. This is considered necessary and effective, but is not enough; attention is drawn to another, to wit, the daily introduction into the cream of a first class ferment containing the best bacteria. This may be done by getting every day some good buttermilk from another creamery; but if the distance is too great, or the carriage difficult, buttermilk, in which good bacteria have been very carefully cultivated, may be used, and added to the cream in proper quantity.

That the buttermilk from another creamery should rapidly lose its force during the ripening of cream, is easily understood. The cream constitutes a medium less suitable to good bacteria, it even contains numbers of micro-organisms which hinder their development, and consequently prevent them imparting to the cream the desired qualities.

Wherefore, it is advisable and necessary to make daily a new ferment with milk of the best quality, as described above. After having skimmed, pasteurised, heated it to 176° F., kept it at that temperature for half an hour, or, if possible boiled it, to kill or render harmless the injurious micro-organisms, and cooled it down again to from 77° to 86°, 5 to 10 p. a. or more of buttermilk from another creamery is added. By leaving this mixture covered in a warm place, a good ferment will be made which can be used the next day, and part of it can be kept as a starter to be added to pasteurised milk on the morrow, and so on. In many creameries, experience has shown that this process is a very successful one.

*Pasteurisation of cream.*—This has been practised in many Danish creameries for the purpose of obtaining a better ripening of the cream. Formerly, it was thought sufficient to practise great cleanliness, and cooling the cream so that it should keep set and cool until the moment of adding the starter arrived. Dr. Lund and Dr. Jensen were the first to make investigations and experiments in different creameries in Denmark, and these inquiries have shown that pasteurisation, done properly, neither injures nor diminishes the superior quality of the product, but is always advantageous; that it increases the keeping quality of the butter, while at the same time it carries off any bad smell or taste, and renders the churning and making up more easy. Still, pasteurisation causes a greater consumption of fuel, water, and ice, while the yield of butter is slightly decreased; partly, because a greater quantity of fat than usual remains in the buttermilk, partly, because the butter contains less water than usual; as to this last result of pasteurisation, it may in many cases be considered rather a benefit than a detriment.

In small creameries, pasteurisation may be practised by putting into boiling water each pail of cream as soon as it leaves the separator, and heating it to a temperature of from

162° to 170° F., stirring constantly to prevent burning, it is then put quickly in iced water.

In large creameries, the heating is best and more cheaply done by the pasteurising apparatus of Dr. Bjord, which is filled with cream before the steam is introduced.

Cooling is best managed by letting the hot cream from the pasteuriser run directly over the Schmidt's refrigerator, in which the cold water is pumped from a reservoir and, if necessary, cooled with ice before using.

The froth or foam of the cream should be pasteurised and cooled by itself, and then mixed with the rest of the cream.

In many factories, where both skim-milk and cream used to be pasteurised immediately after operation, Dr. Lund tried the effect of pasteurising the whole milk before separation, and of cooling the skim-milk and the cream immediately after separation. This plan, replacing the two successive pasteurisations, was found to be excellent: the skimming was as well done, and the quality of the butter compared advantageously with the quality of the butter from pasteurised cream. There was less butter, however, and in this case as well as in the case cited above, there was more fat in the buttermilk and less water in the butter.

As average results of the analysis made in different creameries where the experiments took place, Dr. Lund gives the following figures.—

	Percent- age of fat in the butter milk.	Percent- age of water in the butter.
Cream unwarmed....	0.37	14.37
Cream pasteurised....	0.45	13.77
Whole milk pasteurised.....	0.63	12.85

It is to be feared that this loss of butter will, in future, prevent this method from becoming general, although it is worthy of attention from the superior quality of the butter it gives. It is also probable that the great consumption of water and ice demanded by pasteurisation will prevent, in many places, the process being carried on throughout the year.

At starting, it is impossible to decide how low the cooling must be always carried, neither can the proper temperature for pasteurising be determined. All this seems to depend upon local peculiarities.

In small creameries, where there is not a large supply of water and ice, very satisfactory results have been obtained by working the cream down to 41° to 46° F. and putting it into the cream-cask into which the ferment has previously been introduced. In other establishments, it has been necessary to cool the cream much lower, and afterwards to raise it to the proper point of ripening. Dr. Lund says it ought to be cooled down to 41° to 46° F., or rather as low as possible; moreover, he says it is very important that the cooling should be done as quickly as possible, as this has a double result: first, of removing the flavor of boiled cream pasteurised at 167° to 176°; secondly, of ensuring the increase of the keeping quality of the butter from, probably, the enfolding of the micro-organisms and the prevention of the development of the spores that were not destroyed by the heating. It may be said that in creameries where the quality of the butter was more or less faulty, when pasteurisation had been introduced, a very great improvement was speedily detected, when the pasteurisation and

the cooling were carefully done, and when a good ferment was used, especially if this ferment was of butter-milk from a creamery in which a superior butter was being made.

Pastourisation, in some places, may have given results hardly satisfactory, but this may have been the effect of the want of skill of the maker, or of various other reasons.

(To be continued.)

Swine.

SWEET AND SOUR MILK FOR PIGS.

Prof. Henry, of Wisconsin, says in the Breeders Gazette:—We have conducted a good many experiments here at the station with milk singly and in combination with other food articles for pigs, and have always found skim milk a most valuable article, especially for young pigs. Unfortunately there is most always an overplus or a lack of this product. Frequently just when there are nice litters of pigs, all with huge appetites, the milk supply is most limited, and then the opposite condition occurs. I have read much pro and con about sweet skim milk and sour skim milk for pigs. We have done no experimenting directly on this point, important as it is. After listening to both sides of the controversy I have rather sided with those favoring sour milk. (1) By sour of course I do not mean rank sour, but that first acid which comes from the turning. In the first place very little of the food value is lost in such milk compared to what some suppose. Only a little of the sour sugar has turned to lactic acid, the rest remaining yet as sugar. We all know how healthful butter-milk is in summer time, and sour skim milk is practically the same substance. So long as sour milk makes such splendid pigs I should not worry to keep it sweet. (2)

In these experiments bones from milk fed pigs were the strongest we made. To the breeder of pigs for sale let me urge dairying as an adjunct. Skim milk from every good dairy cow should be worth \$20 a year to the breeder of fine pigs, and this added to what the butter brings will make the cow generally quite profitable. It is not at all strange that milk should be so effective when we reflect on its character. It is nature's food for a young animal, the growing calf, and when we have extracted the fat we have still left all of the mineral matter for the bones, as well as the protein—that which goes to make up most of the hair, hide, horns, &c.

- (1) The great Arthur Young soured food on purpose for pigs, having ten tanks on purpose.—Ed.
- (2) Neither should we.—Ed.

NOTES AND NOTICES.

GRIMM'S EVAPORATORS.—At the recent exhibitions all over the country, great interest was manifested in the Evaporators manufactured by the G. H. Grimm Manufacturing Co., of Montreal. These Evaporators are now so well-known and appreciated that the demand is greater than ever and persons thinking of purchasing an Evaporator should write for full information and place their order early. Address G. H. Grimm, Mfg. Co., Montreal.

THE FAMOUS ONTARIO BUSINESS COLLEGE. We would draw the attention of our readers to the advertisement of the famous Ontario Business College of Belleville, Ont., now in its 27th year. This institution is the most widely attended business college in America and has the highest reputation for thorough teaching and general efficiency. There are constantly in attendance a large number of students from the province of Quebec. We would advise young men and parents desiring to give their sons a start in life, to send for the catalogue of Ontario Business College to Messrs. Robinson & Johnson, the principals, Belleville, Ont.

We take pleasure in calling the attention of our readers to the advertisement in another column of THE BAIN BROS. MANUFACTURING Co., Ltd., of Brantford. This firm is one of the most prominent and successful concerns in Canada engaged in the manufacture of farm and freight wagons and sleighs. Their goods are well and favorably known throughout the Dominion, from the Atlantic to the Pacific, and their largely increased output each succeeding year is one of the evidences that their goods are popular with the Canadian farmer. They are built of the best grade of material, neatly finished, and give the best satisfaction to those who use them. At the latest improved machinery specially adapted to wagon building is to be found in their extensive factory. None but the most skilled workmen are employed. As a result, the "Bain" goods have made their way and won universal recognition as being the best of their kind to be found anywhere.

It might also be added that this concern has recently acquired the business of the Bain Wagon Co., Ltd., of Woodstock, and with this valuable addition to their own enterprise, they are now better equipped than ever before to turn out first-class goods in the shortest possible time. Their goods were on exhibit at all the principal fairs and they presented some entirely new features in the art of wagon building, in the Bain Holey Patent low down wagon, which attracted so much attention at the fairs last year. Farmers and others will do well to see what is called The Great Success of the Century in Wagon building: THE BAIN WAGON. The Massey-Harris Co., are agents for the Province of Quebec.

CONSUMPTION CURED.

An old physician, retired from practice, had placed in his hands by an East India missionary the formula of a simple vegetable remedy for the speedy and permanent cure of Consumption, Bronchitis, Catarrh, Asthma and all Throat and Lung Affections, also a positive and radical cure for Nervous Debility and all Nervous Complaints. Having tested its wonderful curative powers in thousands of cases, and desiring to relieve human suffering, I will send free of charge to all who wish it, this recipe, in German, French or English, with full directions for preparing and using. Sent by mail, by addressing, with stamp, naming this paper, to W. A. NORTON, 820 Parkers' Block, Rochester, N. Y.



Is Pure Salt . . . . . Nothing but Salt . . . . . Live, Bright, Sparkling Crystals . . . . . The SALTIEST SALT in the World.

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PETER ARKELL, Summerhill Stock Farm, Tecumseh, Ontario, Canada, two miles from Tecumseh, C. P. R., and eight miles from Midway, G. T. R., breeder and importer of Registered Oxford Down Sheep. Stock of all ages and both sexes for sale. Correspondence invited. Visitors always welcome. Telephone Office, Tecumseh. 11 95-12

FOR SALE.—A few pure bred Silver Grey Dorkings. My Dorkings won the silver cup for the highest scoring pair of fowls at the Eastern Exhibition, Sherbrooke, P. Q. I also took 1st prize for the best breeding pen. Eggs for hatching next spring. Apply to H. J. GOWNE, Mt. Gowne, Upper Melbourne, P. Q.

I. J. PARNELL Spring Road, P. Q. — Breeder of — Leicester Sheep and Improved Yorkshire Swine. Two sows and one Boar 3 months old for sale. Orders booked for fall letters. 10 95-11 GUY CARR, Compton Station, P. Q. Breeder of REGISTERED CANADIAN PATTLE, Southdown Sheep, Plymouth Rock Fowls. Won 1000 prizes in Quebec, Ontario, Vermont and New York. 95 10-31

400 CARDS, MOTTOES, GAMES, Puzzles, etc. Also, samples of our NEW CARDS and our mammoth Catalogue, all free, provided you send 5c. for postage and packing. Address: W. H. GAGNE, P.O. box 190, St. Justin, P. Q. 6 95-61

Choice Leicester Sheep for Sale. The Eastern Townships Flock, having carried first prizes at Exhibitions, sheep of both sexes for sale. Each sheep has required qualities for registration. Young rams, \$10 each. R. W. FRANK, Kingsbury, P. Q. 11 95

Nice Apples of "Sauvageon." Send us between this and the first of May next, one dozen of your nicest apples of "Sauvageon." Their prizes are awarded. 1st Prize—95 "Wealthy" . . . . . JUNE 2nd " — 50 " . . . . . APRIL 3rd " — 25 " . . . . . FEBRUARY These trees will be delivered next spring, provided that the winners supply us with all the desirable particulars on their apple and apple trees. The Rev. Trappist Fathers, Oka, Que.

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