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**THE ILLUSTRATED
Journal of Agriculture**

Montreal, September 1, 1895.

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Notes by the Way.

Prediction of night frosts in spring.—Every farmer should have in addition to a barometer, two thermometers, a dry-bulb one of the ordinary construction, and another the bulb of which can be kept constantly damp. This may be done in the simplest way by surrounding the bulb with a piece of cotton-wick, the other end of which is kept in a small cup constantly supplied with water. The meteorologist, Hammerman, states, as the result of numerous investigations, that frost may be expected if the reading of the wet bulb thermometer in the afternoon minus 4° C. is zero or less.

Home made fertilizers.—A profitable way of dealing with the materials from which are compounded the ordinary fertilizers seems to have been practised in New-Jersey last year. Seven hundred tons of different stuffs were bought, at a cost of \$20,790, in which the nitrogen cost 14.9 cts a pound, available phosphoric acid 5.7 cts a pound, and 4 cts. a pound for potash. According to the Report of the Station of New-Jersey, the average cost of these elements had they been bought in the form of mixed fertilizers from dealers, would have been, severally, 24.3 for nitrogen, 9.4 for available phosphoric acid, and 6.7 for potash; the cost of the constituents of the 700 tons would therefore have been, \$34,889, instead of \$20,790, a difference of \$14,649; a notable saving indeed of, in round numbers, 70%!

Giant knot-grass, otherwise Sachaline.—From all we can gather this much vaunted fodder crop turns out to be a failure; but it would be a gratification to all of us if M. Bouillier, of Ste Thérèse, would send us a description of the present state of his plants.

Drain-pipes.—If within 40 miles of London (Eng.) one inch drain-pipes can be sold at a profit for \$3.00 a thousand at the kiln, and all Parkes', the great drainage-engineer of our day, drains were made with that sized bore, there can be no reason why we should use 2½ inch pipes here, at a cost of \$8.00 a thousand, to say nothing of the extra cost for the carriage. Ourselves, we never used quite so small a pipe as the one inch, but with the 1½ inch pipe we drained hundreds of acres, allowing 2½ only for the mains. Springs are, of course, quite a different thing to drain; for them the size of the bore must be suited to the discharge of water.

Rape.—In several experiments, at the States experiment-stations, on green fodder crops, rape has been found to give the greatest weight of crop. As to quality it is far before green-corn, tares, and all the rest.

Warts on teats of cows.—An exchange recommends putting lard on the teats of cows twice a day, after milking for several days. The compositor evidently omitted a comma after the word "milking."

Water before grain.—The same paper asks: "Do you ever give the horses a drink in the morning before feeding them grain? If not try your own breakfast that way once." But we do not eat grain for breakfast.

A puzzle.—And again, from the same source: "Stork that is allowed to fall off in condition is always kept at more or less cost, for it costs as much or more than it originally did to put them back to the weight they have fallen from." What a wonderful sentence.

Varying terminology.—"Better to sell one inferior animal than breed it even if you must sell at a sacrifice." But you have bred the animal, or at least some one or other has bred it; unless, the term is intended to read "breed from it," which appears probable.

Sheep.—"All unnecessary driving or chasing of sheep should be avoided." The writer of the five paragraphs we have criticised must have thought he was addressing an audience of little children.

Horses for England.—The styles of horses most wanted in England are chiefly three in number: the showy carriage horse, the "machiner," as it has been long called, i. e., the same sort as our old tram horse; and a heavier kind for van-work.

The carriage-horse must not be less than from 15.3 to 16.2, and fine knee-action is indispensable. Pace is not required, but plenty of weight. Fast driving, except when late on the road to the meet (of the hounds) is considered ill-bred. Not but what men like to have horses than can go if wanted, but a pace over 9 miles an hour is not needed. A really good carriage horse, quiet in harness and sound, with perfect action will fetch any sum from \$1,000 upwards. Lyne Stevens gave, in our "about town" day, \$5,200 for a pair for Madame's barouche. Madame was, before marriage, Mlle Davernay, the original dancer of the Cachucha, and one of the loveliest women we ever saw. She died last year.

The Machiner.—the old coaches, in the last century, were called, the Bath Machine, the Portsmouth Machine &c. runs about 15.2 to 16 hands, and is a coarser sort of animals. It may sell for from \$180 to \$280.

The third, or van-horse, is a heavier style of machiner. If the feet are not good, no horse can stand the work of the London pavement. Weight, other things being equal, is a selling feature in all horses.

Fodder-crops.—In Vermont, among the experimental crops of green-fodder, were sown our own special favorite rape, and a mixture of pease, oats, and rape. The largest yield of dry matter, 7,491 lbs. an acre, was made by rape, and this plant produced a larger crop when the drills were 6 inches apart, than when 27 inches apart. In our oft repeated opinion, rape should always be sown broadcast. At 3 inches between the drills, only the hand-hoe can be used, and that would cost a great deal more than we can afford, even if the labour were available. In one of the reports from the U. S. stations, it is remarked that, in growing Mr. Robertson's mixture for silage, the sunflowers and corn did well, but the horse-beans were a failure. They will generally fail unless they are planted very early in the spring, as the nigger, or black fly, cuts the blossoms to bits unless the pods set early. As for sowing them with the corn, that is clearly an error. On the 5th of August, last year the horse-beans, at Mr. Crane's farm near Valois, were in bloom, and the nigger was hard on work upon them. Sow thick, at least 2½ bushels to the acre, in drills 24 inches apart, if you intend horse-hoing them, though we should prefer for cutting half-ripe for silage, to sow broadcast 2½ bushels an acre, particularly if they cannot be got in before the middle of May. When prevented from sowing early, why not try pease instead of horse-beans, the silage would be about as good, and the crop, cut half-ripe, would be bulky enough.

Sachaline.—which plant we mention above, has not given satisfaction in the States, and its general cultivation is not recommended. But it strikes us that as a protection to the banks of streams it would answer well. Why do not the people of Chamby try it on the bank of the "Bassin," which in our day used to be annually devoured by the spring freshet?

Artichokes.—The so called Jerusalem artichoke was grown last year at Newport, Arkansas; drills 36 inches apart, and sets 18 inches apart. The yield was 454 bushels an acre; at 3 ft. x 3 ft. at Fayette, in the same State, the yield was 612 bushels an acre. Hogs did well on them, and they have one great advantage over potatoes; they need no cooking. We should feel inclined to set some in the corners of the fields, were we farming now. In this good city the tubers brought to market are very small, from being set too close and allowed to stand too long without re-planting.

Red-clover.—We constantly see in the reports of the crops in the States that the red clover is a failure in certain districts. The loss of plant is at one place attributed to the drought at seed-time, at another to the rigour of the winter; but, somehow or other, it is only the red clover that suffers; the Alsike survives owing, of course, to its being so much hardier than the other. The real reason is, of course, that owing to its having been sown so often, at too proximate periods, the disease, as it is called, affects the red-clover on this continent as it has long affected it in England, where it rarely takes if sown oftener than once in three rotations.

Fall-feeding meadows.—In England meadows are fed, at intervals after mowing, from the time the hay is carried till the end of January, and they are none the worse for it. So, when an Englishman reads the following extract from the "Vermont Farmer's Advocate," he is surely puzzled. But when he comes to learn that the grass of the meadows is all timothy, he immediately sees that the practice is so far a wise one, as he knows that the root of that grass is of a bulbous nature, and liable to be pulled out by the stock; whereas the grass he has been accustomed to at home is a compound of perhaps fifty different kinds, that are so firmly rooted as to require the exertion of great strength to eradicate them. Of course, it remains a marvel to him—as to us—why farmers persist in sowing this one grass, from which only one hay-crop and no after-feed can be secured; and more particularly is he puzzled when he learns that, though good for horses, timothy is but poor food for either cows or sheep.

Now and then a farmer will turn his stock on a meadow as soon as haying is over, particularly if it is not a very productive one. This is poor policy and will help to keep the field from possessing much value, as without attention in some other way it must be continually growing poorer.

This fall feeding of meadows as generally done is a questionable practice and is apt to cost the owner more than it comes to. A neighboring farmer has a back field that he used to treat in this manner. The result was the grass would not hold out, and would have to be ploughed and re-seeded pretty often. He thought the land was leachy and would not retain the manure. He decided to make a change and not allow the stock to run upon it at all. Since he commenced this practice—a few years ago—there has

been a great improvement in the hay crop, the yield being much larger with less necessity for ploughing as often as before. In this case there has been a great gain in not feeding the meadows at all.

Surely a mixture of seeds, such as any dealer would furnish, suitable to each peculiar soil, might be tried at least. Surely, as we have said times out of number, the lawns in Sherbrooke Street afford plenty of proof that permanent grass is by no means an impossibility in this country. When a farm is situated near a town where there is a good market for hay, and abundance of dung to be bought for a mere song, as in the case of our friend M. Séraphin Guérard, of Sorel, it is a different story, for he has good sale for all the timothy he can send into that city, and can buy a ton of dung for 30 cents within 300 yards of his land! Twenty tons of dung for one ton of hay! What a lounge!

Price of horses in England.—Since we wrote about horses for England on the first page of this number, we have received a report of the sale of the Prince of Wales' drafts. One pair of carriage horses sold for 1,000 guineas: £5,000.]

Early harvest in England.—On July 12th, on the Kent and Sussex coast, both wheat (Talavera, probably) and winter-oats were in shock. This is by some days the earliest cutting of grain we recollect in an experience of something like sixty years.

The weather.—Such a grand rain fell here on the 27th July. Perfect in its gentle descent, and yet plenty of it [1]

SUBSOIL-PLoughING.

(By the Editor.)

We have been asked for our opinion as to the advantages to be derived in this country and climate from the practice of subsoiling. Born and brought up, as we were in the county of Kent, England, where, every five years, the land intended for root-crops; or for summer-fallow if the land was heavy clay, was broken up with a *turn-wrest* plough, drawn by four heavy horses, and where the clover-leys were turned over nine inches deep; we are naturally strongly in favour of deep-ploughing of any kind, if done at the proper period of the rotation. One unvarying rule was followed in our old county, i. e., never to give the deep furrow at any other season of the year except in the autumn, and always to follow it with a manured crop. The practice answered admirably, and from what we hear from our old Kent friends is not yet abandoned. It naturally required a great outlay in horse keep and wages, for a boy to drive, as well as a man to hold, was necessary, and the horses were not light half-breds, but good, weighty beasts; some 1,500 to 1,600 lbs. each, as well as we can remember, for we never weighed horses in those days.

During the last eighteen months, there has been a good deal of discussion, in English papers, over a system brought forward by General Middleton, a retired officer of the Royal Artillery, most of whose life has been passed in India. This plan is to break up land three feet deep, by manual labour of course, and to sow wheat. Many a crop-return is stated to have

been from 80 to 100 bushels an acre; but, Sir John Lawes, whose opinion is, as we all know, very well worth listening to, has evidently no confidence in the practice, as he has offered prizes to the amount of \$25,000 each to any man who can, by this system, secure a crop of, we think he says, 90 bushels an acre.

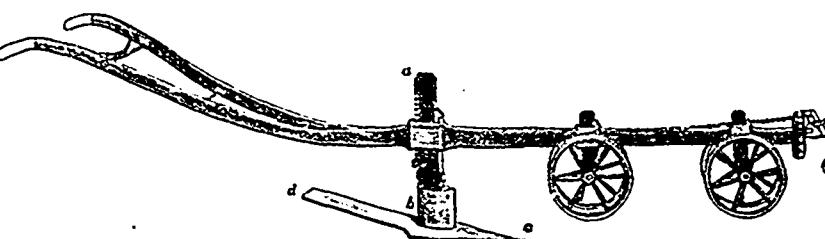
The late Marquis of Tweeddale, so well known in Scotland as a success-

ful farmer, and an ingenious inventor of agricultural implements, brought out, in 1849, what he called a "Sub-soil trench-plough," an engraving of which we give at page 000. As will be seen by inspection, this plough is an adaptation of Read's subsoiler (v. p. 000) differing from it in the prolongation of the shank of the share, which instead of acting as a cutter, takes the form of a sort of tail.

ORDINARY SUBSOIL-PLoughING.

ful farmer, and an ingenious inventor of agricultural implements, brought out, in 1849, what he called a "Sub-soil trench-plough," an engraving of which we give at page 000. As will be seen by inspection, this plough is an adaptation of Read's subsoiler (v. p. 000) differing from it in the prolongation of the shank of the share, which instead of acting as a cutter, takes the form of a sort of tail.

be taken at £2 per acre. The rationale of this enhancement of value is to be found in a perfect system of drainage, followed *some years afterwards* by the deep ploughing. The manuring application has not been more expensive than is commonly followed by every judicious farmer. The general results may challenge comparison with those of the best land in the country. In 1849, the turnips were superior to the



TWEEDDALE SUBSOIL TRENCH-PLough.

board, and following in the furrow made by the common plough, not only breaks up the subsoil, but, owing to its peculiar form, elevates a portion and mixes it with the regular plough-furrow.

The breadth of the share of this subsoil-trencher being 14 inches and that of the preceding "Tweed-

general crop, and in 1850 they are superb; while the wheat crop was both bulky and abundant."

The terror expressed by many farmers of bringing up the subsoil near the surface we deem wholly chimerical, for although injury may have been sustained, in some instances, by bringing up the subsoil at an improper

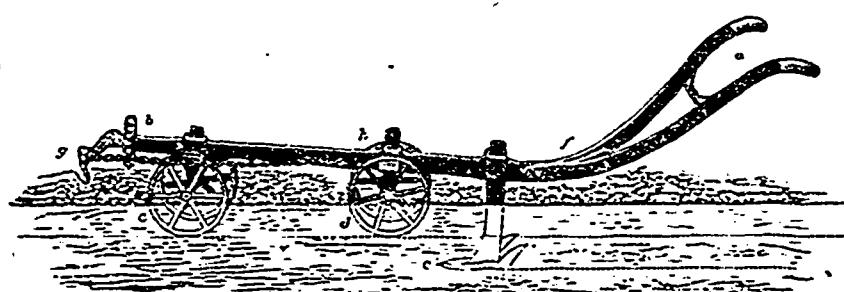


THE TWEEDDALE SUBSOIL TRENCH-PLough AND THE TWEEDDALE PLough IN OPERATION.

dale plough" being only 12 inches, it follows that an inch of each side of the furrow-sole is ploughed twice, and consequently that no ribs are left in the subsoil, which must add to the perfection of the work, as the soil of the whole of a subsoiled field worked by these implements will, when completed, be found to be stirred to an equal depth throughout. But,

period of the rotation — when a white crop, for instance, was to be taken, or before the land had been thoroughly drained — no instance, that we are aware of, can be adduced of injury having been sustained after thorough-drainage, by any green crop, which ought always to be taken after trenching and subsoiling.

The original subsoil plough was in-



READ'S SUBSOIL PLough.

as these tools require eight horses to work them, four in each plough, it is hardly necessary to say more about them, except to give Mr. Stephens' observations on what he saw of the crops produced by their work.

"I have had repeated opportunities of observing the progress of improvements effected by these valuable im-

plements on the farms in the Marquis of Tweeddale's own hands, of Yester Mains and Broadwoodside. The latter farm has been managed for the last six years under the system of *deep* ploughing; and it is consistent with my own knowledge that, at the commencement of a six years' course of improvement, the land on that farm was not worth more than 7s. or 8s. per acre. The present value may safely

soil of many parts of East-Anglia — Essex, Suffolk, and Norfolk — was drained by the Romans during their occupation of Britain, rows of cows' horns having been found 30 to 36 inches below the surface which could hardly have served for any other purpose.

One great fault in the Deanston subsoiler, its unsteady action, rendering it difficult to hold, and thereby making its work on the subsoil uncertain, led Mr. Read, of Piccadilly Circus, to add wheels to it, and thereby steady it.

This last is the only one with which we have any personal experience, though in our time the two wings in the rear of the share, each of which appears to be intended to act as a sort of grubber, v. cut, p. 000, had not been invented. They must add considerably to the draught, and may be omitted without deducting much from the utility of the implement.

The great object of subsoiling ought to be to increase the depth and pulverise the soil to a finer state, in order to give the plants cultivated a larger range for their roots to search for natural, in addition to the artificial food supplied them; and, in my opinion, the pulverisation will be better and easier effected by the deep-ploughing, after the drains have rendered the land as dry as they can, than before that event has taken place. So far, therefore, ought deep-ploughing to be made an auxiliary to drains. As a duct for the conveyance of water, it ought to be deferred until the drains have performed their legitimate office of drying the land, when deep-ploughing will come in with powerful effect to deepen and pulverise it into a state in which it will continue for a considerable time thereafter. To attempt to pulverise soil, before it has been thoroughly dried by draining, is to begin at the wrong end of the process.

As for Howard's subsoil plough, it is probably, as are all implements that derive from that firm, a meritorious implement, but we can only judge of it by the annexed engraving, and it seems to us to have the old fault of the Deanston subsoiler: it leaves the sides of the sole of the furrow unbroken.

Stephens' description of the method of executing subsoiling is as follows:

The effect of subsoil-ploughing with Smith's plough, being merely to stir the subsoil without affecting its relative position with the upper soil, the best way of performing the operation is, as I conceive, in the following manner; and it may be executed either in winter or in summer, according as it is made to form a part of the spring or summer's operations. It is best executed *across the ridges*: let, therefore, a furlong of 30 yards in width be opened across them with the common plough along the upper fence of the field — and parallel and close to it, if it be straight — and another at 30 paces distant, the subsoil-plough following in both the open furlongs, with 4 horses — one man holding it while the horses are driven by another. The common plough then closes the furlongs, and ploughs from one furlong to another until the open furrow is formed in the middle of the furlong, followed implicitly all the time by the subsoil-plough. Feeding after feeding is thus made and ploughed with the common plough, followed by the subsoil, until the whole field is gone over, with the exception of rather more than the breadth of a ridge at each side of the field, upon which the horses had turned. Fig. 547 gives a representation of this mode of subsoil-ploughing.

(1) And plenty, even too much, since — 2d

(1) Trunk-drainage is a better name than arterial drainage.—R.

The depth taken by the common plough is 8 inches, and the subsoiler takes 8 inches below that, 16 in all.

The effect of subsoiling in this country is difficult to arrive at, for we have never heard of its being practised in the province. But, when we lived at Joliette, in or about 1869, we tried the effect of deep-ploughing on an acre and a half of poor sandy land, with a black *tufa* subsoil, or *hard pan*, and it succeeded marvellously. The crops grown were swedes, Belgian carrots, haricot beans, and tobacco. Of the last named there was about half an acre, and people came from far to see it. Indeed, at the last Berthier Exhibition we attended, two good habitans came up to us and said: You do not remember us, perhaps, but we shall never forget the enormous tobacco you grew at Joliette. The land was ploughed about 10 inches deep—just double the depth of the cultivation of our predecessor; the *tufa* was brought up to the top and well mixed with the surface soil, and in that very hot summer, with very little rain, everything grew away, from start to finish, without any intermission.

The next year, encouraged by this successful experiment, we trenched a small plot of land some 18 inches deep, in this way: opening a trench three feet wide and 9 inches deep, the earth removed was wheeled to the end of the piece to fill up with; then, the bottom of the trench was broken up—not

which neighbours unite to plough each other's land in turns? The island farms seldom exceed 12 acres, so no farmer keeps more than one horse or at most two horses; and a jolly supper they have after the day's work.

Why not, lastly, begin by gradually deepening the furrow? Try 7 inches, instead of 6, and 8 inches when the usual furrow has been 6 inches, and do this in the fall before a root, corn-, or potato-crop. The powerful frost, it is true, penetrates so deeply in our winters that the land is not so generally impermeable by the roots of plants as the soils situated in milder climates; but there is, almost everywhere, underlying the surface, a *hard-pan*, partly composed of the iron worn from the plough-sole by its constant attrition against the soil, and until this is broken-up, the range of the roots, and the capacity of the land to retain moisture, must be limited.

Where the land is naturally drained, i. e., when the subsoil is of a perfectly porous nature, the effects of subsoiling will be the same as on artificially drained land. But on stiff clays, undrained, the effects of the subsoiling would soon be lost, the soil running together and getting indurated as before.

FARM-WORK FOR SEPTEMBER.

If you have a second-cut of clover, and a silo, ensile the clover; it is but

stop them securely, and make them as warm as possible, if you want to have early squabs. Make a mushroom-bed in any old root-collar: growing mushrooms pays.

Feeding cattle only twice a day.—Every day, we see out of our window two splendid cows, half-bred Ayrshire and Shorthorn one, the other Ayrshire crossed with Guernsey. Both these fine animals are taken home from pasture every evening at 5 o'clock and receive a large meal each of moulting meal, besides what hay they will eat. The same rations are given them every morning after milking. And yet, they are at work on the grass half a dozen times a day!

LONDON MARKETS.

Very little change has taken place in the quotations for cattle and sheep of the best quality. Ordinary cast cows and old ewes are cheaper.

Best 8 stone Downs.....	5s. 10d.	per 8 lbs.
8½ do. Canadians.....	4s.	

Thus, a Canadian sheep, weighing 63 lbs., is worth \$3.12 less than a Down weighing 4 lbs. less. We ought surely to correct this, and it can only be done by sending only Short-wool WETHERS to England.

Prices of lean stock looking up, as there is every prospect of an abundance of feed. Lambs at Weyhill Fair up 4s. a head.

Grain-crops very poor—the worst since 1879.

An apology is due to Dr. Hoskins for accusing him of ignorance of the true derivation of the word *agnostic*—v. p. 156, August No.—Dr. Hoskins writes us word that he has had no connexion with the *Vermont Farmers' Advocate* since April last.

Sainfoin.—In the July number of *Le Journal d'Agriculture*, we were surprised to find it advised to sow 10 pounds of rye grass (*frontinal*), with the sainfoin seed. What we recommend is 4 to 6 pounds of trefoil (*t. procumbens*), the yellow kind, commonly called hop-trefoil. This will fill up the thin plant of sainfoin of the first year, and vanish completely when the sainfoin takes entire possession of the land. It is no use sowing sainfoin except on limestone land.

FARMERS' CENTRAL SYNDICATE OF CANADA.

30 St. James St., Montreal.

Honorary President: His Grace, Archbishop C. E. Fabre, Bishop of Montreal.

President: Hon. J. J. Ross, President of the Senate, Ottawa.

Manager: W. A. Wayland.

The Farmers' Central Syndicate is in a position to supply the farmers with all that is required for their farms: machinery of all kinds, ensilage cutters, mowers, reapers, rakes, dairy supplies, cheese factory outfits, flax breakers and scutchers, binder twine, barb-wire, thoroughbred animals of all descriptions, fertilisers, &c., &c. All the above mentioned goods are first quality, and highly recommended by the most competent men. The prices are exceedingly low, as can be proved to all those making inquiries at our office or by mail; the purchaser is always sure to gain from 20 to 40% in buying through our intermediary; the annual subscription is thereby soon refunded.

We call the special attention of those who intend using fertilisers to the fact that we have obtained lately large discounts from the Nichols Chemical Co., of Capelton, thus enabling us to quote low figures. Write for information before purchasing elsewhere; it will pay you.

FARMERS' SYNDICATE

OF THE

PROVINCE OF QUEBEC,

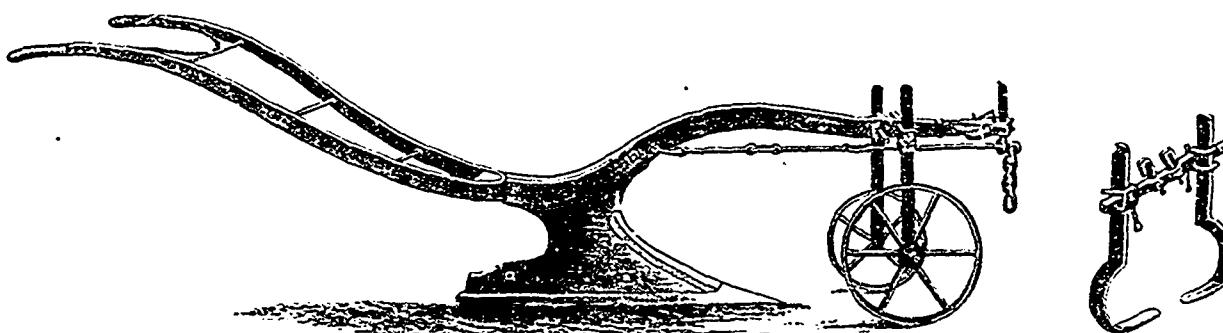
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President: His Grace Mgr. L. N. Begin.

General Secretary: F. Audet, N.P.
Treasurer: P. G. Lafrance, Cashier of the National Bank.

Send at once your orders for grain seeds, artificial manures, phosphate, agricultural implements, &c.

The Farmers' Syndicate buy for its members live stock for breeding purposes, of all kinds: horses, cattle, sheep, pigs, fowl.



HOWARD'S SUBSOIL-PLough.

turned over—with a strong 3-tined fork, to a depth of probably 9 or 10 inches more, making about 18 inches in depth of moved earth. The upper 9 inches—one draw of a spade—was then thrown off the next 3 feet of the surface soil, and the work proceeded as before.

The effect of this was perfectly satisfactory, the crops, that were accustomed to flag in hot, dry weather, resisting the drought famously.

Again, when at Sorel, in 1887, we persuaded Senator Guérinmont to let down his plough three inches deeper than he had been previously accustomed to work his land, and the succeeding crops convinced him that the practice was a correct one. How many prizes he and his nephew won that year at the parish show we forgot, but they pretty well swept the board, though of course their phenomenal success must not be entirely attributed to the deeper cultivation.

Now we see no reason to doubt that a practice that succeeds in so damp a climate as Scotland, and that certainly has turned out well on some of the poorer lands of the province, ought to succeed all over the province. The only question seems to be whether our farmers in general keep sufficiently powerful teams to carry it out. Six horses are absolutely necessary—2 in the first and 4 in the second or subsoil-plough.—Why not follow the Jersey and Guernsey plan of a grand autumn ploughing, with the "Gran' orgue" (*grande charrue*), drawn by 8 horses, at costs before winter; if there are cracks,

too often carelessly made, if treated as hay, and no wonder, as, owing to the heavy dews of this month, it requires great attention, and we have been so long in the habit of despising second-growth clover that we do not like to bother ourselves about it. At any rate, do not plough it in: it is worth more for food than for manure.

Go on cleaning your stubbles where you intend to grow roots, &c., next year: no work pays better than this, if properly done.

The cows are, or ought to be, revelling in food this month. There must be plenty of aftermath in the pastures, after all the fine rains we have had, and, nowadays, we must suppose every one has at least a piece of fodder-corn. Towards the end of the month, it would be wise to give a feed of second-cut clover at night, and a couple of pounds of cottonseed cake will do no harm.

Keep your calves well, so that they may go into winter-quarters with all their summer flesh on.

When October is approaching, take your horses in at night. Those chilly nights do an infinity of harm to all horses, but emphatically to those who have any weakness in the lungs.

Sows and pigs should be almost

keeping themselves now, as will the poultry. Mind your male lambs are castrated; the meat is improved by the operation more than any one would believe who has not tried it.

If you keep pigeons, look to their

Herefords, and Welsh runts, are worth 4s. a stone of 8 lbs., while fat cows only fetch 3s. 10d.

Best fresh English butter..... 13s. per 12 lbs.

Best small pigs..... 3s. 6d. per 8 lbs.

Heavy bacon hogs at Calne..... 7s. per 20 lbs.

Hay: Canadian, per 2240 lbs 80s.

" English, per 2016 lbs. 92s. 6d.

" clover—per 2016 lbs... 110s.

Wool: Downs..... 10½d.
" Kents, &c..... 9d.

Potatoes: Snowflakes, &c.... £5 a ton.
" Regents. 4 "

BACON AND HAMS.

Irish bacon per 112 lbs..... 6s.

Danish bacon " 5s.

Canadian bacon " 52s.

American hams " 52s.

Irish hams " up to... 94s.

MANURES.

Nitrate of soda per 2240 lbs. £8. 0. 0.

Basic slag " " £1. 17s. 6d.

Kainit " " £2. 10s 0

The accounts from the hop-districts are not favourable, though the fine rains of late (from July 17th) have washed the bines pretty free from vermin.

LAWES ON AGRICULTURAL CHEMISTRY.

(Continued)

We shall see that, whereas Liebig's manure in spite of the surreptitious introduction of a certain amount of ammoniacal material, it professing to be entirely composed of the constituents of the ashes of the plant proposed to be sown, had only the power to extract 3 bushels more wheat from an acre of land than was yielded by the continuously unmanured acre, 224 lbs. of sulphate of ammonia, (2), alone, caused a yield of about ten bushels more. Thus, in the harvest of 1846 we have the following selected results.—

nobodies could believe him to be actuated by them. However he was not satisfied, and he even went so far as to send his son over to England to see that the experiments were really such as they had been represented to be. I believe the great chemist died unrepentant, believing to his last hour that his mineral theory was the correct one.

In table V, which is rather too long and too intricate to give here, the experimenters compare the produce of the unmanured plot, with that of another which, except in the year 1844, when superphosphate of lime and silicate of potass were used (giving, however, less than one bushel of increase), was manured every season with ammoniacal manures alone. The average yields for the years from 1845

being reduced from 190 lbs. to 65 lbs. the yield of the manured crop fell to 20 bushels per acre.

Well, I do not think I need bother you any further with the plots. We have seen enough to satisfy ourselves that the true manure for wheat must depend, for its value, on the quantity of its ammoniacal constituents. There remain, then only a few observations.

From the unmanured plot were taken from the land seven successive crops of wheat, and this without any return of manure. Yet, no signs of diminished fertility appear, the average yield of the seven crops being 17½ bushels per acre, with about 1700 lbs. of straw, the crop depending upon the season: whether it was a good or bad wheat-year.

The difference which the season made was sometimes very great, as, for instance, in the year 1845, a good wheat-year all over England, the yield of the unmanured plot was 23½ bushels, with 27½ lbs. of straw; the yield of the same in 1848 being only 14½ bushels, with 17½ lbs. of straw, a difference of 8½ bushels of grain, and 1000 lbs. of straw, attributable solely to the variation in climatic influences.

So we see clearly, that in land which has been properly cultivated for a number of centuries, I may say, like the soil of England, where grain and meat constitute almost the exclusive exports from the farm, the straw of the grain, and the dung of the animals fed upon the farm, finding their way back to the fields in the form of manure; we may see, I say, that even after seven successive crops of the same plant without any return, the soil still contained, relatively to the ammonia available from natural sources, an excess of the necessary mineral constituents.

But do not imagine for a moment that all soils, even in England, will go on producing 17½ bushels of wheat and 1700 lbs. of straw for ever. On the contrary, light soils which, under high farming, will yield great crops of grain in favourable seasons will soon tail off if neglected. As every Canadian farmer knows, heavy lands do possess a native fertility, or how can

want of vegetative power, we know that a moderate top dressing of nitrogenous manures will enable them to start again into vigorous growth, and to utilise the mineral constituents which we are well assured will be, in such a case, in excess.

The following is the condensed history of one plot:

First year.—Mineral manures give one bushel more than the unmanured plot;

Second year.—Ammoniacal manures give 8½ increase;

Third year.—After the heavy ammoniacal dressing of the previous year, and the heavy crop caused by it, the cessation of manuring reduces the produce to slightly less than the continuously unmanured plot;

Fourth year.—Ammoniacal salts alone increase the produce by one-half;

Fifth year.—A complex mineral manure, supplying nearly every mineral constituent in excess, and this combined with ammonia gives an average produce even rather less than was obtained in the previous year without the minerals, and the proportion of increase over the unmanured plot is very little greater.

When mineral manures are added to the ammoniacal dressings, as in ordinary farming in England is always done at least every fourth year in the usual farm-yard dung, we have added to the soil everything that plants can demand, but in the case we are considering it is worth while looking at the effects of this treatment with artificial manures. Thus, at Rothamstead the yield was:

lbs.
bush. straw.

1845, sulphate and muriate of ammonia, 168 lbs. each	31½	4266
1845, sulphate and 112 lbs. each of ammonia with minerals	33	3819
1846, same ammoniacal dressing alone	27½	2241
1846, same ammoniacal with minerals	30½	2784
1847, with ammoniacal manure only	25½	2891
1847, with ammoniacal and minerals	32½	3852
1848, was a failure altogether		
1849, with ammoniacal manure	32½	2854
1849, with ammoniacal manure and minerals ..	33½	3858
1850, with ammoniacal manure	27	3089
1850, with ammoniacal manure and minerals ..	29½	4034

Here we see that, although the plot in which ammoniacal manures alone are used, gives a considerably higher return than the unmanured plot, in every case in which both ammoniacal and mineral manures were employed, there was a considerably larger increase still.

The effect of mineral manures, then, for the growth of wheat is in these cases clearly shown; but what are the circumstances under which this result is obtained? It is only when after taking from the land the whole of the produce of a rotation without return, we provide ammoniacal salts alone, in such quantity as to yield crops year after year larger than the average obtained in the country in which the experiments were tried under the ordinary course of rotation treated with farm-yard dung, and the produce obtained by these ammoniacal salts alone was very nearly equal to that obtained by the annual supply of 4 tons of the best manure, a dressing that nine

Description and quantities of manure per acre.	Dressed grain per acre in bushels and pecks.	Total grain per acre in pounds.	Straw per acre.
Section 1.			
Plot 3. No manure.....	17 3½	1207	1513
Plot 2. 14 tons of farmyard dung	27 0½	1826	2454
Section 2.			
Plot 10 b. No manure.....	17 2½	1216	1455
Plot 10 a. Sulphate of ammonia 224 lbs..	27 1½	1850	2244
Section 3.			
Plot 5a1. Ash of 3 loads of wheat straw	19 0½		1541
Plot 5a2. Ash of 3 loads of wheat straw, and top dressed with 224 lbs. sulphate of ammonia	27 0		2309
Section 4.			
Plot 6a. Liebig's wheat manure 448 lbs....	20 1½	1400	1676
Plot 6b. Liebig's wheat manure 418 lbs. with 112 lbs. each of sulphate and muriate of ammonia	29 0½	1967	2571

In this table we see that the yields of the unmanured plots are so nearly alike that for all practical purposes they may be taken as equivalent; that the dressing of 14 tons per acre of farm-yard dung raised the produce by nearly ten bushels an acre; that three loads of wheat straw burned increased the yield of the acre by the insignificant amount of one bushel, but that the addition of 224 lbs. of sulphate of ammonia to the ashes of the wheat straw added eight bushels to that yield; that 224 lbs. of sulphate of ammonia alone caused the crop to mount up to ten bushels more than the yield of the unmanured acre, and, lastly, that whereas Liebig's patent manure only gave an increased yield of 2 bushels and a peck more than the unmanured acre, the addition of 112 lb. each of muriate and sulphate of ammonia to the much vaunted manure caused an increase of almost 10 bushels an acre.

It is really very wonderful, when one comes to think of it, that Baron Liebig would not be convinced by these, to an unprejudiced eye, most satisfying experiments. He was too great a man to be suspected of wilful blindness, and as to interested mo-

(1) I do not attribute the surreptitious introduction of the ammoniacal matter to the late Baron Liebig, but to the manufacturers of the patent manures.

A R J F

(2) Containing about 40 lbs. of nitrogen—4430 ammonia.

Unmanured.	Bush. pecks.	Straw.	Increase from manure.	
			per acre.	Straw.
Mean per annum.....	17 2½	1756 lbs.		
Ammoniacal manures...				
Mean per annum	25 3½	2698 lbs.	8 0½	933 lbs

Now let us look at another table, in which are displayed several varieties of manure, applied together, and the yield compared with the unmanured crop. To show the idea Lawes and Gilbert wished to convey to the reader, I will quote an example of the mixed manures:

	lbs.
Pearl ash.....	300
Soda ash	200
Sulphate of magnesia ..	100
Bone ash	200
Sulphuric acid	150
Muriate of ammonia ..	200
Sulphate of do	200

Yield per acre of unmanured plot, 15½ bushels, yield of manured plot, 33½ bushels

In the same series of experiments, the amount of ammoniacal manures

we account for the price at which land at St-Hugues sells as compared with the value of the land at Sorel, for instance? The one goes on yielding from 8 to 12 bushels of wheat per acre and other crops in proportion, and this without the sight of a dung-cart; the other, treated in the same way for a couple of years, would yield next to nothing, but well farmed and frequently though not copiously manured, will turn out most remunerative crops of anything you like to sow there. No, we cannot go on selling all our produce of the farm and making a return to it in manure; but what we can do is this: if there is any truth in the experiments we have been considering, we can feel safe in cultivating our farms in accordance with the ordinary methods of practical agriculture, and if at any time our crops in the spring show signs of a

English farmers out of ten would suppose sufficient to "lay" the crop and cause it to produce nothing but rotten straw and "chicken's victuals."

Now, if we consider the effect of these annual dressings of dung we shall be rather surprised. The seven years of the experiment saw 98 tons applied to the acre, and the produce of that enormous quantity was only 73 bushels of wheat more than the produce of the unmanured land. This is equal to only $\frac{1}{3}$ of a bushel of wheat for every ton of dung supplied! A ton of such manure as that we are speaking of would probably contain nitrogen equal to about 18 lbs. of ammonia, so that it took that quantity of ammonia to produce $\frac{1}{3}$ of a bushel of wheat, an absurdity on the face of it, as we see that 224 lbs. of ammoniacal salts, containing probably, 55 lbs. of ammonia, produced, in 1845, 9 bushels of wheat more than was produced by the unmanured land, and that, therefore, 6 lbs. of ammonia, in the form of sulphate and muriate, produced one bushel. It is evident, then, that in the dressing of farmyard dung (1), there must have been an enormous expenditure of nitrogen beyond what the wheat plant was capable of absorbing, and that the mass of carbon was absolutely useless, except as a mechanical agent in lightening the land, and, by darkening it, enabling it to absorb more readily the rays of the sun and bring the crop more rapidly to maturity.

I presume all my readers will agree with me in thinking that the experiments we have been studying prove the incorrectness of Baron von Liebig's theory, that: The crops on a field diminish or increase in exact proportion to the diminution or increase of the mineral substances conveyed to it in manure.

ARTHUR R. JENNER FUST.

Household-Matters.

Domestic help.—About this time of the year, a number of young girls from the country, come to town in search of employment. Many, and various, are the reasons why they do so. Some come just because they want a change from the dull life in the country which must be very trying to a quick intelligent mind, the more so, if she has had sufficient education to make her wish to see more of the world, its ways of living &c.

A girl coming in this spirit will be sure to do well if she is patient, and bides her time, and is not too conceited to take advice, for she will have to alter many of her ideas. If she wishes to live in harmony with her employer, she will have to alter so many of her ways, and to her it might at first seem ridiculous, but if she is an intelligent girl she will soon lose that feeling and follow out instructions with care; well knowing that is all that is expected from her and if she does this she is sure to get on well.

Then there is the girl who comes with the determination to get so many dollars a month, and will take advice from no one, till some day she wakes up to the fact that she has overtaxed her strength and bargained to do what experience has taught her is beyond her strength. In this case she has either to give up some of her dollars and take less work, and of course less pay, or go back to country life.

Then there is the dull girl, who has willing hands provided you can always

be near to show her what, and how to do work. She too as soon as she finds herself of real value, demands an increase of pay. She won't or can't too that he would be of little use to those who could not be constantly with her, so one is obliged to let her go, and very soon she finds herself drifting from place to place, perhaps wondering what is the matter with the people that she does not please them, and few like to tell her that the fault lies in herself.

Then comes the gay light hearted girl who has come to town to see life, to earn, and spend money as fast as she gets it. It is very hard for her untamed nature to submit to rule and certain ways of doing things, which seems to her perfect nonsense, but after a little taming down, provided her temper is not too bad, she is at times a nice girl to have in the house. Where you can put up with her waywardness. This kind of girl has to be dealt with very carefully, and the trouble is to keep her within bounds, and at the same time to let her have as much freedom as you judge is good for her. Such a character I have had to deal with, and the only tussle we had was about going to the Theatre entailing staying out too late at night. She had to give in or go home which she did not want to do. She stayed all the winter. I was sorry to part with her, when she was wanted at home in the spring, but not sorry to be relieved from the responsibility of such a flighty person.

I can speak with truth of these different characters as I have had them all in my house at different times. This summer I have come across some very nice girls, but it does seem sad to see how little they know of real work, or how to do it. I have had the pleasure of being asked, if I would kindly tell them how to do certain things, or if I would mind their asking me how, when they were at a stand how to get on.

And really it is sad to see in what small matters they lack knowledge. With permission from the Editor of this paper I purpose writing on various small matters useful and necessary in every house.

Sad as it seems, some do not even know how to wash their own clothing.

This makes it very hard for the girl and is still harder on her employer who has to show sometimes a very unwilling girl.

How to fry Successfully.—A great many people I find have a very strongly rooted dislike to the process of frying, and on being questioned as to the reason of their, their complaint, in nine cases out of ten, is that the food thus cooked is so frequently served up in a style so greasy, flabby, and unappetising, that one has to be very hungry indeed before one can eat it—enjoyment of the dish being out of the question altogether. But I am always sorry when I hear this, because frying, if the art is thoroughly understood, is not only one of the most dainty and economical methods of cooking, but also one of the most easy and convenient. In order, therefore, to simplify the process and make it perfectly clear, even to those who have hitherto had little or no practice, but yet are anxious to become proficient, I should like to mention just a few points which must of necessity be very strictly observed if the work is to prove successful.

Firs. of all, then, with regard to the frying of fish, which can easily be rendered a very popular dish. Without doubt the very best utensils for this purpose are a scrupulously clean

bright stewpan with a wire basket to fit easily inside, but when these useful items are not come atable, a frying-pan may be made to answer the purpose instead, only it must be large enough to accommodate the fish without crowding, and sufficiently deep to hold the requisite quantity of fat, which latter should entirely cover the fish, otherwise, frying becomes a very difficult task indeed, and is seldom satisfactory.

Then as to the fat in which the fish should be fried. Decidedly the best kind is pure beef dripping or clarified fat, either of these being preferable by far to ordinary butter or lard. But before putting in the fish, make sure that the fat has reached just the right heat, a point which can easily be ascertained by throwing in gently a small piece of bread, if, in a few seconds, this becomes crisp, and just daintily browned, it proves that the fat is sufficiently hot and ready to receive the fish, but if it browns too quickly, or, on the other hand, remains pale-coloured and soft, the fat is either too hot or not hot enough, and must be regulated accordingly.

Next, a few words about the preparation of the fish previous to frying. Whatever kind is being cooked and in whatever form, whether small whole fish, fillets, cutlets, or fish steaks, &c., each separate fish, or piece of fish, requires to be made perfectly dry, and this can best be done by patting it gently between the folds of a soft dry cloth, and rubbing it over afterwards with fine flour until all feeling of dampness or clamminess has been entirely removed.

Then, after this, which is the first stage of preparation, has been satisfactorily accomplished, the fish may be seasoned according to taste, and either be dipped in thick rich frying batter, or egged and bread-crumb in the usual manner. When the latter method is adopted, great care should be taken to press the covering well into the fish, otherwise a good share of the crumbs will fall off into the fat—a point to be carefully avoided. When done enough, take up the fish with a slice, drain it well or a hot sieve, or hot blotting-paper, to entirely free it from the fat, then arrange it neatly on a hot napkin or dish paper, garnish it tastefully with sprigs of bright green fried parsley and cut lemon, or any other suitable items of prettily contrasting colours, and send to table as hot as possible.

The same rules as given above hold equally good in the frying of croquettes, rissoles, meat cutlets, &c., as these also require a plentiful supply of fat in order to be cooked properly. The same fat, however, can be used time after time if, after each time of using, it is carefully and properly clarified. Thus, it will easily be seen that the plan is decidedly more economical than that of using only a small quantity of fat at a time, as in the latter case the fat invariably gets burnt, in spite of all one's care, and has to be thrown away in consequence; and not only so, but the dish, more often than not, is completely spoiled.

Chops, steaks, bacon, ham, &c., on the contrary, require very little fat, only just sufficient to keep them from burning or sticking to the bottom of the frying-pan; but both the fat and the pan should be made thoroughly hot before putting in the meat, then, if the outside of the meat is browned very quickly, and the cooking afterwards accomplished more slowly, the result is most satisfactory, the surface of the meat being dry, crisp, and richly coloured, while the inside remains full of juice, none of the strength or flavor of the food having been lost

in the cooking. In turning meat of any kind, that is being fried never, on any account, use a fork or any other sharp instrument, so as to pierce the meat and let out the gravy which good intelligent cooks try to hard to retain.

Omelets and pancakes, too, require very little fat for frying, and the pan used for cooking these dainties should never be washed, a special one being kept for the purpose.

If, while still hot, it is well rubbed out with a clean soft cloth, the pan will remain clean and bright, and there will be no fear of the contents sticking as invariably happens the case of a freshly washed pan being used.

A Few Ways of Keeping Tomatoes.

SPICED TOMATOES.—One peck ripe tomatoes, one pound sugar, half a pint of vinegar, one tablespoonful each of salt, cloves, cinnamon and allspice, and half a teaspoonful of pepper. Scald the tomatoes, remove the skins, cut them in halves and stew until reduced nearly one half, skimming occasionally. Tomatoes are about 90 per cent. water, and a large part of this should be driven off in cooking. When they are of even consistency and no longer look watery, add the other ingredients, mix, and boil ten minutes longer. Seal while hot in pint jars. This is to be served with the meat course, or for luncheon, and is not so uncertain about "keeping" as canned tomatoes.

TOMATO CATSUP.—One gallon of ripe tomatoes, 1 pint vinegar, 4 tablespoonfuls salt, the same of black pepper, 2 tablespoonfuls mustard, 1 tablespoonful each of allspice and cloves, and 1 teaspoonful of cayenne. Cut the tomatoes in halves without peeling, sprinkle the salt over them, add the vinegar and let them simmer slowly in a preserving kettle or granite pan for three hours, stirring often; then strain through a sifter or fine colander; it is much nicer if the seeds are rejected. Add the spices, boil until reduced to two quarts, bottle and seal. This is an excellent and well-tested receipt.

TOMATO PRESERVES.—Five lb. ripe tomatoes, 5 lb. sugar, $\frac{1}{2}$ lb. green ginger, 1 lemon. Cut the lemon in slices and remove the seeds. Peel the tomatoes and cut them in halves, add the ginger and boil one hour; now add the sugar and boil down until as thick as jam. Put up in small jars; it is a very rich sweetmeat.

Tomatoes Preserved Whole.—Peel 3 lb. of small yellow tomatoes, add 3 lb. of sugar and let them stand over night. Drain off the syrup and boil it until the scum ceases to rise, then put in the tomatoes and boil gently for twenty minutes. Take out the fruit with a skimmer and lay on a dish, boil the syrup until it thickens, adding the juice of a large lemon. Put the tomatoes in jars and pour the hot syrup over them and seal at once.

C. Gent.

Doréz.

A GOODLY percentage of the homes of to day are by far too large, and conducted on too elaborate a scale for those who live within them. Not that these people are living beyond their incomes, they are not. The wife is simply living beyond her physical capacities. And why does she do it? In nine cases out of ten from a sense of false pride. To live more modestly would, she thinks, lay her open to the possible criticism of friends or neighbors. "People might think" this or that, she says. And to prevent people from "thinking" she is willing to sacrifice her health, the welfare

(1) Peat, made dung may contain as much as 80 % of water.

of her children and the happiness of her husband. She has help, but, after all, of what consequence is even the best help in a home? There must be a head, and that head must think, and thinking will kill where work will only tire. If the evil of excessive house-keeping would only cease with the employment of servants life would be easier. But with the kind of servants we have nowadays the evil is only increased.

The Cry for Rest. — REST SLEEP. — In the tropics, where no labor is required of men, the night is scarcely divided from the day; but in temperate climates, where man's working powers are in the highest state of activity, the night nearly halves the day, — at the season of intensest activity it does halve it. — God lights His candle late and puts it out early. All the remainder of the time is for rest. Then labor naturally stops, office and shop are shut; machinery is still. The decree goes forth that the places of business shall be deserted. Then comes sleep — the long sleep, knitting up the ravelled sleeve of care, pouring balm into hurt minds, immersing Nature in her bath of oblivion, untying the knots of the brain, sifting and disentangling the thoughts, carrying sufferers away into the land of dreams, and bearing the weepers of among their loved and lost ones. Sleep, answering questions that could be answered in the day-time; putting to rest doubts that had made the mid-day wretched, keeping all low cares and tribulations in their place, and calling out the imagination which revives and transports the mind.

MURDERING SLEEP. — But we murder sleep. We turn its darkness into day; its silence into revelry; its peace into pain. Fashion murders sleep; pleasure murders it, yes, and work murders it. In the days of youth when we might cultivate the habit of long, still deep sleep, we scorn its heavenly privilege, and throw its divine opportunity away, and then in middle age too many of us cannot sleep. We are nervous and restless, and God's great, immeasurable night is all in vain for us. We wake exhausted the night's fever spoils our day. We stumble and bungle in all we do. That is a touching story in the Gospel which tells how Christ was asleep in the fishing-boat when the storm came up, and ship wreck seemed inevitable. His companions, who had been watching their nets all night, were nerveless, and had lost command of the vessel. He wakes from slumber, rebukes the winds and seas, and there is a great calm. The good sleeper goes safely over life's turbulent sea. He rules the storm, for he has rested. He is himself. We should cultivate sleep, while we can. Woe be unto us if we do not. In sleeplessness is utter weakness, there may be madness in it at last. Get all you can of it, it is God's daily boon of rest to the workers.

Grains of Gold. — Be where you can learn something useful, and you will be in the proper place.

It is not the ignorant man who is to be blamed, but he who doesn't know enough to find it out.

The glory of love is that which takes delight in doing gratuitously what nobody else would do if paid for it.

ALL experience hath shown that mankind are more disposed to suffer, while evils are sufferable, than to right themselves by abolishing the forms to which they are accustomed.

"A good name is rather to be chosen than great riches," said Solomon, and he was a millionaire.

EDUCATE the whole man—the head, the heart, the body; the head to think, the heart to feel, and the body to act.

The way to wealth is as plain as the way to market; it depends chiefly on two words—industry and frugality.—Franklin.

SOCIETY is composed of two great classes—those who have more dinner than appetite, and those who have more appetite than dinner. —Chamfort.

THERE are certain gossips in society who resemble long and twisted trumpets—what they receive as a faint whisper, they give out in a long, connected blast.

GOOD COUNTRY ROADS.

It Takes a Great Deal More Than Talk to Secure Them.

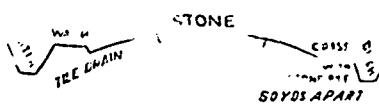
I know well enough the kind of plan the country is waiting for; it wants a plan that will give it roads for nothing. No revolution of that kind is likely to occur. But it does seem to me, and has always seemed, that a settled and united policy of employing public prisoners on the roads might easily improve the trunk lines to begin with for a minimum of cost.

I have urged this before often, for I had seen how well it could be done.

Every county gaol should work in unison on a trunk road through a state. Very often one or more of the county farms will own a crusher, but if not a good deal may be done in breaking by using proper long-handled hammers. All the stone for the crack British roads was so broken, and maybe is yet, but then there was a continuous system about it, while here there is none. There the stone heaps are deposited along the roadsides about 30 yards apart, and broken during December, to be laid on during fall and winter.

They don't try to build a road in a few days that will last forty years without attention! They don't ballast country roads from gutter to gutter 6 inches deep as our splendid new road architects do! They don't send two-horse teams along to pick up the stones first, and then throw them off again into the ditches as I have seen done in this very state! They don't let water or even mud stay in a rut, for they aim to keep their roads without ruts! Every drop of standing water is let out of such little depressions as exist.

Some old fellow who does not want to go to the poorhouse is given work on each section (about 2 miles) of road.



He does all the work except hauling. A good road is first properly rounded (I, up, that is, sufficiently to throw the water to the ditches and gutters. Generally British roads are narrower than here, perhaps 32 feet or so; in such a case in the country a road gets about an inch of stone in the fall, and then the attendant with his wheelbarrow and hoe scraper does the rest, keeping the gutter open and breaking the stone piles, (I ought to say that the stone piles are never more than 18 inches high and flat on top, so that a runaway team would pull over them, and not knock their brains out) in the summer with a long handled hammer, and a piece of netting over his face!

"The more it is 'rounded,' the heavier the draught. A very slight rounding is sufficient.—Ed.

Practically this is the system all over the British empire, and some parts of Canada—which is in North America.

There is a section of a British road on the Lincolnshire marshes—which were once far softer than the prairies.

The ditches are kept in order by adjoining owners. The stuff from the ditches built up the road. The ditches are kept distinct.—James McPherson, in Landscape Architect.

HARD COUNTRY ROADS.

Until We Have Them Public Prosperity is Bound to Suffer.

At this time of the year we can appreciate good roads fully, and it is to be regretted that we forget how inconvenient bad roads are as soon as the roads that are bad get good in the spring. A few weeks ago we had occasion to drive four miles into the country in northern Ohio, where the roads get frightfully bad on occasion, and although we had a fairly good team and a light buggy, the best time we could make was to drive the four miles in an hour and a half. When we arrived at our destination the team showed the effects of the hard drive very plainly though they had not been driven off a walk. A week ago, in southern Ohio, we saw a team trotting along hitched to a wagon on which was 3,000 pounds of hay. They have good roads in southern Ohio, or rather southwestern Ohio, and they derive the benefit from them. They cost a tidy sum to make, but now that they are made the people benefited would not return to the barbarous mud roads of former years for any consideration.

The costliest item of expense to the farmers of this country is the loss they sustain from impassable roads. There has been much agitation on the subject and it is having its effect, but until something is done to improve the condition of the roads of this country its prosperity will suffer to an enormous extent. Land in a county where the roads are good is worth twice as much as in a mud road county, and the farmers of the country could not pay taxes for any purpose that would make greater direct returns. Good roads are necessary to a perfect civilization, and that means that we shall have them some time in the not distant future.—Springfield (O.) Farm News

Good Roads and Prosperity.

Before all things the United States is an agricultural country. It is the possibility of large returns for labor in this direction which keeps up the price of labor in our manufactories and in all our industries and thus brings comfort and ease within the reach of all. Good roads, by lessening the cost of agricultural products, form the most effectual means of maintaining the condition of comfort and even luxury of which America is so proud.—H. W. Conn, Department of Biology, Wesleyan University, Middletown, Conn.

Direct Loss from Bad Roads.

Although the methods of attaining the result afford discrepant indications as to the amount of loss due to ill kept highways in Massachusetts, they alike clearly indicate that the direct loss is very great; probably amounts to somewhere between five and ten million dollars per annum.—Report Mass. Com. Highways.

The Dairy.

APPENDIX to evidence of Jas W Robertson, Dairy Commissioner, before the Select Standing Committee of the House of Commons on Agriculture and Colonisation.

ON THE MAKING OF BUTTER.

A teacupful of milk of average quality contains over ten millions of globules of butter-fat. They are lighter than the liquid or serum of the milk, in which they float, and when it is left at rest they rise to the top. Cream is only that part of the milk into which the globules of fat are gathered in larger numbers than they are in the whole milk. It has no constant or regular percentage of butter fat. There may be only 8 pounds or there may be 75 pounds of butter fat in 100 pounds of cream.

SEPARATING THE CREAM.

Two methods of separating the cream from milk are in common use; one is known as the natural or setting method, and the other as the mechanical or centrifugal method.

In the natural method, the force of gravitation attracts the heavier portion of the milk, commonly known as skim milk, downwards in the vessel which contains it, with the result that the globules of fat are pushed upwards towards the top. The serum of milk is the name given to the heavier portion consisting of water, containing the casein, albumen, sugar and ash, nearly wholly in solution in it. Sometimes the serum becomes viscous or sticky, and a small quantity of it adheres to the surface of the globules of fat and like a coating of gum hinders their movement upwards.

A small quantity of lacto-fibrin occurs in milk after it is drawn from the cow, and its delicate mesh is similar to the fibrin which forms in blood, causing it to clot after it is drawn from an artery or vein. That also retards the separation of the globules of fat into cream.

In the mechanical method, centrifugal force is applied to the milk in a metallic bowl which is made to revolve very rapidly, in some machines at a rate of over 7,000 revolutions per minute. By the force thus applied, the serum of the milk is thrown outward against the resisting inside of the bowl, and the globules of fat are pushed inwards towards the centre. In the form of cream they are then conducted by a mechanical device into one vessel, while the serum, which is practically the skim milk, is conducted into another vessel. The machine which is used for this purpose is called a centrifugal cream separator.

The following paragraphs are based upon the information derived from tests conducted at the experimental dairies, of which particulars are contained in the annual reports of the Experimental Farms and Dairy Commission.

THE SETTING OF MILK.

1. All milk should be carefully strained immediately after the milking is completed.

2. When shallow pans are used, they should be placed in a room with a pure atmosphere, at a temperature as even as possible at between 50° and 60° Fahr.

3. When deep-setting pails are used, the water in the creamer or tank should be kept below 45° Fahr. or as

near 45° Fahr. as is practicable. It is advantageous to have a supply of ice for use in the water.

4. When an abundant supply of cold water from a flowing spring is not available, the cooling power of fresh cold water may be applied economically by conveying it in a pipe to the bottom of the tank or creamer, and allowing the warmed water to run off from the top. If the water be scarce, the overflow may be carried into a watering trough for the live stock of the farm.

5. It is advantageous to set the milk as soon as practicable after it is drawn from the cows.

In a test with deep-setting pails, it was found that the quantity of butter fat not recovered in the cream, and consequently left in the skim milk, was 11.48 per cent greater when the setting of the milk in ice water was delayed one hour, than it was set immediately after it was drawn.

6. There was not much difference in the percentage of butter fat recovered into the cream, due to the temperature at which the milk was set, when between 88° and 98° Fahr. The loss of butter fat unrecovered from the skim milk was 2.53 per cent greater when set at 78° than when set at 98° Fahr.

7. The milk should be left undisturbed for about 22 hours. The quantity of butter fat not recovered into the cream was 2 per cent greater when the milk was set for only 11 hours than when it was set for 22 hours, in deep setting pails in ice water.

8. With ordinary milk, there is no gain from adding water "to thin it" when it is set. There was practically no difference in the percentages of butter fat not recovered into the cream when, (1) 25 per cent of water at 160° Fahr. added to the milk (2) 25 per cent of water at 60° Fahr. added to the milk, and (3) no water added to the milk, were the differences of treatment in the setting of milk, in deep setting pails in ice water.

CREAMING MILK FROM COWS CALVED MORE THAN SIX MONTHS

9. The milk from cows which have been milking more than six months does not yield its cream so readily as the milk from cows more recently calved.

During the cold weather of autumn and winter, by the setting of milk (in deep-setting pails, in cold water, at a temperature of 38° to 40° Fahr., for 22 hours) from cows which had been milking for periods of from 6 to 12 months, about 33 per cent of the total quantity of butter fat in the milk was left in the skim-milk.

Where the milk of one fresh-calved cow was added to the milk of eight cows which had been milking for periods exceeding 6½ months each, and the milk set as stated above, about 1½ per cent of the total quantity of butter-fat in the milk was left in the skim-milk.

When the milk of cows, which had been milking for periods of less than 6 months each, was set as stated above, from 7 to 15 per cent of the total quantity of butter-fat in the milk was left in the skim-milk.

During the autumn and winter when the milk from cows which had been milking for periods of more than 6 months each was set in shallow pans for 22 hours, from 5 to 15 per cent of the total quantity of butter-fat in the milk was left in the skim milk.

By the use of the centrifugal cream separator all the butter fat in the milk, except about 3 per cent of the total quantity, may be recovered into

the cream, from the milk of cows at all stages of lactation and during all seasons of the year.

SEPARATING CREAM BY THE CENTRIFUGAL METHOD.

10. The milk for the separator should be carefully strained and heated to a temperature of 80° or 85° Fahr. If it be used at a lower temperature, the cream is apt to become thick and clotted in the separator. Cold milk has a greater density than milk at a higher temperature; the higher the temperature up to 85° Fahr., the greater the efficiency of the separation of cream, all other conditions being equal.

11. Particular care should be exercised to prevent the use of any bitter milk. If any appreciable quantity of bitter milk be mixed with the general supply, the result will be a yield of butter which is likely to be more or less bitter in flavour. In very bad cases, the butter may become quite oily. These are both serious defects.

12. Where the heating and cooling conveniences are rather limited, the milk may be separated at a temperature of 40° Fahr.; but in those cases, the inflow of milk should be lessened and be regulated according to the percentage of butter fat which is discovered to be left in the skim milk. That should not exceed one-tenth of one per cent. The Babcock milk tester should be used every day to check the percentage of fat in the skim milk and in the buttermilk. For the testing of the skim milk, the sample should be composed of small quantities taken from the outflow of the separator at different times.

13. The efficiency of the separation of the cream depends largely upon the skill and management of the operator, although there are differences in the capacity and construction of the different centrifugal machines. The thoroughness of the separation of the fat into the cream depends mainly upon (1) the speed at which the separator is run (2) the temperature of the milk, and (3) the quantity of milk run through per hour. The operator should study carefully the instructions which are issued by the manufacturer or agent of the separator which he uses. It is desirable that the separator be run at its maximum speed, and that it be not exceeded. The separator should be set exactly level, and it should be kept so. Where belt machines are used, the belts should not be intensely tight; and in setting up the machines and calculating the speed between the engine and the separator bowl, from 3 to 5 per cent should be allowed for slippage of belts.

14. When the quantity of cream to be separated can be regulated by a set-screw in the bowl, it should be set to allow from 14 to 16 per cent of the quantity of average milk to flow through the cream outlet. A good rule is to take off cream which contains from 20 to 25 per cent of butterfat, or cream which contains about one pound of butter to from 3½ to 5 pounds of cream. The set screw inside the machines should be loosened occasionally, to prevent it from becoming immovably set.

THE RIPENING OF THE CREAM.

15. The cream from the centrifugal separator should be cooled quickly after it is received from the machine.

16. The cream from the setting method should be kept cold and sweet until the quantity intended for one churning has been gathered.

17. The temperature of the cream,

when set to be ripened, may vary from 65 to 80 degrees Fahr. according to the season; the higher temperature is used during the late fall and winter.

18. The temperature at which the cream is set for ripening should be maintained about six hours, during which time it may be stirred occasionally. After that, it should be left undisturbed until ripe for churning. No close cover over the cream vat need be used. A clean canvas cover is sufficient. Care should be taken to purify the canvas or other cover frequently.

19. "Fermentation starter" is the designation applied to the portion of fermented or sour milk, buttermilk or cream, which is added to the cream to ripen it for churning. The ripening of the cream consists of the development of the ferment or ferments which are added to it, or which got into it from the atmosphere, from contact with vessels or utensils, or from other sources.

20. It is quite important that every butter-maker should have on hand a fermentation starter of pure clean flavour, and of a uniform smooth consistency.

21. The following is the way in which a culture of lactic ferment was made at the Central Experimental Farm dairy, from which "fermentation starters" were prepared.—

A quantity of about two quarts of skim milk was heated to 205° Fahr. The temperature was maintained at that point for ten minutes after which, and while exposed to the atmosphere of the butter-making room, it was cooled to 80° Fahr. It was left in a closed glass-stoppered bottle at the ordinary temperature of the dairy-room, from 60° to 70° Fahr. for five days. It was then found to be coagulated and to possess a mild pure lactic-acid flavour, which became more distinct after it had been kept in cold water at a temperature of 40° Fahr. for three days. That was the culture. The flavour of it was such as was characteristic of cream from which fine flavoured butter had always been obtained; and "fermentation starters" for the ripening of cream were prepared from it.

22. A "fermentation starter" may be prepared from skim milk which is pure, sweet and free from taint. It should be heated to 150° Fahr. and left at that temperature for ten minutes. It may then be cooled to a temperature of 80° Fahr., when a portion of the culture, as described above, at the rate of ten per cent of the quantity of the skim milk should be added to it. That becomes the "fermentation starter."

23. The "fermentation starter" should be left to ripen at a temperature not exceeding 80° Fahr. for 20 hours. When the flavour and odour are distinctly acid, it should be placed in cold water at a temperature of 40° Fahr. in order to arrest a further development of the ferment.

24. The bacteria cultures for the making of "fermentation starters" may now be obtained also in the market from firms who deal in dairy supplies.

25. Where no undesirable flavour exists and no difficulty has been experienced in churning, some buttermilk of pure, nice flavour may be used as a "fermentation starter" for the cream. If at any time the flavour of the butter seems to deteriorate from that method, a new "fermentation starter" should be secured, as described in paragraphs 21 and 22.

26. The "fermentation starter" may be added to the cream at the rate of from five to ten per cent of the quantity of cream.

In any case where the cream has become somewhat tainted, if the taint be of fermentation origin, a larger quantity than usual of the fermentation starter should be added. This may in a great measure check the development of the taint and leave the particular fermentation of the starter which is added, to be the prevailing one in the cream and butter.

27. If for any reason it is desired to churn the cream while sweet, the churning should be commenced at a temperature of five to eight degrees colder than for the churning of sour cream. In all our examinations, the butter from sweet cream has been rated from two to three points lower in valuable commercial flavour than butter from a portion of the same cream which had been ripened or soured.

28. Although it is usually not desirable that turnips should be fed to milking cows, when they are fed, the odour and flavour may be prevented from appearing in the butter.

In a trial which was made from the milk of cows which were being fed the excessive quantity of 90 pounds of turnips per head per day, the odour and flavour of turnips was not perceptible in the butter which was made after the following treatment was given to the cream:

The cream was heated at 150° Fahr. and stirred at that temperature for ten minutes while it was still sweet. It was afterwards cooled, ripened and churned in the usual way. A portion of the cream from the milk of the same cows was ripened and churned in the usual way without being heated above 68° Fahr.

The butter obtained from the cream which was not heated above 68° Fahr. had a distinct odour and flavour of turnips; while the butter obtained from the cream which was heated to 150° Fahr. was excellent in odour, flavour and grain, and was without any perceptible odour or flavour of turnips.

From the cream heated to 150° Fahr. before being ripened for churning, eight-eenths of one pound less of milk was required to yield each pound of butter, than from the cream from a portion of the same milk which was not heated above 68° Fahr.

29. It has not been found advantageous to thin the cream by adding a quantity of water to it before it is churned or before it is ripened. Quantities of water were added to cream at the different rates of 10, 20, 25 and 30 per cent of water added; and the conclusions were that (1), the churning was slightly less efficient in the recovery of the butter fat, (2), the quantity of marketable butter obtained per 100 pounds of milk was ounce less, (3) the butter was not so firm or solid in the grain, and (4), the churning period at an equal temperature was longer by from one minute to thirty minutes, when water was added to the cream than when cream was churned without the addition of water.

CHURNING.

30. The preferable degree of ripeness in the cream will be indicated by the following points,—a mild, pleasant acid taste, a uniformly thick consistency, and a glossy appearance, somewhat like white oil paint. If not at the exact temperature desired for churning, it should be cooled or warmed to that point, which may range from 54° to 58° Fahr. according to the season. It should be strained into the churn and the churn should not be filled to more than two-fifths of its capacity.

31. If butter colour is to be used, it should be added to the cream before the churning is commenced.

32. The regular speed of a factory revolving churn should be about 65 revolutions per minute; and when butter granules are formed in the churn, a few gallons of weak brine (salt and water) should be added, to assist in the separation between the granules of butter and the buttermilk, and also to give a firmer body to the butter.

33. The churning should then be continued until the granules of butter become a little larger than clover seed. The buttermilk should then be drawn off and a quantity equal to the buttermilk, of pure cold water, at a temperature of from 50° to 58° Fahr., according to the season, should be put into the churn, for the purpose of washing out the buttermilk from the butter granules. The churn should receive a few quick revolutions, and the water should be drawn off immediately. Attention to this is of some importance, as the water will contain more or less curdy matter, which, if allowed to settle on the sides of the churn, forms a film there, where it is apt to adhere to the butter when that settles gradually as the water is drawn off.

34. After the butter has been left to stand for some 20 minutes, it should be salted at the rate of from one-quarter of an ounce of salt per pound of butter, to one ounce of salt per pound of butter, according to the preferences of the market which is to be supplied. The very finest quality of pure butter salt only should be used. That which is of a uniform fineness of grain and velvety to the touch is suitable.

35. Care should be taken to prevent the salt from being exposed to an atmosphere that may leave on it impurities causing foul odours and taints, as these may readily be introduced into the butter by that means.

THE WORKING OF THE BUTTER.

36. After the butter is salted it should be left for 2 or 3 hours, to allow the salt to dissolve. Then, by a second working, the excess of moisture may be expelled, the salt thoroughly mixed, and any streakiness in colour corrected. Care must be taken that the butter be not overworked and made greasy. This may result from the butter being worked at a temperature either too high or too low. Where practicable, it should be worked at a temperature which leaves it in a waxy condition, causing it to bend about one half towards the under layer when it is being doubled on the butter worker. A temperature of 50° Fahr. will usually put the butter in the best condition for being worked. Sometimes injury results from a larger quantity being placed on the butter worker than can be handled conveniently.

PREPARING PACKAGES AND PACKING THE BUTTER.

37. Where the butter packages are not tinned or paraffine lined, they should be filled with strong hot brine and left to soak for a day. The brine may be used several times if boiled each time. The insides of the packages should be lined with butter cloth or parchment paper—preferably the latter. The package will then be ready for filling.

38. In packing, the butter should be pressed against the side of the package, keeping it slightly hollow in the centre of the package, the object being to pack the butter so close to the side that no air spaces will be left between

the butter and the package. These are often seen when a tub or box of butter is "stripped." Care must also be exercised in using the packer, not to move the butter more than is really necessary to make it compact. When the package is filled, the surface should be smoothed with a hardwood radio, or scraper, and then covered with fine butter cloth or strong parchment paper.

CLEANING THE UTENSILS.

39. In the washing of churns and all other vessels for milk or cream, they should first be rinsed with cold or tepid water. The addition of washing soda, or a small quantity of borax to the water, will increase its cleansing properties. They should then be washed with warm water, and scalded with water "boiling hot." The use of a brush for the cleansing of dairy utensils is much preferable to the use of a dishcloth.

40. All wooden utensils and vessels should be scalded, cooled and dipped into cold water before they are used. Small wooden utensils should be kept floating or immersed in cold water.

41. Where closed drains flow from a dairy or creamery, they should be flushed out occasionally with a strong solution of concentrated lye, followed by hot water.

I certify this correct as an appendix to my evidence.

JAS. W. ROBERTSON,
Dairy Commissioner.

THIS AND THAT.

Effect of a Grain Ration in Summer upon Quantity and Quality of Milk.

ED. HOARD'S DAIRYMAN:—The following experience is related by a fellow dairyman. He was feeding twenty-four cows up to the second week in June when he removed the grain ration. His cows were testing 4.7%, while feeding the grain, (milk taken to the creamery.) At once, the grain being removed, they began to shrink, and in a few days were 100 pounds short, and the milk tested but 4.3%. After two weeks or so he began feeding grain again, and after a week they had gained 46 pounds. I did not learn that a test was made after this gain in quantity.

Notwithstanding our learned scientific investigators strongly contend that feed has little or no effect in changing the butter fats in milk, facts like these seem very stubborn things. It will be a hopeless task I think to convince my friend, Mr. J. S. Woodward, one of our ablest institute workers, that the quantity of fat in milk cannot be changed, so long as he continues to fill his stables with cows from the general market, whose milk, at the time of purchase, contains but one pound of butter, or more properly, butter fats that will churn a pound of butter in 28 pounds of milk, while the same cows, under his liberal system of feeding, will soon make a pound of butter from 18 pounds of milk.

I hope none will gain the impression that I am in any sense an opponent of science as applied to dairying. On the contrary, too much cannot be said in praise of those who have given us the many grand results already obtained through scientific research, and yet the truth remains that the cow has some mysterious way of finding certain elements in foods that seem to

evade the grasp of the chemist. With hundreds of others, I look upon Prof. Stewart's book of "Feeding Animals" as of great value; and yet I agree with a certain director of farm institutes, who said the ordinary farmer could not profitably follow his directions for feeding. There are so many things we do not know.

CLEAN ROAD SIDES AND FENCE CORNERS.

It is a continual surprise to me in going about among farmers to see roadsides filled with bushes, weeds and briars, and to see a hedge row of unsightly bushes of every variety occupying from five to fifteen feet along the fences around the meadows. We have a law in New-York state that says the overseer of highways must see that all weeds and brush are cut each year along the roadside; but it is not enforced. It would seem, however, that any farmer would feel sufficient pride in his own premises not to allow such a nuisance upon his farm or on the roadside adjoining his grounds.

Some twelve years ago, a farm in an adjoining town was owned by a man who always took great pains to keep everything about him in the neatest manner. No bushes or weeds along the road side or by the inside fences. Gates were always kept in order. The farm buildings were not expensive, but kept in good repair. A gentleman living in town was attracted by the air of neatness that pervaded everything and bought the farm at \$10,500. Had the same farm been in the condition of many we see, with lawns broken down, and an appearance of neglect everywhere, it would still be seeking a buyer at one-half the price; in fact, the farm has, within a year or two, been re-sold at about one-half the purchase price.

SELLING MILK OR MAKING BUTTER, WHICH?

I was so thoroughly pleased with the answers given by Mr. J. B. Shattuck to the questions I fired at him some time ago in regard to pork raising, that I desire first to thank him for myself, and also in behalf of my fellow farmers, who have spoken to me of its worth to them, and I beg his indulgence while I send in a few more. The Borden Milk Condensary Company are putting in a bottling establishment in Delhi, to be merged into in condensary as well, as I understand. Our farm is about five miles from this institution, nearly every rod a gentle down grade.

Our dairy consists of grade Guernsey and grade Jersey cows, and we have twenty two head of high-grade yearlings and calves coming on, bred for butter purposes. We have never reached the 300 pound mark, as we have practised selling off springers during the fall, and filling in with heifers, but have been selecting and breeding with the view of something still better ahead. Will Mr. Shattuck kindly give to the *Dairyman* readers his view of the comparative profits of milk selling and butter making, taking into account the profits of pork, calves raised for keeping up the dairy, manure on the farm, &c. A large number of farmers in this vicinity will be interested in his answer. I wish to say that we are following Mr. Shattuck's directions in pig feeding as nearly as we are able. We have, at present, two brood sows at pasture doing well, and twelve spring pigs in the pens, making a very fine growth on a mixture of wheat shorts, oil meal and skim milk.

It is reported, but not officially, that the bottling works expect to pay about 2½ cents per quart on an average for the year, but I fear this estimate is higher than farmers will realize, although not higher than they should get.

J. D. SMITH.
Delaware Co., N. Y.

BUTTER IN THE WINTER AND CHEESE IN THE SUMMER.

Several years ago *Hoard's Dairyman* tried very hard to get the dairymen to organize the factory business on the basis of making butter in the winter and cheese in the summer. Our efforts however proved of no avail, and so we said no more about it. Prof. Robertson, of Canada, has been working up this system with very flattering results in several establishments, and we understand the patrons are very much pleased with the arrangement. From an economic point of view it is the most perfect and profitable for the patron. The main portion of his cows calve in the fall. That gives him plenty of skim milk on which to rear what calves he wants and feed his fall dropped pigs for the spring market. In May the milk is turned into cheese and the calves are ready to turn out in good shape to go without their daily ration of milk. In July and August the cows are dry just when the prices of butter and cheese are the lowest, consequently the milk worth the least, and the farmer is the busiest of any time of year with harvesting of his crops. As a rule also milk is worth more for cheese in mid-summer than for butter. By adopting this system, the factory and farmer are both in position at any time to take advantage of the market for either butter or cheese. All that is needed is to exercise a little Yankee gumption in the matter. Maybe we had better call it "Canadian" gumption.

GRANULAR BUTTER.

ED. HOARD'S DAIRYMAN:—On page 105 of the *Dairyman* is copied an article on the above subject from the *Practical Farmer*, which contains some good instruction. The difficulty to impart information on this subject, and in fact any other subject, is to adopt the instruction to the size of the mind which is to receive the instruction. In this case the pupil seems slow to understand a very simple thing, to wit: that the object of churning is to separate the butter fat from the milky part of the cream. If the pupil can understand that cream in proper condition churned to granulation at a temperature of 62 degrees or less, and the churning stopped at that stage, the butter is distinctly one thing and the milky portion distinctly another, and will run out almost entirely if permitted by pulling out a properly adjusted cork. After a little drainage, if cold water is added it percolates the whole mass, hardens the granules and rinses out the remaining butter milk and leaves the butter in fine particles (granules), a perfect condition to receive the salt, particularly so if a revolving churn is used that has no inside machinery to grind or injure the grain of the butter.

On the other hand, had the churning been continued until the butter had formed into lumps or a mass, considerable butter milk would have become imprisoned in the massed butter

that no washing would remove, and if removed by laborious working the grain of the butter is greatly injured in almost all cases.

The granular process saves much labor and performs its part of the process of making perfect butter. The old way of churning the butter to a mass, fastens in the butter milk, which if allowed to remain in—well you know the result; if worked out it is great labor and cannot fail to injure the grain of the butter.

I am aware that some will fail, at first, to succeed in making granular butter in its most approved form, but if they will use a revolving churn without inside machinery, churn until it begins to "swash"—pull out the cork and let the buttermilk run out into a clean vessel—"Oh, my! the butter is all running out with the milk, what shall I do?" Some say strain it through a hair sieve and put it back in the churn. Don't do anything of the kind, but after you get out of this scrape as best you can, sit down and reason the case.

The doctor studies out the cause of the disease, removes the cause and the disease vanishes.

Some time ago I related the case of the pupil complaining of results in deep setting of milk. When I asked if he had followed directions, he replied, "Oh, the old fellow is not here to watch me. I don't need to follow all his scallops."

Now, gentle reader, I started out with the proposition, "Cream in Proper Condition." Heretofore I have often explained that cream in proper condition is a slight and even acidity, just as the cream begins to thicken, and a temperature of 62°. I am aware that many advocate a colder temperature, but I am confident I can churn as exhaustively as need be at that temperature, and get the granular butter that will float on top and not run off with the buttermilk. I am aware that churning at a colder temperature will secure the butter in finer granules, causing a necessity of adding salt to make the liquid portion heavier so as to float the fine granules, and to keep them from running off. But I see no necessity for this colder temperature. It certainly takes longer to churn, and when it is done by hand an unnecessarily cold temperature is objectionable. I have often tested the buttermilk after this method and find very little butter fat remaining in the buttermilk, but I have found butter remaining in the buttermilk when the churning was done at a warmer temperature. Hence the necessity of knowing what you are about. The best little twenty-five cent aid you can get is a glass floating thermometer.

PROVINCIAL EXHIBITION.

In the Dairy Department There Will be a Special Competition by Order of the Department of Agriculture.

The dairy products and utensils department of this year's exhibition will be one of the most important features to be visited. The buildings appropriated to this display are to be repainted and decorated, new shelves are being added, which will give additional accommodation to exhibitors. The refrigerators, which have been lately created at great cost, are amply provided, and are wide enough to hold over five hundred tubs of butter or cheese. During the entire time of the exhibition there will be a plentiful

supply of ice, so that the butter and other perishable goods may be safely kept.

There will be a special competition open to syndicates of butter and cheese factories, under the charge of an inspector having one year's experience and upwards, each factory to exhibit one ordinary export cheese, white or colored, made between the 1st and 15th of August, 1895. The total prizes will be as follows:—For the inspector—1st, \$40; 2nd, \$30; 3rd, \$20. For the syndicate—1st, \$100; 2nd, \$75; 3rd, \$50.

There will also be a competition open to syndicates of cheese factories under a new inspector (first year's experience) each factory to exhibit one ordinary export cheese (white or colored) made between the 1st and 15th August, 1895. The prizes offered are as follows:—For the inspector, 1st, \$30; 2nd, \$20; 3rd, \$10. For the syndicate—1st, \$75; 2nd, \$50; 3rd, \$25.

There will be a competition open to syndicates of butter factories, each factory to exhibit a tub, barrel or box of butter, made between the 1st and 10th September, 1895. The prizes offered for this competition aggregate \$315.

The Hon. Commissioner of Agriculture has awarded special prizes for essays. The following are the conditions imposed in the different competitions, which must be strictly carried out. The directors reserve the right to require such further proof, by affidavits or otherwise, as they may deem necessary. All papers prepared in connection with the following competitions must be short and to the point, so as not to exceed one page of the *Journal of Agriculture*. These essays must be written by practical farmers; those on butter and cheese making by makers, directors or proprietors of cheese and butter factories.

Entries in this department close on the 26th August, 1895. It has been agreed that any subsequent entries that may be made will have to be put on a separate entry form and pay the regular fee. No entries will be accepted after the opening of the exhibition. A written declaration will be required from each prize-taker that the cheese shown was made in the factory named. This rule applies also to creamery butter. Any exhibitor misrepresenting as to dates or otherwise will forfeit any prize that may be awarded. Any factory or manufacturer can compete in all sections, but no factory or manufacturer can compete in the same section under different names. Exhibitors in this department who do not intend to come with their exhibits can address them to the superintendent of the Dairy department, Exhibition grounds, Montreal, from whom they will receive every care and attention. Instructions can be given to the superintendent as to the disposal of exhibits, and these will be carefully carried out. The butter will be kept in a large glass refrigerator made for the purpose and well supplied with ice.

AGRICULTURE IN GLENGARRY.

WHAT MR. D. M. MACPHERSON M.P.P., HOPES TO ACCOMPLISH.
His Own Farm an Object-Lesson—He Wants to Make the County an Example for the Province—Government Aid to Farmers.

"Give me a hundred-acre farm with a thousand-dollar mortgage on it, let me borrow another thousand dollars

to run it and within ten years. I will pay off mortgage, loan and interest simply by the products of that farm and leave it in much better condition than I found it."

This is the claim made by Mr. D. M. Macpherson M.P.P. of Lancaster, the well known cheese-man, who represents the County of Glengarry in the Ontario Legislature. As a business man Mr. Macpherson is intimately associated with farming and as a representative of the Patrons of Industry he has given the condition of the Agriculture of Canada, and particularly Ontario, much time and study. He has a farm at Bainsville on which in the past six years he has worked a revolution. It comprises 120 acres and previous to Mr. Macpherson's working it himself, it had been rented for seven years. During this time the soil had run down considerably and nothing had been done to improve it. Mr. MacPherson built a large barn, fitted it up with every modern improvement, including a silo—for he is a warm believer in silage for feed—and could comfortably house 150 head of cattle. Since then it has been his aim to accomplish a two-fold object—to make all he could out of the farm and at the same time to keep on improving it. What has been done—and Mr. Macpherson claims the same can be done by any farmer with \$1000 capital—can be seen from the following estimate of this year's crop:

Hay, 110 tons, at say \$9...	\$ 990.00
Grain—oats and barley—	
900 bush, say	340.00
Corn—700 tons at \$2.....	1,400.00
Milk production.....	1,800.00
Pork production.....	450.00
Veal—Calves sold.....	200.05
	\$ 5,180.00

This makes an average crop value of forty-three dollars per acre. It will be seen that Mr. MacPherson does not limit himself to one line. He goes in for general farming and when a representative of the Star visited the place this week it was seen that everything was unusually vigorous and prolific. The haying had been finished about a week and the meadows were covered (1) with a luxuriant growth of after-grass,—"the result of top-dressing last year," Mr. Macpherson remarked.

In one of the meadows seventy-five head of cattle were grazing, and thirty-five acres of pasture—less than half an acre to each animal—had sustained this large herd in good condition. An eleven acre field of corn is expected to make a record this year with a yield of thirty tons to the acre. It is incredibly thick and stands over twelve feet with a month's growth ahead of it.

"This condition of things," said Mr. Macpherson, "may be attained by any farmer in the county, or for that matter, in the province. The knowledge and a little capital is all they need. I have tried to make this farm an object-lesson for the county, and now I want to make this county an object-lesson for the Province. The Government should provide the money, for the improvement of agriculture is a national question—I care not whether it is the Provincial or Dominion Government that takes the matter up. I have offered my services in explaining methods and pointing out the principles of action to Mr. Dryden, the Ontario Minister of Agriculture. What I propose is that the Government borrow money to loan to the farmers. A thousand dollars each would be quite

(1) i.e. by the 3rd August.

sufficient for each farmer who would be willing to try the new methods, and an officer should be appointed to see that this money be properly applied, just the same as an official would oversee any other contract with a Government. These loans could be repaid in ten years at most, and then look at the change. This question of increasing the farmers' surplus, to my mind, solves the whole question of political economy. Increased surplus would mean increased Government revenue, increased population (which would be imperative under an improved system of farming, for extra help would be required) increased railway traffic, increased education resulting from the aroused intellect by a more intelligent system of farming. Let me give you a few figures. Roughly speaking, there are in this county of Glengarry, two thousand farms worth at present twenty-five dollars per acre, which makes five million dollars. The labor on these farms would aggregate one million days yearly. The surplus produced in cash, taking the average for the past ten years, is \$500,000 annually, and the surplus exported \$250,000. The average value of a day's work in cash is fifty cents.

"Now look on the other side. By systematic improvement the value of the two thousand farms would be doubled; double the number of days' labor would be required; the population would be nearly doubled. Instead of the surplus being \$500,000 it would be three millions. Half a million would represent the amount consumed by home wants, and \$2,500,000 would be the value of the surplus reported. (exported?) To achieve these results I have done, one of the most important points is the proper rotation of crops. My system is this: Corn, two years manured first year; third year, grain, seeded down with grass; fourth year hay followed by top-dressing; fifth year hay, and then two or three years of pasture according to circumstances. This, if every condition be fulfilled, will give an average yield for each season of forty dollars per acre.

"Of course, I cannot get every farmer to adopt new methods. Some are so used to farming along the old ruts, just as their grandfathers did, that they cannot realize that any improvement is possible, but if I can win over half the farmers in Glengarry, I shall be satisfied. And if the results I have indicated could be achieved in Glengarry, why not all over Ontario?"

STATE OF THE CROPS.

HAY.—At my last writing the haying was in full swing in many places, and should have been more general. There is lots of hay to cut yet, that is, what some might call hay, but it will be very little better than straw, and some that I saw harvested the past weeks not so good as lots of good straw; it was black and musty, having been out in the rain and wet weather the past 10 days. Asking some of these people in passing why they had not finished haying in the fine dry weather during July, they said cutting hay when in bloom gave the horses the heaves, my reply was use the hay cut in bloom for the cows and the last hay cut for the horses there would be no danger of the cows taking the heaves, at least. I never had heard of such a thing.

A great many in Vaudreuil and Soulange, kept their hay for seed, but it has been a bad time for saving it, there would have been more money in

it this year to have cut it early and sold the surplus to those in Western Ontario and the United States, where it is very scarce. The crop generally is better than many counted upon, in some sections it was frozen in the early spring but generally speaking new sown meadows yielded well. This Province will have considerable hay to spare, after providing for local consumption, at remunerative prices, and many no doubt will sell their cows, in order to sell the hay, on account of the low price of cheese prevailing.

Surely if nothing else will teach farmers a lesson to secure their hay early, this bad weather may help to open their eyes, as green grass is not so easily damaged by wet weather as over ripe hay (1).

WHEAT.—is I said before very little sown and looks only fair.

OATS.—Taking the oat crop as a whole it is better than for many years. In some places, the crop of straw is too heavy, wind and rain has put it down so badly that it will be rather difficult to cut with the reaping machines.

BARLEY.—Very good, in some sections cut and threshed in July—the grain a fine bright color.

PEAS.—Have not done extra well, cold wet weather early in the spring seems to have made them rather sickly.

CORN.—Like the oats is doing well, the July heat forced the growth, and corn, if not touched by early frost, will be a grand crop.

POTATOES.—Doing well, were at a stand-still with the heat and drought at the end of July, but are growing famously at present.

ROOTS.—Looking first rate and more grown than usual—farmers should grow lots of roots: they give health and vigor to cattle and horses.

APPLES.—Hurt in places by the frosts in May. They seem to be more free from spots than for many years. Many used the Bordeaux mixture, but it seems as if it was not needed as those who do not believe in it are about as well off this year, as the apples seem so far to be quite free from it.

SMALL FRUITS.—Not quite so good as usual, that is there not quite such an abundant crop but the quality is very fair.

BUTTER AND CHEESE.—The butter market is somewhat firmer and in better shape than last year, in many places where the factories are rigged up to make either one or the other many turn to butter making.

The cheese market is dull and heavy. The price of cheese in England is low enough to encourage the consumption but still the market is lifeless. Many, too many, are holding the cheese in the factories for a rise, the quality is deteriorating at the factories, many of them are not built for holding them at a low enough temperature to prevent many of them from going off in flavor. All the June cheeses are not yet sold and too many July still unsold. A great many makers are using rennet enough to cure them up in 10 to 12 days and the salesmen holding for higher prices. Some will find out to their cost they would do better to accept market prices and sell their goods when at their best. The cold storage facilities are getting filled up at a rapid rate. The Englishmen are getting cheap enough cheese this year. The possibilities are that many of the small factories will get closed.

(1) Very good and true.—Ed.

ed up, and it would be a good thing if a few hundred were closed up. Hundreds of new factories started this year will not make a fortune: when will this kind of thing stop?

PETER MACFARLANE,
General Inspector.

Chateauguay,
10th August 1895.

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A GUERNSEY RATION.

H. W. Cottrell, the herd and farm manager of Governor Morton's noted herd of Guernseys, reports the following to the *Rural New Yorker* as the grain mixture which he has found best to feed his cows: 360 pounds of bran, 265 pounds of corn meal, 50 pounds of oil meal, 25 pounds of cotton seed meal; total, 700 pounds. Of this mixture cows in average flow of milk receive nine or ten pounds daily with 35 pounds of ensilage or its equivalent in some other green fodder.

Each cow is watched carefully and the amount of bran or corn meal is regulated according as she takes on fat. Mr. Cottrell is very firm in the conviction that the great secret of successful feeding of dairy cows consists in conforming to the individual characteristics of each cow. On this point he says:

Why, take the members of any human family, sitting at the same table day after day. They all show different tastes, and naturally select different combinations of the food on the table. Take a man and his wife—the former would starve to death in time if forced to eat just exactly what his wife does, and no more. Why is it not the same with a big herd of cows? The individuals vary greatly in their tastes and habits. Here are two Guernseys side by side. This one is thin and bony, and you can't possibly fatten her. You might give her all the corn meal she would eat, and still her bones would show. The other is naturally disposed to lay on flesh, and extra feeding of corn meal would ruin her as a dairy animal. Bran is what she needs. You can see from this how necessary it is to study these cows as individuals, if we are to feed them to the best advantage, both as regards economy of grain, and quantity of milk. That is why we weigh the ration for fresh cows separately, and watch them carefully changing the brand and corn meal until we get the ration to suit us. Of course this takes time—though not so much as one might think; but in a herd like this, it pays very well.

THE THISTLE MILKING MACHINE.

We copy from the *British Agriculturalist*, a description of a new milking machine that is causing a decided sensation in dairy circles. We also have advices from parties who have seen the machine in operation, who believe that the Thistle is a practical machine, and will do all claimed for it. There is without doubt an existing demand for a milking machine, and we hope soon to have this one introduced into this market.

"The Thistle milking machine requires to be seen before anyone can have any true idea of its marvellous ingenuity and capacity for performing the work for which it is designed. Like most of the other milking machines, which have been produced before, it works by suction generated by an air pump. But unlike all other

milking machines, the suction is applied on the pulsating principle in precisely the same way as is done by the calf in sucking the milk from the udder of the cow. This is accomplished by means of a teat "cup," which is a marvel of ingenuity. The teat "cup" is of cylindrical shape, and is made of the very best quality of rubber. By means of the suction in the rubber tube connecting with the air-pump, the "lips" of cup fit firmly to the udder of the cow at the neck of the teat, precisely as the lips of the calf do when sucking. But immediately behind the "lips" and inside of the "cup" are two "gums," which with every stroke of the piston in the pump, clasp firmly around the neck of the teat, and, from the peculiar formation of the tube, the pressure, when it slackens at the neck after each pulsation, is continued down the teat so that the milk is drawn off just as is done by the calf in sucking, or by the skillful milker at each movement of the hand in the milking process. The air tight milking pail, into which the milk of each cow is drawn, is also a most ingenious and thoroughly original contrivance. The milk is first received into a small cylindrical compartment on the top of the "pail," this compartment having a glass gauge on one of its sides. In the bottom of this compartment is a small aperture, on which rests a ball of rubber filled with air. The milk as it falls into the compartment causes the rubber ball to rise and allow the milk to have free egress into the milk pail, the rubber ball again closing and keeping the pail air-tight the moment the current of milk has ceased. The milk pail has also a glass gauge on one of its sides so that the amount of milk in it may be easily seen. The arrangements for regulating the pressure are equally notable as marvels of ingenuity and simplicity combined. In fact, the machine, as a whole, is one of the most notable inventions of the nineteenth century. The cows seem undoubtedly to prefer the mechanical milker to the hand milking, and the milking is done to perfection, even the last stripings being thoroughly drawn off by the machine. If the teats be brushed or washed clean before the teat "cup" is applied, the pure milk, thoroughly free from dirt on the udder or teats of the cow, or on the hands of the milkers, perfectly uncontaminated by the germs of putrefaction, is drawn straight away through a vacuum tube into the vacuum in the air-tight milk pail.

SPECIAL COURSE.

DOMESTIC ECONOMY.

We take much pleasure in publishing this month the following programme of a special course in domestic economy, to be introduced this year—September 1895—by Ladies of the Ursulines, at Rerval, Lake St.-John besides their regular curriculum. The instruction in theory and practice to be given cannot fail to prove of great advantage to the pupils who receive it, as the farms, gardens, dairy, stables, &c., of this establishment are truly models of economy and excellent management.

PROGRAMME.

A. Theory:—Principles of agriculture, horticulture, arboriculture and pomology.

Practice:—In the garden and orchard.

B. Theory:—Management of the cowhouse, the dairy; principles of butter and cheese making.

Practice:—Milking cows, dairy work, butter and cheese making, from a family stand point.

C. Poultry:—Theory and practice. Food, care, management, for meat and egg production; profits.

D. Practice:—Work in the kitchen, bakery, laundry.

E. Practice:—In the sewing room; cutting and making of clothes, repairing and stitching; the working of wool and linen thread; knitting, spinning, weaving.

In this special course, reading, writing, arithmetic and book keeping will be taught. Religious instruction, teaching and hygiene will also be taught, and object lessons given on the various sciences.

The ordinary boarders of the establishment will also follow this course, according to their social position and to their parents' wishes.

Ursuline Convent,
Rovalval, 30th June 1895.

The Farm.

STANSTEAD COUNTY.

This county abounds in fine farms, but perhaps the leading one is that at present in the occupation of Dr. E. P. Ball, D. V. S., of the Leo farm, Rock Island.

It was settled by the ancestors of Dr. Ball in 1797, has been occupied by the family ever since, and is today a specimen of what continuous and well directed effort can accomplish.

The farm is 400 acres in extent; rolling, sandy loam, and in a high state of cultivation.

Haying is in full swing of which about 200 tons will be harvested, the average yield will be in the neighbourhood of three tons to the acre. The other crops are looking in the finest possible condition, there are 12 acres of ensilage corn growing, all of which are fine, but 1 plot of three acres is exceptionally so. Its rich green, broad foliage, and stout stalks, even at this date (July 17) bespeak that the crop will be very large. Dr. Ball is a believer in ensilage and proposes to increase its supply, he stated that he had only enough to last his stock until March last and the cattle did not thrive so well after it was gone.

Apropos of corn, a crop of wheat was growing on the land occupied by it last year, planted without manure or any other fertilizer and was far heavier headed and better than that which was growing upon the sod manured 20 loads to the acre. Mixed forage crops of oats, barley and peas are extensively grown, roots also, which are looking well, and are as clean as a garden. The Breed's universal weeder is used and has proved its usefulness in the destruction of young weeds amongst the growing crop and as a splendid labour saving machine.

A system of mixed farming is adopted, the dairy taking the lead and the products are not sold in bulk but fed to animals first. Therefore a fine herd of registered Jersey cattle are kept, amongst which are some excellent specimens. The bull Prince Hugo notably so, we should hear of him at the coming fairs.

Here too are the celebrated stud of standard bred trotters of which Lady Lee, with a record of 2.19½ takes the lead, having already won four races this season.

A flock of Shropshire sheep are in fine order, the lambs coming early are sold at highly remunerative prices and the ewes are fattening on good pasture for market in the fall. Since Dr. Ball has occupied the estate, he has made great improvements in the buildings, his cattle barns are made on the most approved plans for the comfort of the cattle, and the preservation of manure (a point to which the utmost importance is attached) and, notwithstanding, the young doctor's extensive veterinary-practice, he is assiduously paying attention to his farm, and adopting all the methods which he finds good in the new lines of husbandry. Such men as these we need to make Canada great.

GEO. MOORE.

A MASSACHUSETTS FARM.

During a visit to Boston and vicinity I had the opportunity to make a brief inspection of the farm of Mr. N. J. Bowditch of Framingham and hope a little sketch of it may be interesting as illustrative of what our neighbours over the border are doing in Agriculture.

I found Mr. Bowditch very kind and affable; he seemed pleased to welcome a Canadian farmer and willing to show me all he could and explain his practice.

The farm is 675 acres, a good deal under cultivation, with extensive pastures. The land is rolling with gentle declivities, good mellow loam and well watered. The farming is the highest, and no expense is spared to obtain this very best results.

The production of milk is the leading feature, Mr. Bowditch has brought it to a state of perfection seldom attained, and a handsome profit is realised notwithstanding the enormous outlay, is the pay roll averaging \$14,000 per annum.

Of course the profit could not be made under ordinary circumstances but the products are sold at retail. The farm supplying several of the hospitals in Boston with milk, cream, and butter, for which they are content to pay an extra price to insure its uniform purity and quality.

Butter too is made of so fine a quality that it is sold for 60 and even 80c per lb. to customers who think they cannot get the best without paying a fancy price for it. It certainly looked most tempting, of a beautiful golden color, no coloring matter being used, but the breed and feeding of the cattle, added to the method of creaming and churning, causing the superiority. Mr. Bowditch repudiates the centrifugal separator but adopts the deep setting and says that it is quite impossible to make butter up to his standard without setting the milk.

As to breed he is entirely in favor of the Guernsey cows, he says that he has proved that they give a larger flow of milk and a greater proportion of butter fat per cow than any other breed, and further, that, by his method of feeding and management they are in good condition all the time, so that if any accident occurs they can be sent to the butcher and are not all loss as the poor little Jerseys are.

Some Holsteins are kept but are not considered so profitable as regards butter fat, although some individuals come pretty close to the Guernseys.

The animals of this breed are from stock imported some years ago, by Mr. Bowditch's father, and have been improved by selection until now many

of them are hard to beat. A two year old bull showed points which were near perfection, and his mother, a ten year old cow was making 23½ lbs. of butter per week.

Last year Mr. Bowditch commenced the ensilage system, he says he went into it with strong prejudice against it, but one year's experience was enough to prove to him its great utility, and would not omit it in future upon any consideration, but would not use it unless perfectly sweet. This year he is growing 80 acres of Indian corn and proposes to ensile a good part of it.

The feeding is done upon strictly scientific principles, a differently mixed ration being fed to produce milk or butter (1) as the case may be. The ration too is varied to suit the case in different animals and given to them in the morning, with hay as a basis, and then the meal or ensilage, then water, then they are milked and remain undisturbed until evening when they are again fed, watered, and milked, and left for the night. Mr. Bowditch, facetiously, remarked, that if you went to disturb a cow in the middle of the day she would groan to be let alone. I was rather surprised at one thing he told me, which was that he heated the water for his cows in the winter time up to 70°, and said that cool water made a great difference in the quantity and quality of the milk.

He further said that he looked upon a cow as a machine for producing milk and worked her up to her full capacity; he could not see that they were injured by this treatment, for he had cows that he had been working for all they were worth for years and he could not see any deterioration.

The barns were well lighted and arranged, each animal being allowed 800 cubic feet of breathing space, and still more in a new barn. Ventilation was looked upon as most important and to make it complete, tubes were being put in to conduct air in front of the cattle, and ventilators with fans in the roof so that an accumulation of foul air is quite impossible.

I was much struck by the docility of the creatures, the bulls did not show the slightest disposition to be wicked, but came out to be examined, led by their keepers, and suffered themselves to be handled as quietly as lambs. Every cow came to Mr. Bowditch at his call and it was easy to see that they had been treated kindly. No man is allowed to speak harshly to a cow on pain of dismissal. On the question of dehorning, Mr. Bowditch says he does not like it and is of opinion that if the cattle are well brought up there will be little necessity for the operation.

Speaking of tuberculosis, he thought that it was not very prevalent or alarming if proper sanitary measures were taken, but he never sold or bought an animal without giving or taking a certificate from the duly appointed officer.

Of course farming on so large a scale as this is only possible to a few, and hence perhaps it does not afford so good an object lesson as a farm of lesser proportions, where less capital is involved, but it is well for us all to have an idea of what can be done with money and brains, to guide us in our more humble efforts, and whether we own one or one hundred cows the rules as to breed, feeding, and general management will hold good.

GEO. MOORE.

(1) Then Mr. Bowditch believes butter can be fed into milk!—Ed.

ORCHARD GRASS AND CLOVER

EDS. COUNTRY GENTLEMAN—I want to ask some questions, the answers to which I have not been able to find either in "Storer's Agriculture" or "Flint's Grasses," both of which books reached me through you last week.

About the economic value of orchard grass and clover for an orchard—I have, say, 10 acres of orchard, excellent land, which I desire to seed in late August, and which I shall have in first-rate condition. I have thought of putting in orchard grass and clover, but the farmers about here think I should do better with timothy and red top, as they consider that orchard grass, although it looks thick and heavy while growing, proves to be thin when cut, and shrinks up greatly in bulk and weight when cured. I find no satisfactory information about this in either Flint or Storer, though both apparently think highly of this grass. (1)

What quantity of clover should I sow with orchard grass?

Flint says (p. 70) orchard grass should never be sowed alone, and (p. 69) quotes Col. Powell as saying that one bushel per acre should be used when sown with clover, but does not suggest quantity or kind of clover. (2)

I want to use this land exclusively for hay, not for pasture, and as I board horses in winter have thought the mixture of orchard grass and clover would be a valuable change in diet from timothy; but it is a great object to me to get as large a bulk of good hay as possible.

Do you consider that this hay would be a good feed for horses, or is so much clover objectionable? (3)

I have also considerable land to lay down in timothy. I have read your articles and note you consider six quarts timothy and one of clover good seeding, and eight quarts timothy and one of clover very liberal, and shall seed as you recommend. This is a much smaller quantity than Flint mentions, though he speaks of over seeding. I was disappointed to find that he does not recommend any quantity only gives examples of what some use.

As I intend to seed this fall, or rather in August, am I right in understanding that the grass seed should be put in alone, and clover sown on it in the spring? (4)

I fear this is a deluge of questions, but I think the answers will be of value to others besides myself, and I am anxious to "keep up with the procession," and do my seeding in the best way. I wish you could get some of the farmers who are your frequent contributors, and whose articles I always read with great respect and interest, to give us some accounts of their practical experience in laying down land to grass, amount of seed sown, &c. I am sure any discussion by them would be of the greatest interest and value to many of your readers.

JUNIOR.

Lincoln, Mass.

This letter was submitted to a correspondent who had much experience with orchard grass, and who kindly furnishes the following reply:

1. Orchard grass and clover do well together when mown for hay, as they come to their best condition pretty nearly together, and clover is almost the only plant that answers this requirement with orchard grass. In the latitude of Massachusetts orchard grass should be cut by June 15th; in some years by 10th, and never later

than 20th. Much of the prejudice against this grass for hay comes from cutting it too late. Its greatest value is as a pasture grass, for when sown with a proper mixture, it will do its valuable part in furnishing continuous feed throughout the season most satisfactorily.

2. With one bushel of well cleaned orchard grass we should sow one peck of red clover. Some would think this heavy seeding, but we find heavy seeding most profitable.

3. A mixture of orchard grass and clover is well suited to wintering horses that do no work. The prevalent opinion that timothy is best for horses is based upon the fact that it is so for driving horses or any that have severe work, but timothy is not the best hay for animals that do not work. It tends to constipation of the bowels, and does not contain the best elements for simple nutrition. A horse wintered upon orchard grass and clover should be in the best possible condition for spring feeding and use.

A CURE FOR CLOVER SICKNESS.

On one of the fields in the Rothamsted experiments last year clover sickness began to make its appearance and, with a view to at once arresting its extension, steps were taken to dress the field with certain mixtures. On the most diseased portion of the field an application of 3 cwt of sulphate of potash and 1 cwt. sulphate of ammonia was given early in April; on another portion 2 cwt. sulphate of iron, and on a third plot, half the quantity of sulphate of iron. By the middle of May it was found that the disease had entirely ceased to exist on each of the first two pieces of land, the clover growing most vigorously—especially on the plot dressed with sulphate of potash and sulphate of ammonia, on which there was not a gap to be seen. At the end of July the good effect of this application was found to have extended to the second crop of clover. While the disease showed no sign of existence on the plot to which 2 cwt sulphate of iron had been applied, it did show itself where only half the quantity was used; but the growth was much more luxuriant where the mixture first named was put on. Mr. John Elder, of Uphall, Linlithgowshire, also cured a crop of clover of the disease in a previous season by the use of ammonia and potash.

Farmer's (Dublin) Gazette.

AVAILABLE MINERAL FOOD IN SOILS.

There is no more complex question in connection with manuring than that in which we are compelled to take account of the quality of the soil and of the plant food which is really available. So far, little or nothing is known upon this point, but it has been shown that phosphates, for example, although highly soluble, are not liable to loss through being carried off in the drainage water. If, therefore, they are rendered insoluble by chemical combinations with some other soil constituent, such as carbonate of lime or alumina, how are they taken up by the plant? It has been shown that the root sap of agricultural plants is acid, and agricultural scientists have long been engaged in teaching that this sap has the power of re-dissolving the material with

which the plant food is locked and rendering it available to the plant. It has been shown, too, that although the soil may contain abundance of plant food, such as phosphoric acid, it responds freely to soluble phosphates as they are given in superphosphate. It has been pointed out that where the top nine inches of a soil contained 15 lbs. of phosphoric acid, this layer would include two tons of phosphoric acid per acre, or a similar quantity to that present in seventeen tons of super phosphate. This fact is rather curious, and there is, therefore, reason for the efforts which chemists are making to ascertain why it is that the plant which so readily seizes upon the two or three hundred of super-phosphate distributed by the farmer appears to be unable to attack the much larger quantity which is present in some less valuable form, or if it attacks it, to obtain so small a result. The subject has recently been taken up afresh, and there is some reason to suppose that if experiment is continued we shall in the course of time be able to understand another of the secrets which are at present locked up in the soil.—JAMES LIND.

LIME AND FARMYARD MANURE.

Effect on Grasshoppers.

Mrs. COUNTRY GENTLEMAN.—In a rotation of corn, oats, wheat or rye and grass, on clay loam, what is the best time to apply lime, and what should be a sufficient ration of it? Is it probable that manure applied broadcast in the fall and winter will increase the hatching of grasshoppers? The worst ravages of these pests this year began in a field which was thus heavily manured last fall and winter. How much lime should elapse between manuring and liming the same soil?

U. S. C.

New Ringgold, Pa.

Lime may be applied advantageously on grass land in the fall, or on wheat land after it is plowed and before it is fully fitted. If the land is already full of vegetable matter, it is probable that the lime will do great good. Forty bushels was considered a fair dressing in former years, but now 10 to 20 bushels per acre is considered the most economical application. Buy stone or calcined lime, place it in small piles of about five bushels each at regular intervals over the field, and cover slightly with earth, allowing the rain and the moisture which rises from below to wash it. If it is applied to the wheat land, and there is not enough moisture, then water may be drawn and poured upon the heaps. Immediately after this is done, cover lightly with earth, so that the air may not easily get to the lime. Spread broadcast from a sled or stone-boat, if no convenient machine is at hand.

A good practice is to manure during the winter on grass land intended for corn the following spring. Five to ten tons of good manure evenly spread over the ground would be the most economical dressing. Usually farm manures are spread poorly and too thickly. The corn to be followed with oats, without any fertilizers or manures, oat stubbles to be plowed and treated to the same quantity of manure as the corn ground before harrowing. It is usually economy to add some mineral matter in the shape of commercial fertilizers. It is seldom necessary to add nitrogen. Color and growth of the plant should indicate

very accurately whether there is a deficiency of nitrogen or not in the soil.

Prof. Comstock says that there is no evidence that manuring grass lands tends to multiply grasshoppers. Their eggs are so thoroughly protected that they seldom fail to hatch, but if the weather is cold and rainy when the grasshoppers are young, vast numbers of them are destroyed. A short rotation is likely to prevent them from multiplying. It may be just possible that heavy manuring retards the hatching of the eggs, and so the young grasshoppers appear late in the season when it is likely to be drier and warmer than at an earlier period.

The lime and manure should be put on simultaneously, that is, if lime is found to be very beneficial, a light dressing might be applied with every dressing of manure. Only by experimenting can it be determined how often liming will be profitable. The chances are that 10 bushels per acre, applied with about an equal number of loads of manure every other year would produce very satisfactory results, or the liming might be only once in the course, that is, every four or five years.

Lime, strictly speaking, is not manure. It is almost always beneficial on both clay and sandy lands, but whether the benefit will equal the cost can only be determined by trial. It usually acts very energetically on heavy lands full of vegetable matter, making them more friable and setting free large quantities of plant food which before the application were dormant.

WHY THEY RIDGE UP THE POTATOES

To day I took a tour through the potato section of this vicinity to see how the crops looked, and watch how and what kind of cultivation was being practised, this terribly dry weather. I dare say that three or four thousand acres have been planted in the section just east of me, and while these men all live a post within the sound of Mr. Terry's voice and his pleadings for practically level culture, nearly every one of the fields were double rowed and hilled up, either by the use of wings on the cultivators, or by shovel plows. Now there must be some reason for such a universal ridging up of the potato crop, for where a storm is about general in its adoption and well stuck to, there is more to it than "further done so." I asked several to tell me why they were doing the same way that they had been doing for the past twenty two years, when the authorities were against them, and not one of them could say for certain, but thought it the better way, and potatoes were easier tended and dug when in ridges. One field that I passed, the owner was throwing every last cupful of fine earth from the centre of the row up against the vines, leaving a wide strip of moist ground in the center to be quickly dried out. When he was asked about his practice, the reply was "that it was better to have some moist earth put upon top of the hill, to keep the 'partakers' cool," and so I came home without being enlightened upon the point of hilling up potatoes, but there is no doubt that three fourths or more of the crop next year will be cultivated by the duplicate process. While the crop looked small and somewhat stunted from the effects of the long drought, and acres of the latest planted just coming up, there was an evenness to the stand, and few

missing hills that told of almost universal hand planting, notwithstanding there are many planters owned but not used in the territory. While every other crop has a constantly being added to list of better tools, with the potato, there seems to be a reverting back to more hand work, and even the digger is not so popular as in former years, if all reports are to be credited.

A threatened rain that turned out to be a slight sprinkle, and a change of the weather that sent an almost 9° temperature down this morning to the fifties, is not an encouraging change to report, but it is the best that I can do.

Western Reserve, O., July 10.

JOHN GOULD.

C. Gent.

A DRAINAGE EXPERIMENT

An Indiana farmer, J. C. Wainwright, tells in the *Drainage Journal*, his experience in underdraining eight acres of wet land, which had never produced enough to pay for cropping. The land belonged to a neighbor, who could not be persuaded to drain it. Finally he offered to give a five years' lease of the land to Mr. Wainwright, who thereupon set to work to under-drain and crop. There was a good incline on the field, and 250 rods of drain and tile were required to conduct the surplus water and fit the land for cropping. This cost \$122.70. The first year oats were sown. The yield was 40 bushels per acre, and the crop from the eight acres sold for \$96. No account was made of the straw. Wheat followed the next year, yielding 29½ bushels per acre, and selling at 60 cents per bushel, or \$141.60. The third year the field was in clover, yielding two tons per acre of hay, worth \$96, and a crop of 21 bushels of clover seed, which sold for \$121.50. The fourth year the field was in corn, yielding 504 bushels of grain, worth 40 cents per bushel, or \$200. After cutting the corn the field was sown in wheat, which yielded 35½ bushels per acre, or 284 bushels, and was so good that it sold to a seed company at 75 cents per bushel, making \$213 for the crop. Mr. Wainwright estimates his expenses for the above crops at \$200, rent \$120, ditching \$122.70. Total, \$442.70. The total receipts were \$868, leaving a profit of \$425.30, besides which Mr. Wainwright fed on his own farm the corn stalks, and the straw from two wheat crops, and the clover hay from which the seed was threshed. The field was turned over to its owner improved fully 100 per cent. Both parties made well by the bargain, though his neighbor who leased his land to be drained might have done better if he had drained the field himself.

The Horse.

FEEDING and WATERING HORSES.

By D. McNaugur, V. S.

I now come to what I conceive to be the most important part of my talk on feeding and watering horses. I have spoken on the different foods, their strength and adaptability to our horses, also the water supply, but when should we feed and when water? The time we give the water I think I can show you has more to do with the health of the horse and the amount of nutriment he receives from his food than any other part of the care of the

horse. The programme I advise and carry out myself in this: On entering the stable in the morning we water every horse all they will drink. They do not as a rule drink more on cold mornings than a painful, sometimes not so much, but they all drink, as they know from experience there is no more water until noon. Then feed hay, clean the teams that go out to work and harness them. When that is done feed the grain. If you feed grain first they prance around and waste the food, and many horses are dangerous to work around when eating grain; besides they will not stand around in the stall when eating and are hard to handle. At noon on the arrival of the teams at the stable they are given, say, half a pail of water to wash out their mouths and some fresh hay, which they eat until their stomachs regain their tone. As soon as dinner is over they are watered all they want and fed their grain. As grain is the last thing taken into their stomachs it is longest of digestion; consequently they are not weak with hunger before supper time, as they will be worked five hours each time of hitching. At night they are given half a pail of water when they come in and some fresh hay. After supper they are cleaned, watered all they will drink and fed their grain, and before bed-time, say 10 o'clock, if they will take half a pail of water they get it and a gallon of dry bran. I always water before feeding, and never on any account give any afterward. If I find a man watering my horses after they are fed I have no farther use for him. I consider him a dangerous man to have around a place where there are horses. I have had horses doing all kinds of hard work in this country—stage, livery and farm work—for 14 years, and I have not lost a horse through anything connected with their food and very rarely have a sick one.

Many people spend a portion of their time and not a little fuel in boiling and steaming food for their horses. Where there are a great many idle horses to feed, such as growing colts, stallions being fitted for the season or for sale, whose systems would be heated up, their legs swelled and swollen by such food as oats and chop, they may be fed on scalded bran and cracked oats, mixed while hot with sufficient cut straw to give bulk, twice a day, with one feed of whole oats at noon and sufficient roots once a day to keep them cool. I do not believe that the stomach of the horse was designed to digest cooked food, and I think many valuable horses have been lost from following this course with working horses, as its continuance is apt to set up acute indigestion and bring on flatulent colic and other diseases of the digestive organs. The large corporations, such as street car companies and others which work large numbers of horses and try to get all the work out of them they are capable of performing, and which ought to know as they have large quantities of horses to experiment on and the very best talent to be had and everything is run on strictly business principles—have discarded this method of feeding and now feed crushed grain and cut hay three times per day, with long hay at night, with perhaps a warm bran mash twice per week, with a few carrots and plenty of salt. I have always noticed that the people who do most boiling for and doctoring of their horses (I say doctoring because they are always giving them something in the way of drugs) have the most sick horses. The more ignorant a man is concerning drugs the more virtues he

thinks they possess. There is a mystery about them that works on his imagination, and he thinks by putting a teaspoonful of some mysterious drug into his horse's food his coat will shine and save him the sweat and elbow grease so essential to stimulate the glands of the skin and which bring a brightness and gloss to the hair which nothing else can impart.

N. W. Farmer.

THE ROYAL AGRICULTURAL SHOW.

This year the "Royal," as we usually term this great annual fixture, is being held at Darlington, the famous Quaker town on the borders of Durham and Yorkshiro, where it has been given a splendid welcome. This town competed strongly with Newcastle for the show in 1887, but was then defeated by the larger claims of the northern capital. But now its turn has come, and nothing can be more delightful than the weather and surroundings, a fine stretch of land overlooking the Tees Valley, and nicely wooded, being placed at the disposal of the society by a member of the celebrated Pease family, who are the magnates of this district. The weather has been up to the time of writing marvelous, brilliant to an extreme but tempered by a pleasant wind. Some of your readers who visited one of the former "Royals," when leaden skies and pouring rain made everything and body miserable, and led them to ask if there ever was sunshine in England, should see it now. To enhance the pleasure of Teesdale people, to-day the Shahzada (of Afghanistan) has been a diligent observer of the show, and tomorrow we are to have the Duke and Duchess of York. But for the crowds of people who have been there, and are expected to come, excellent arrangements have been made. Darlington is one of the chief stations between London and Edinburgh by the east coast route, and the two great companies concerned, the Great Northern and North Eastern, deserve a word of praise for their dealing with this plethora of traffic. The total number of entries is as follows :

Horses.....	650	Sheep.....	505
Cattle.....	518	Poultry	769

There are no pigs, in consequence of the prevalence of swine fever in the country.

In cattle, as might be expected on Tees side, Short Horns command primary attention and there appear signs of a rise in interest and prices, due to causes which need not here be explained. It would be fitting if the present show heralded a revival in the breed. The total entries were 124, largest in the show. Lord Polworth's Nonsuch is a grand shaped animal, with splendid movement, and he wins well in the aged bull class, taking also the Short Horn Society's championship. He is largely of Booth blood. There are no fewer than 17 2 year old bulls, the son of a well-known sire, Mr. Geo. Harrison's Champion Cup, by the famous Challenger Cup, bred by Mr. Deane Willis, reverting on Mr. W. Atkinson's Major Munro, which is only third this time. There are 19 young bulls, and here the victor is seen in Mr. Willis' Count Victor, an attractive level bull, which quite bears out the promise he made a year ago, and he fairly may claim to be only beaten by Nonsuch aforesaid in the show yard. In aged cows, Mr. Geo. Harrison's Warfar wins, and thus adds another to her many victories. She has great substance and is well built. In the heifer (in calf or milk) !

class, the female champion is found in Mr. Deane Willis' Miranda, emphasizing her previous triumphs this season. She is by Count Lavender, and is of beautiful type. Out of 16 2 year-old heifer calves the queen secures first with a red, Frederica, by Volunteer, handsome and nicely built. No fewer than 25 heifer calves are present, and here again, Mr. J. Deane Willis shows the quality of his herd by taking first with Seraph, victor at Bournemouth a fortnight ago. She is a pleasing red by Roan Robin.

In Herefords there are 50 entries, a remarkably good display for so far north, but there is considerable variation of opinion as to some of the awards. In aged bulls, Mr. Arkwright's Happy Hampton wins, and this is not far wrong, he is a good 4 year old by Hilarity. Two year-old bulls are a nice, though not a striking, lot. The victor is Liberty, by Albion, bred and exhibited by A. E. Hughes, who, it is reported, has sold him at a long price to South America, where his good qualities ought to tell. Albion's blood is also to the fore in yearling bulls, wherein Mr. Hughes wins with Ladas, a neat, well-fleshed specimen. In cows and heifers, Mr. Thos. Fenn's Downton Heiress wins, but some good judges prefer the second, Mr. A. P. Menor's Gwendoline, which has won at some of the previous shows.

Devons are few, but fairly representative. Pretty Middling 2d maintains his great repute in aged bulls for Sir W. H. Williams, Bt., and deservedly so, the same blood being at head of affairs in young heifers, with May, a sweet 2 year old. In bull calves, Mr. J. C. Williams, M. P., wins with Asterthought, another son of the great sire, whose supremacy is thus unquestioned. Sussex make a good display, but call for no mention, and the same is true of Welsh and Red Polls—the prizes falling to those exhibitors who seem usually to absorb them.

Aberden-Angus are very good indeed, for there are many admirers thereof in the North. Sixty entries are made in all, representing most of the best herds and blood. Aged bulls finds Mr. G. S. Grant winning with Equestrian, a son of the well-known Prince Inca, and this exhibitor is equally successful in the older cow class with Legend, a daughter of River, both well selected "doddies." The Dowager Countess of Seafield wins in 2 year old bulls with Bernadotte, a promising, level-bodied fellow. That well-known feeder, Mr. Clement Stephenson, shows that he can breed as well as feed, for he wins in yearling bulls with Light Heart, by Cerberus, and in yearling heifers with Gipsy of Benton, by Albion, two excellent youngsters, shown in grand form. In 3 year-old heifers, which are a good level lot, Mr. W. Nunnion takes first with Rose of Benton, a daughter of Albion, and bred by Mr. Stephenson. The Marquis of Huntly carries another prize to the north by winning in 2 year-old heifers with Waitress of Aboyne. (1) It is generally conceded that the display of Galloways is the best that has been seen for some time, certainly on this side the border, but the winners are generally well known specimens, who have often carried off awards before. There are 47 entries in all. The Duke of Buccleugh is chief winner, but his flag is lowered in yearling bull calves, where he is beaten by Mr. W. P. Moore by Nonpareil of Castlehill, defeating the well known Emperor of India; yet the award is very generally approved. Highlands are few, and Ayrehires good, but the latter I cannot speak of.

(1) Lord Huntly's eldest son's title.—Ed.

Jerseys make a grand display with 91 entries, and the competition is very keen indeed. In a fine class of old bulls considerable difficulty was experienced in deciding between two animals of great merit, namely, Mr. James Blyth's 3 year old Victoria's Pink, a handsome dark gray, and Mr. R. J. Pope's Devotion's Lad, and when taken together there was very little difference. Eventually color decided the day, and the last named was placed first, thus reversing some previous awards. This class was exceptionally strong in old winners. The yearling bull class was by no means easy, 22 animals presenting themselves, and they took some sorting out. Mr. R. J. Pope wins here again, with Prince of Beresford, by Gamboge Lad, a very pretty whole colored specimen. Jersey cows in milk (old) is another big class, and the first prize is Lord Rothschild's (1) Oxford Dahlia, a handsome fawn cow, now 8 years old, by Sultan Cicero, and a frequent winner. Behind her was a good lot. Two-year-old heifers had 17 entries, and here the same exhibitor is victorious with Regina's Sultan 2d, a Mulberry by Orme, and a grand animal with splendid milking qualities. She has already won firsts at Taunton and Bournemouth this year. In yearling heifers Mr. James Blyth carries victory to the Stanstead herd with Snowflake, by Distinction's Pride, out of Snowflake, and beats the winner (Lord Rothschild's Oxford Daffodil) at the two shows just named.

The four classes of Guernseys are fairly well filled with good specimens of the breed. In aged bulls first goes to Sir H. D. Tichborne for Guess, a red and white 3 year-old, by Fearless. Yearlings were few in number, and the same exhibitor wins, this time with Active Lad, a white Cow or heifer found Mr. C. Middleton first, with Flakes II, a handsome fawn and white. In younger heifers Sir F. A. Monto fiore, who meets with less than his usual success, is first with Daisy of Worth, late Daisy 4611, a pale red and white, and excellent throughout. Kerries are not numerous, but good in quality, and the best known breeders are as usual to the fore.

In sheep, of which my notice must be very brief indeed, Leicesters are better than usual at the Royal though the Yorkshire type of this breed fares badly. Mr. Hutchinson of Catterick, is the chief winner. Cotswolds are not a large show. Lincolns are very excellent in quality though they have been more numerous on other occasions. Mr. Dadding of Riby Grove, has a lion's share of the prizes. The comparatively little known Wensleydale sheep are almost on their native heath, and form an excellent collection of 47. In fact it is conceded to be one of the best displays ever made. Oxford downs are a fairly good display, whilst Shropshires are numerous and good, no fewer than 31 shearling rams being presented, with others in proportion, the total entries being 93. Southdowns make a good display, and here Mr. J. J. Colman, M. P., and Mr. E. Eldis are chief winners and deserve their position. Hampshire Downs are a nice lot.

My notes on the horses and other features of this fine show must come by the next mail

S. B.
Darlington, June 25

(Cult. C. Gentleman.)

THE WALDRON RANCH.

Mr. Duncan McEachran, M. R. C. V. S., is now visiting the Waldron ranch of which he is manager. The English shareholders have determined to quit

the business, and the affairs of the company will be wound up as quickly as possible. The company will have, this year, an income of \$90,000, which is a good percentage on a capital of \$350,000, and it seems regretable that when the ranching business has such a particularly good prospect, they should have decided to sell out, the returns for the year past not having been what was expected. With 2,000 steers ready for the market, and with every prospect of the number increasing yearly from now on, with a calf crop unprecedented for numbers; and with a horse trade only just finding its legs, it would seem that now is the very time they should "stay with it." The cattle will be counted this spring, and next spring the Waldron brand will frizzle the calves' hides for the last time. Horse breeding has been discontinued already. Mr. McEachran expects it will take about four years to wind the business up.—MacLeod Gazette.

The Poultry-Yard.

SHAPING AND MARKETING POULTRY.

How it is Done in La Bresse.

The food used for the fattening of the fowls in the Bourg and Louhans districts varies somewhat, though of course this is limited. The chief idea seems to be that people shall use such food as is produced upon their own farms, and thus save the purchase of anything that can possibly be avoided. The chief exception is in the direction of rice, which is considerably used for feeding the young chickens. Maize, buckwheat, oats and pollard are all utilized, while milk is extensively used both for chicken feeding and also for fattening purposes. In several cases I noticed that whey from curdled milk was employed, and the La Bresse fatteners declare that this has a most beneficial influence upon the flavor of the flesh. The same fact is true in this country, namely, that soured milk is preferred for the purpose of fattening, and I believe that some of the cases where novices have not succeeded as well as they could have desired, was simply that they had used the milk fresh. I noticed at one establishment in the Bourg district that the milk had been mixed with the meal and allowed to stand until a measure of fermentation had actually taken place. I know that some of the crammers in Sussex mix the food immediately after one meal and allow it to stand in the machine for twelve hours, until the next time of feeding. Sour milk having been used in preference to sweet. For the actual fattening of the birds, however, in La Bresse buckwheat meal and maize meal are chiefly depended upon, and in the majority of cases these are mixed in equal proportions. The meal, as a rule, is partially cooked by scalding, and I believe that either scalding or actually cooking the meal is of great help in the work of fattening. I may mention that the flesh of fowls produced by this system is marvellously white, and the customary plan is to blow the feathers of the breast on one side so that the color of the flesh may be seen.

Of course before killing, the birds are starved for about 36 hours. (1) The plan adopted in killing is not one to be recommended, and I was very sorry to see it used. Palstring—that is,

(1) 18 hours is enough.—Ed.

piercing the brain with a proper killing knife—is a rapid and excellent method, but in the La Bresse country they do not carry it out anything like so effectively, but in many cases the roof of the mouth is simply cut with a fine, sharp pair of scissors and in a transverse manner. The bird is thrown down and simply bleeds to death. I saw in one or two places the work thoroughly done, but in others the birds had evidently been suffering in this way for hours. The Sussex plan of dislocating the neck, although by no means attractive, is certainly much more humane and to be preferred. (1)

As soon as the birds are killed, plucking takes place, and this work is expeditiously and thoroughly performed. It is claimed by La Bresse breeders that one of the great virtues of the fowl is that the feathers come out so easily and leave the skin smooth. Certainly the appearance of the birds lends credence to this statement, and I am inclined to think that the La Bresse fowls have not so much in the way of plumage as is the case with other breeds. A very few minutes suffice to pluck the bird clean, and the whole body and wings are denuded of feathers except a few upon the head and neck, left there to prove the class of fowl. Then comes the peculiar shaping which is so striking in the case of this breed, distinctive from any other elsewhere to be met with. For this purpose two cloths are used, the first of fine linen, and the second, which is shaped something like a wine bottle. These are stitched



Fig. 1—SHAPING CLOTH.

round the bird firmly and tightly. The effect of this shaping is to give the fowl when it is taken out the appearance of a champagne bottle, the head being the mouth. The birds are allowed to remain in this cloth until they are completely cold and set, the cloths being dipped in milk or water, which has the effect of smoothing and whitening the skin. All birds, even those which sell as low as four or five



Fig. 2—FOWLS READY FOR SALE.

francs, are shaped in this way. I send you herewith drawings showing the shaping cloth and also the appearance of the birds when completed.

It is somewhat difficult to learn the extent of the trade done in La Bresse, but it must be very extensive indeed, and there can be no question that this industry has a most important influence upon the success of the district. The fact is that the La Bresse

(1) We have practised it for 40 years and it answers perfectly.—*Ed.*

fowls are in evidence pretty nearly everywhere; even the hotel keepers in their general advertisements call attention to this industry, and in the shops of both Bourg and Louhans sweetmeats and souvenirs of various kinds are modeled after these fowls. It would be useless to quote the figures from the last decennial French returns, because they are so old, but when the new census is issued we may be able to say something upon this question. Fowls from this district are sent to all parts of the country, but particularly to Paris and the Riviera. During the Mediterranean coast season the demand from the latter district is very great, though I do not think they take quite the quality of the La Bresse poultry which are sold in Paris. A fair number of the cheaper kinds go to Switzerland, and I met with them in the poulterers' shops at Geneva, though they were not the best quality.

So far as prices are concerned, these vary considerably and in accordance with the time of year. Probably the ordinary rates range from three to eight francs for fowls, and a good substantial bird may be bought for six to seven francs. The chief prices, however, are for capons and poultaries. I was asked in Bourg market by a country woman twenty francs for a capon. Of course it was a beautiful bird and I suppose weighed over a dozen pounds. She sold it immediately afterwards at the price named above. These capons make special dishes, and the demand is of course, while considerable, more limited than for ordinary poultry.

So far as practical value is concerned, it is a little difficult to say whether the La Bresse fowl would bear introduction into this country. That it is a splendid fowl for table purposes cannot be questioned; its great length of keel, rapid growth and readiness to fatten, with splendid quality of flesh are all strong recommendations in its favor. Some of these best qualities of French table fowls have not proved hardy enough for our more northern climate, and it may be the case that the same would apply to the La Bresse. I should think, however, that there are parts of the United States where it could be introduced with advantage, more especially in the Southern States. It may be interesting to mention that we are having experiments carried out as to its adaptability to the English climate. One thing I should like to mention in conclusion—it is that the La Bresse breeders realize the importance of having a definite type of fowl, of giving attention to its improvement, and not spoiling it by the introduction of foreign blood. I saw in a few cases crosses with other breeds, but I am bound to say that they were much inferior to the pure La Bresse.

STEPHEN BEALE.
H., England.

HOW THE DUCKS GREW FAT.

The Wilmington (Del.) News tells a story of a poultry-keeper of that city which might fairly be headed "Important if True." Mr. Tong, the person in question, has been sadly puzzled of late with regard to his flock of ducks; they 'got off their feed,' and nothing that he could tempt them with succeeded in inducing them to eat as of yore. The strange part of it was that, while they appeared to be lazy, their health was unimpaired, and they grew fatter and fatter.

Mr. Tong told his friends about the mystery, and, like him, they all gave

it up. He was speedily coming to the conclusion that he had produced a breed of ducks that, chameleon like, would live on wind, when Police Sergeant Massey last Monday night solved the mystery. The sergeant was hurrying to the reporting place, when, coming down in the middle of Market Street, he saw "Bob" Tong's ducks.

They came in Indian file, a mammoth drake in the lead. The ducks waddled as they came, and a desultory conversation appeared to be going on, judging from the quack quacks that were heard along the line. The sergeant was interested, and, as he was ahead of time, he followed the ducks, walking quietly and keeping in the shade.

The ducks stopped under the first arc light and ate the large pile of insects which had been killed or maimed by the lights. When all the bugs had been devoured, the ducks went on to the next electric light, and kept on until they were so gorged with bugs that they could only barely waddle back to Tong's stable.

The secret was out. The ducks had been living on bugs. So well did they love the diet, that they gorged themselves until they could eat no other kind of food.

Sergeant Massey was interested. The next night he watched for the ducks, and they came as usual. The next night he was at the stable when the court house clock struck two. When the last note echoed over the city, the ducks emerged from the stable. A watch has been kept ever since. It is when the clock strikes two that they come, and always on the second.

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

(Continued.)

The late red clover comes about a month after the other; it cannot thus be used at the same time as the early plants. Formerly it was mixed with timothy. After the first year, it partly disappears, and generally after the second year it is gone entirely. It is often marked with a disease, which is the reason that it is not well to sow it in the same place without an interval of six or eight years. In pasture, when it is young and a little moist, from dew it often causes hoven or blowing. Cattle like all kinds of clover as hay or as grazing grass; under the latter form it imparts a better and more savoury flavor to the butter.

White clover grows wild in nearly every place; it is to be found in quantities on very light soil. Heretofore it was preferred to the red clover, before it grows for several years without requiring any resowing. It is a characteristic of white clover to creep, consequently a single plant may cover a large piece of ground, even when the chief root is dead; for this reason it is better for pasture than for hay. It does not give as great a yield as does the red clover; but when the latter is dead the white clover will have, during the second year of growth, a better chance to spread. The white clover is not so particular as to soil as the red.

The alsike or Swedish clover (*Trifolium hybridum*) was principally cultivated in that country during the last few years. It is a hybrid between the red and white clovers: the flower is at first white or pink, and it afterwards becomes a rose color; it is distinguished from the white clover by

the stem, which is straight and does not creep; it can stand cold but not drought.

The yellow field clover. (1) It is called in ordinary talk rocky clover, or yellow clover, expression that indicates a fodder plant of lesser value. It has a yellow flower. During recent years it has been more generally raised in this country; it is an annual and biennial plant, and is noted for its rapid and complete development, and is therefore well adapted to the raising of new grain; generally it grows to two feet, rarely higher. (2)

Lucerne has been raised from time immemorial in the South of Europe, but with us not so much as it deserves. There are several kinds that bear white or violet flowers that appear in clusters. It cannot be raised with other fodder plants, or for grazing, but should be cut like hay, for the cows and pigs in the stable. It makes splendid fodder for cows and above all for pigs. It gives three or four large crops and can be harvested even earlier than green rye. It should be sowed in a rich and limy soil. During the first and following years it should be carefully hoed. The Belgians say it is as necessary to hoe a field of lucerne as a field of sugar-beets. It is, therefore, no wonder that the Danish experience with this clover has not been successful; if it do well, it will give, without manuring, during at least ten years, three or four crops a year, provided it is well cared for. It draws its moisture from the subsoil, and leaves the ground in a fertile state, and after a ploughing the land will give a large grain crop.

Peas and vetches do not suit pasture. Cows feeding upon them give milk that produces a poor quality of butter. It should not be used as feed in summer for dairy cows, except when mixed with rye or barley. This is called *mætin* in which the grain predominates. It is better to give this mixture to the cows when in the house, or to give it to them a couple of times daily when they are grazing. As food for pigs, vetches and peas are excellent; but once cut they do not grow again, so the after-math is null compared to that of lucerne. (3)

Roots are raised at present in great quantities, especially mangels, carrots turnips, which are very important in cow feeding.

Mangels belong to the same family as the sugar beet, spinach, etc. (4) Very many kinds are raised of different colors and shapes, red, yellow, long, thin pointed, globular, etc. The most in use are the *Elverthams*, *Barris* and *Eckendorfer*. It is a plant that all domestic animals like and the root of which has no bad effect on the quality of the products, if not given in too large quantities. The leaves are not good food for cattle, because they contain very much water and are purgative. Mangels contain a great quantity of sugar, which makes them very nourishing. The quantity of sugar varies with the different sorts, but the *Elverham* is the richest in sugar.

Domestic animals are very fond of carrots; they have no bad influence

(1) Emphatically called, in England, *trefoil*. A. H. J. F.

(2) The trefoil here meant is the *t. procumbens*, or hop-clover.—*Bo.*

(3) Lucerne has been grown successfully at the Ottawa Experimental Farm, where it gives three crops a year of splendid fodder. For this plant, the underrail must be permeable and well drained. It has also been raised in the Western States, where it is called "Alfalfa."

(4) Spinach is evidently the "Spanish" plant (from the Arabic), and, as Thomas Lord says, "is perfectly antiphonetic to Greenwich." A. H. J. F.

upon the products, but, as a rule, in every kind of ground they give a less abundant yield than the mangels, both in weight and volume, and they demand more cultivation and more labor in the gathering than do the latter.

Turnips and swedes are greatly in use. The turnips are about the same shape as the wild turnips, and the swede is something like the kohlrabi. The white and yellow species of this plant are raised in this country, but the yellow is considered the better; it is firmer and easier to keep in winter. Turnips and swedes are far superior, as food, to mangels and carrots. Turnips are very easy to raise; often they are sown in June. Swedes take longer to develop; they keep better, require a good soil, but contain more nutritive matter and less water than turnips. They are greatly used for cattle food, but they are not suitable for milk, on account of a strong odor they have, and they contain certain essential oils that are often found in the milk, cream and butter. The leaves are specially dangerous for dairy-cows, because they rot quickly and give forth a fearful stench of rotten cabbage.

(To be continued.)

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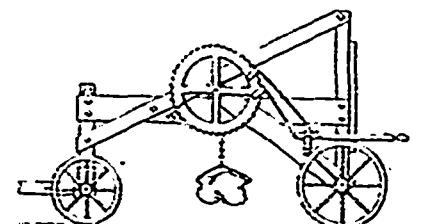
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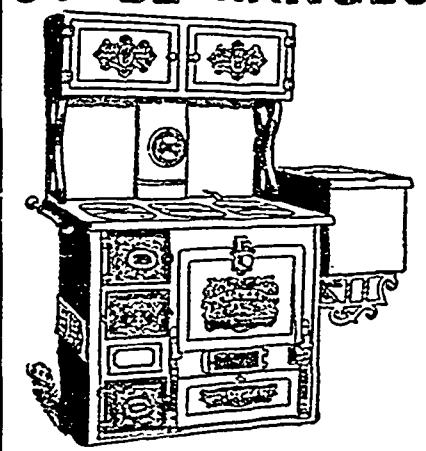
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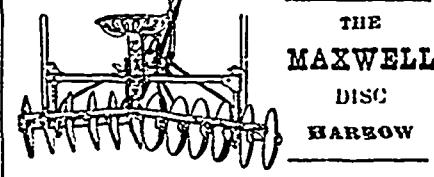
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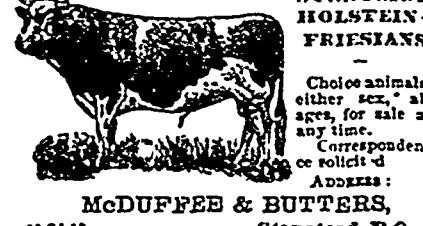
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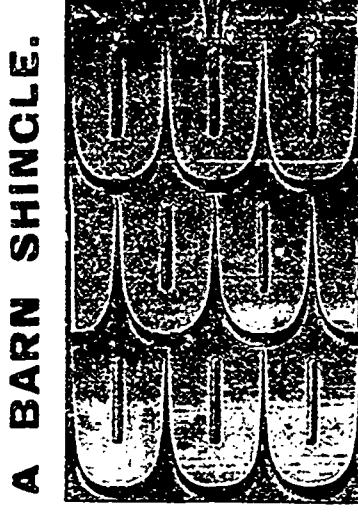
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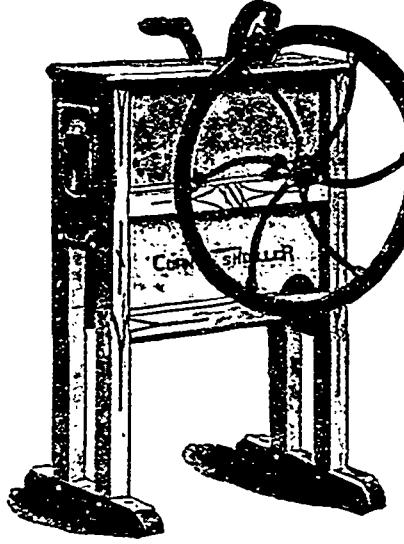
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