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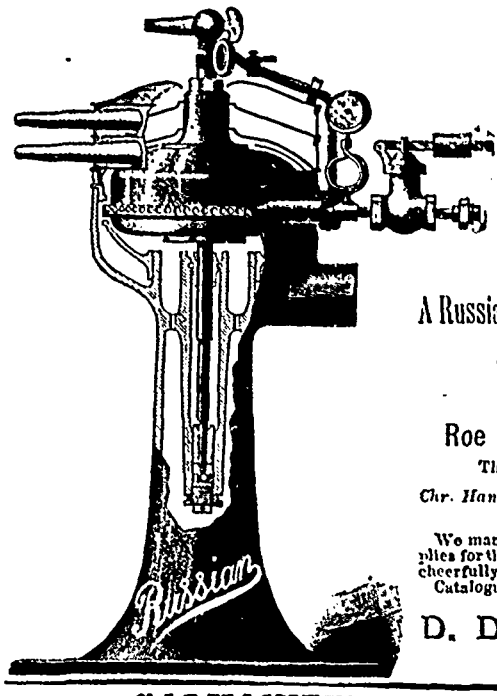


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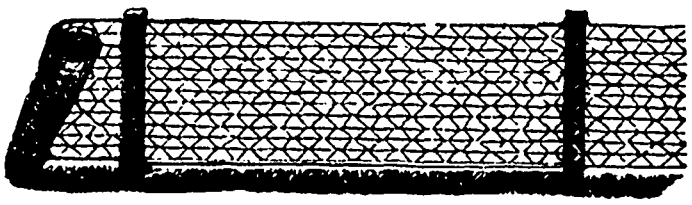

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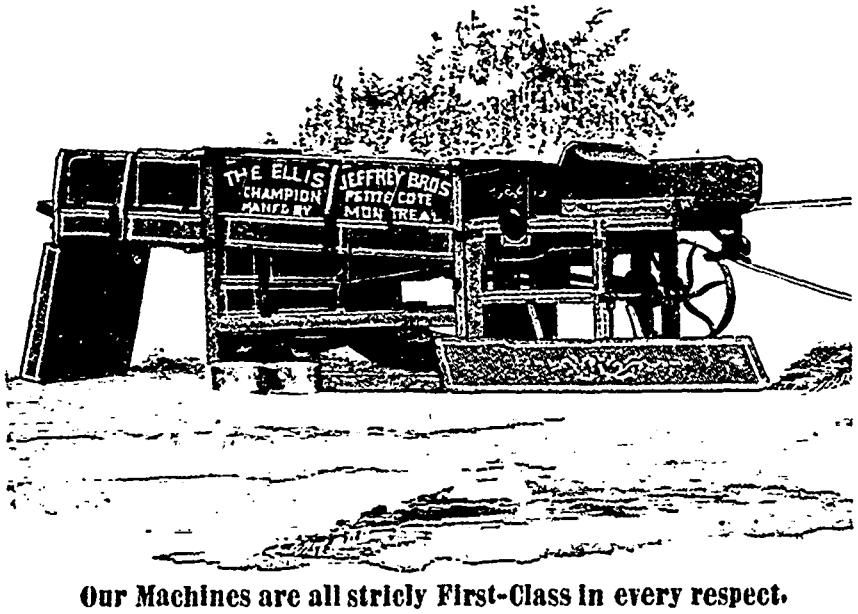


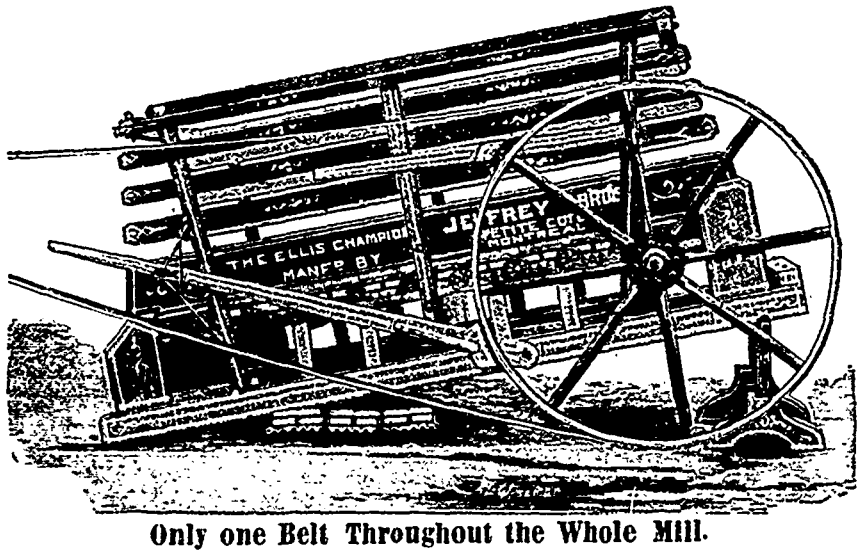


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The best Proof of their usefullnes is the great and constant growing demand for them and the best proof of their superiority is that the demand is the greatest where they are the most used.

On our Mills, there is no Side Shake. The Upper Shaker travels 4¾ inches, and the Lower Shaker 1¾ inches lengthways. There are none of the old-fashioned Fans, but a new and simple and much better Fan, which gives ample wind, and cleans perfectly. When you have done threshing, you know exactly how much grain you have; and, when you market it, you are not disappointed in the quantity, like other mills now made, which leave almost as much dirt as grain to be taken out by the Fanners. You have, direct from the Mill, your grain clean and fit for market.

### Only one Belt Throughout the Whole Mill.

The Power is direct geared. The Chain Links are Malleable Iron, having Cogs on them, and they pass over Pinions on each end of the Band Wheel Shaft, by which the wheel receives its motion. The Power is made very strong and wide, having from 3½ to 5 inch longer Legs than any other Power made.—The Legs are 3 feet 11 inches long, 8 in. wide, by 2¼ inches thick, of hard maple, and have no bolts or screws to take out to change them, but are tenoned on the lower side, thus away from the horses' feet. All Steel Arbors and Rods, and the Rods are ⅝ of an inch round. The Powers are so arranged that the Band Wheel can be used on either side, and are guaranteed to carry the heaviest Horse to be had. We give Belt, Jack, Bench and Bridge, with each Power. We make two sizes of Threshers—One and Two Horses—and three sizes of Powers—Viz: One, two and three Horses.

## JEFFREY BROS., Manufacturers, COTE VISITATION, Montreal.

THE ILLUSTRATED

# Journal of Agriculture

Montreal, July 1, 1894.

## Table of Contents



## Notes by the Way.

### FARM-WORK FOR JULY.

*Hay-making* is the principal occupation of the farmer in all parts of the province during this month. Though, in the southern counties, most of the clover ought to have been cut in the latter part of June, in the northern parts, it will, even in such an early season as the present, have hardly attained its proper degree of maturity before the second week in July. (1) Do not let clover stand too long; rather cut too soon than too late, the second crop will make up for any deficiencies in the first. Not that we agree with a statement we saw in an exchange the other day, that the quality of the second crop of clover is as good as the quality of the first crop; for experience leads us to think that the London market is generally pretty right on its judgment; in that emporium second-cut clover always fetches at least a pound a ton less than the first-cut, *cæteris paribus*.

After the clover is down, let it lie till the surface is withered, turn it over, let it lie till, in its turn, the new surface is withered, and then get it into cock as soon as possible, where it should remain until fit for the barn or stack. This is a merely repetition of what we said last month, but clover is so generally spoiled in the making here, through injudicious tossing about, that the true way of making it into hay can hardly be too often repeated. We should be delighted if Mr. Robert Ness, of Huntingdon, would describe to our readers what he has seen and learnt of the clover-crop in England during his visits to that country. It is our belief that the yield of clover-hay to the acre, taking the district of Montreal as a whole, is at least one-third more than the yield of the same crop in any part of England; but, on the other hand, we are convinced that two tons of London clover-hay are quite equal to three tons of the clover-hay generally to be found in the Montreal market.

*Barley*, in the western part of the province should be pretty ripe by the end of the month (2): if for malting purposes, it can hardly be too ripe. As the rains we are now (June 1st) having so plentifully will have given the young seeds a good start, there will probably be plenty of young clover in the barley at harvest. Where the soil is accustomed to yield a good sample for the brewer, we should advise mowing the barley high, so as not to get more grass into the swath than absolutely necessary: but if the grain is intended for stock-food, cut low and do not leave the crop standing too long; the straw and clover together, if carefully made, will grow very valuable fodder.

The reason that malting barley should stand till dead ripe is not that there is more *beer* in the ripe than in the nearly ripe grain, but it depends entirely upon the behaviour of the ripe grain, after it leaves the *steep*, being more regular and even than the behaviour of the other.

As for our exporting malting barley to England, that we shall never do to any extent until we change our style of threshing; a few broken grains in a sample deter the maltsters from buying; for on the *floors* these broken grains invariably turn mouldy, and infect their neighbours with that complaint: now, mouldy malt always causes the *worts* made from it to *work* too fast in the *gyle-tun*, and what is worse, the fermentation never keeps quiet when the ale is in the vat or puncheon, unless chemical means are used to arrest it, consequently the beer is never bright, and soon turns sour. A machine with a cylinder and concave is the only one that will thresh barley properly—the flail is the best of all, but, of course, out of the question here.

*Barley*. Prizes were offered by Messrs. Gilstrap, Earp, and Co., maltsters, Newark-on-Trent, to farmers whose barley, bought by them direct, was delivered in the best condition as regards dressing and freedom from broken and peeled corns. We are pleased to observe once more that all the prizes, first, second, and third, are won by Lincolnshire agriculturists. This speaks well for Lincolnshire, and, seeing how important barley growing has become, in fact, the mainstay upon which farmers have had to rely of late years, it is highly gratifying to perceive that they are alive in this district to the necessity for care in preparing the grain for the market. For malting purposes damaged barley is highly objectionable, inasmuch as it not only creates loss in extract, but gives the brewer a wort which is much more risky and unsuitable for his operations. One of the greatest advantages a farmer possesses in competing with the foreigner for the custom of the English maltster and brewer is to be found in the superior means at his disposal for avoiding the crushing and peeling of the grain; and with due attention to the machinery employed, and care on the part of the men who work the machines, this advantage is realised in the better price commanded by the more perfect article. We are glad to hear that Messrs, Gilstrap, Earp, and Co. contemplate continuing to offer these prizes as heretofore, and we think farmers generally will recognise the public spirit which prompts this commendable policy, inasmuch as it is one more evidence of the desire of the firm to encourage the production of the best results from the agricultural industry.—*Newark Herald*. (May 14th.)

The above will show that we have not overrated the damage done to malting barley by ill constructed threshing-machines.

*The hoed crops* now require a good deal of attention, which will have to be given in the early morning before the dew is off and while the hay is at rest. Though it is reasonable enough not to horse hoe deeply between the rows of corn, since this crop must mature as early as possible, and the cutting of the roots of any plant must delay maturity; yet this does not hold good in the case of mangels, swedes, &c., the roots of which, if cut, nature will soon refurnish the plant with in a triplicate ratio, and early maturity does not much signify for such crops as these. Wherefore, as cultivation between the rows tends to improve the soil for the subsequent grain and grass-crops, horse-hoe between swedes, &c., as deep as possible, beginning shallow, and gradually increasing the depth until at least five inches is reached. Try it once, and we are sure you will always pursue the plan afterwards.

About the middle of this month, generally speaking, the cows will be giving notice that if you do not want to run short of milk you had better see that they do not run short of food. With plenty of vetches and oats, together with what they can pick up on the now pretty well burnt up pasture, cows will do well enough; but with watery stuff, like green-maize, some stouter food should be given and nothing better can be found than pease-meal, a couple of pounds a day of which per head will pay well, as would the same dose of cotton-seed cake, if it were not so unreasonably dear.

Were the pastures better divided here, so that they could be fed off in turn, they would stand our droughts better; but they are all gnawed down close at once and kept so, and what chance have they? As for feeding meadows after mowing, if the grass is timothy, it will soon eradicate it: timothy is of a bulbous growth, something like *eschalots*, and cattle, when the dry weather is on, soon pull up the roots. For our own part, we should like to see some other grasses substituted for timothy, except where it is grown for market: a grass that yield no pasturage, and only one cut in a season, can hardly be of much value to the general farmer, particularly as its chief use is for horses, it being now acknowledged even by the most prejudiced men that clover beats it into fits for cows and sheep. In fact, bar the seed in it, good oat-straw, cut, on the green side, is quite as good for feeding purposes as a great deal of the timothy bought to our country markets.

(1) See Mr. Gray's letter p. 129.—Ed.
(2) Barley was in ear, at Beaconsfield, June 17th.—Ed.

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**Tuberculosis.**—It is all very well attributing the prevalence of this dire disease to inattention to the sanitary condition of the cattle-sheds, but, as the editor of *Hoard's Dairyman* observes:

"The scare will not be wholly bad if it leads to more rational methods of breeding on the part of some of the special purpose dairy cow breeders. They have sapped the constitutional foundations of their cattle by breeding too young and by in-and-in-breeding. Animals have been mated without regard to relationship, and following that with an unnatural system of forcing, it is not to be wondered that a ruinous predisposition to this alarming disorder was developed."

Now it only needs a glance at the numerous advertisements in the agricultural papers to see how the "special purpose cow" has been "bred too young" and "in-bred" to a degree that almost exceeds belief. And in saying this we do not by any means allude to the Jerseys alone, for the other "special purpose cow," the shorthorn of the herd-book, has been just as hardly dealt by; and although in the early days of the breed, in-and-in breeding may be considered necessary to the formation of a type, no one with experience in breeding can doubt that the sooner it is exchanged for a "more rational" system the better it will be for the health and fertility of the stock.

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**Condiments.**—We have been asked more than once to give our "highly-commend" to certain preparations called condiments: we have invariably refused to do so. The price of these articles is generally high enough to frighten any practical farmer, and this has probably acted as a safeguard to the feeder's pocket. For we find that, as a rule, corn-meal forms $\frac{1}{10}$ of the bulk of these condiments, and the few chemical ingredients added may be purchased at any druggists for a mere song.

In the volume of the Journal for 1893, at page 53, we gave our opinion pretty freely on this subject, and supported our opinion by a quotation from one of Sir John Lawes' addresses. We were speaking of a quack preparation advertised for sale at $100 a ton. Well, that was bad enough, but

it fades into insignificance by the side of an extensively advertised condiment called *nutriotone*, which is sent out to customers at the moderate price of $280 a ton! It is to do everything: to improve the digestion, increase the appetite, promote assimilation, and increase the activity of all the animal functions.

Now, unfortunately for the proprietor of this wonder-working preparation, it has been subjected to chemical analysis at the Connecticut experiment station with the following results:

| | Water. | Protein. | Starch. | Fat. | Cost. | Real value. |
|---|---|---|---|---|---|---|
| Nutriotone | 8 | 22.1 | 37.8 | 6.0 | $280 | $19.90 |

Now, pease can be bought, wholesale, at about $21.00 a ton and they analyse about as follows:

| Water. | Proteine. | Starch. | Fat. |
|---|---|---|---|
| 12 | 23.1 | 50.7 | 1.2 |

the value of their constituents being about $22.00. As nutriotone contains upwards of 19 % of ash, we prefer pease that only contains 3 7 %

Another food extensively advertised in the States is "Elevator screenings." This is *low-priced* enough, whether it is *cheap* or not is another thing; we should say *not*. According to Prof. Jenkins, it is, as might be expected, full of grass- and weed-seeds, and should be used as fuel to get up steam for the elevators.

---

**Farm book-keeping.**—Some fifteen years ago, we had an amicable discussion with Mr. James Browning, of Longueuil, on farm accounts, he contending that a farmer could, and should, keep as thorough and accurate accounts as a tradesman. We took the ground that it was impossible for a farmer to place any exact value on the products of the land devoted to the consumption of the stock, giving, as an instance, that whereas we considered the home-consuming value of a ton of mangels to be two dollars, one of our collaborators estimated it at only fifty cents! We see, as the following extract will show, that our friend, Dr. Hoskins, of the *Vermont Watchman*, agrees with us:

One of the many current absurdities is the belief that a farmer can keep an exact set of books or any sort of accounts in a similar way and with the same accurate results as a merchant or a manufacturer can do. We have kept books for manufacturers and for merchants, in our younger days: and as our father, who taught us bookeeping' was long noted for his excellence as a skilled accountant, we think we have a right to say, after over twenty-five years farming, that it is impossible to keep farm books with anything like the accuracy that merchant and manufacturers' books are kept. A farmer can keep a cash account; and he can keep an account with his live stock He can keep a debt and credit account with his help, and with those with whom he does business, and, in a rough way, *which is more than half guess work*, he can keep accounts with his fields and his crops; but there are so many indefinite and obscure factors in all the transactions of the farm that any clear and demonstrable computations as to what he has grown, sold, and the stock in hand, especially that part of the stock in hand which we may call unused fertility, is absolutely impossible.

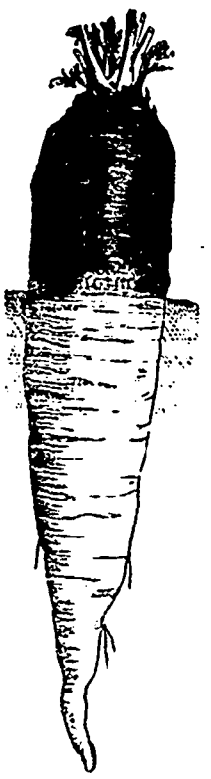
If any reader believes to the contrary of what we here aver, we should be very glad to hear from him, and to have a discussion of the whole matter with him, or any other man. It is only "on an average," and "in the long run," that a man who puts a thousand dollars' worth of fertilizer into the ground with the seed can even guess whether he has made any profit on that fertilizer, and if so, how much. If he has an exceptionally good crop, he cannot tell how much of it is due to the fertilizer, how much to the quality of the seed, how much to the weather, how much to the cultivation; and, if with exactly the same treatment, he has a very short crop, he cannot, with even tolerable exactness, calculate how fully he may be able to retrieve himself on that field afterwards. Here are some plain propositions, true or false. Will some book-keeping farmer tackle them?—*Vt. Watchman.*

## ROOT GROWING.

*(Continued.)*

### CARROTS.

Though mangels will cause as great a flow of milk as carrots, the latter will, in spite of what professors in the States say, produce richer and better coloured milk than mangels. Carrots

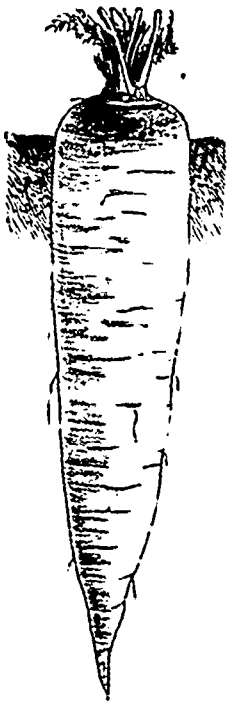


White Belgian Carret.

are good food for all kinds of stock; horses do excessively well on them, as we need not tell our readers, and there is no better food for lambs as soon as they can eat them; but for a butter-dairy in winter they are almost indispensable; for although, by proper treatment of the milk, the taste imparted to the butter by swedes and turnips may be obviated, there is always a risk of carelessness on the part of the men employed in looking after the cows; letting them get at the swedes at improper times, or the dairy woman omitting to add the saltpetre to the milk, or fifty things, in fact. Therefore we strongly recommend this root to the attention of the winter-dairyman. Carrots, if properly treated, are not so expensive a crop to grow as people fancy. The first thing to attend to is the selection of the kind sown; and here we hold a very strong opinion in favour of our old friend the White Belgian, of which, in the Sorel sand, we grew, in 1884, at least 25 tons to the acre, with certainly not less than 7 or 8 tons of top. Such a crop we never saw on the best farmed land in England. Unfortunately, the seed was mixed, some of it being green-topped Orthes, or else there would have been three or four tons an acre more.

Our friend, M Bouthillier, of Bleury, Ste. Thérèse de Blainville, will persist in growing red-carrots for his hors s, wherein we think he is wrong; the quality of the red-carrot may be a trifle superior to the quality of the white-carrot, but the yield of the farmer is not more than half the yield of the Belgian, and the cost of singling and, especially of pulling, is much greater.

If you will look at the engravings on p.—, you will see at once that the Belgian carrot grows a good deal more out of the ground than the other kinds. Now, there used to be an idea among farmers that the part out of the ground is not so good as the part in the ground; but last year analyses of both parts were made at one of the experiment-stations in the States, and the two parts were found to be of equal value for cattle-food. Practically speaking, the cattle prefer the underground part, which is indubitably the more tender, and their judgment is infinitely more to be trusted than any analysis, so we must suppose that the green upper part is *not quite* so good as the more succulent white part.



White Green Top Orthe Carrot.

So much has been said lately about the preparation of the land for root-crops in general, that it is needless to go over the ground again. Only, if you can make up your mind to hang a couple of extra horses on to the plough and break up the land as deep as the four can manage it, the extra yield of carrots will, we feel sure, pay for it. Or, and perhaps this is the better plan, let one plough precede another, in the same furrow, and let the latter be deprived of its mould-board: its share should be at least 9 inches wide. This will thoroughly disturb the land to a depth of 12 to 14 inches, and if the land be heavy, we should be inclined to plough down what dung we were going to apply in the autumn, at the double-furrow time: the breaking up with the second plough would mix the dung with the subsoil, to the great benefit of the carrots as well as to the certain improvement of the subsequent grain- and grass-crops.

We said above that we should apply the *dung* in the autumn on heavy land; well, for any other carrot than the Belgian it is very dangerous to apply dung on any land in spring: fresh dung always makes red-carrots grow forked and thereby spoils the look and the flavour of the roots when cooked; but the brave Belgian does not trouble its head about such trifles; it will go straight down as near to the centre of the earth as circumstances will allow, and rarely, if ever, indulges in bifurcations.

As for manure for carrots, trust to mixed dung. We never heard of any successful application of "chemical fertilisers," except in the case of M. Georges Ville, and, although as our readers know, we are strong advocates for their use, as a general rule, in the case of other root-crops, we are utterly incredulous as to their effects being of any account in growing carrots or parsnips. Land in good heart and deep cultivation, are the two essentials for both of those *plungers*.

When the manure has been ploughed down in the fall, the carrot-seed will naturally be sown on the flat; but the *cost of singling is so much reduced by* sowing on the raised drill that we prefer that plan.

**Preparation of the seed.**—*Always* test the seed a few days before sowing, thus: take, say, 25 seeds and soak them for several hours in lukewarm water; place them on earth in a saucer and cover them lightly with finely pulverised mould, keeping the whole moist by covering with a piece of flannel which you will sprinkle with water thrice a day. If from 20 to 22 seeds come up freely and healthily, the seed may be called good, and 4 lbs. an acre will be sufficient. And this experiment will be a guide to you with inferior qualities, as thus: if only 16 seeds germinate, then, according to the rule of proportion, 16: 20:: 4: 5: that is, 5 lbs. of seed to the acre will be the proper quantity to sow, and so on. The trial should be made at least a fortnight before seed-time to give yourself a chance of procuring other seed if the first lot does not turn out well.

The next thing to be done is to steep the seed, and you may proceed in this way. If, by the bye, you are near a running stream, steep your seed in that: it will imbibe as much water in 12 hours in running water as it would in 20 hours in a pail; but if no stream is handy, put the seed into a linen bag and keep it under water for 36 to 48 hours. The steep-tub should stand in a moderately warm place. At the expiration of the time, wring out the water from the bag, and hang it up in a cool place: if kept too warm, the germs will sprout too lengthily, be weak, and will be easily broken off. Turn the seed over and over, once or twice a day, mixing it well, so as to get all the germs to bud as nearly as possible at the same time When germination has taken place, indicated by a tiny speck appearing at the side of each seed, sowing may be done; but before sowing we advise that the seed should be mixed with a quantity of dry sand—finely pulverised charcoal is better,—*to make it work* better in the drill, and a few pinches of turnip or rape-seed; the latter for this reason: as carrots can hardly be sown too early in this country, the ground will probably be still pretty cold when the seed is sown, and the carrots will hardly show themselves enough to admit of the horse-hoe being used in less than a fortnight; as the weeds have at least an equal chance with the carrots, the hoe

should go to work as soon as possible between the drills, and this proceeding will be made much more easy of execution by the row being made sooner visible by the more rapid germination of the rape or turnip-seed.

**Sowing.**—By far the most regular depositor of carrot seed mixed with mould or charcoal, as above, I ever saw is the Plant-jr. drill. Of course it only sows one row at a time, but we do not need a machine that will g t over a great number of acres in a day' here. After sowing, the roller should be used, as the tiny one attached to the drill is not heavy enough to do much good; indeed, we generally roll both before and after the drill, and try to keep the coulter of that implement exactly in the middle of the space rolled, so that the horse-hoe may work as close up to the row of plants as possible.

If you have no sower, you may, after rolling, draw a shallow drill along the center of the space with the angle of a hoe or a pointed stick; a inch will be deep enough; then sow by hand and cover with a garden-rake, rolling afterwards.

In this way, the rape coming up, at latest, 6 days after sowing, the horse-hoe can go to work at once, to the destruction of the weeds, and the quickening of the young plant in its struggles to emerge from its cradle. The early use of the hoe—hand and horse—will save dollars an acre, for the only expensive part of carrot growing is the singling, and if the weeds are kept down and the *proper system* pursued, even the singling need not cost very much.

Now, the proper system is this: As soon as the horse-hoe can be safely worked, let it go between the rows made visible by the rape; not too widely set this first time. Seven or eight days afterward, pass it through again, but set it wider this time, as the carrots will be—or ought to be—well up, let the curved side-hoes (see p—vol. 2) cut the sides of the drills well down till not more than 1½ inches be left on each side of the row of carrots. If you will do this job well, you will see that the costly process of hand-hoeing is reduced to a minimum, all that this implement having to attend to being the 3 inches on which the carrots stand. Of course if your horse-hoe has no curved side-hoes, the sooner you get your blacksmith to make two the better; the Scotch drill-grubber, and other implements of the kind, do well for the subsequent operations of *stirring* the land, but nothing but the curved side-hoes can cut down the sides of the drills.

**Edge-hoeing.**—A capital thing is edge hoeing, but you will generally find it badly done here, as thus: the workman will fancy he has to hoe all over the piece, whereas he should only strike his hoe alongside of the row of plants; on each side of course—; therefore, he should take the row between his feet, and, with a *four inch* hoe, go up each drill, with a *chopping* stroke. A *chop* and not a *draw*, because the latter covers up the weeds and the former leaves them bare. Again, the *chop* cuts deeper than the draw, and thus secures the object in view, which is to make the earth all round the infant plant as loose and free as possible. In edge-hoeing potatoes, there will of course be a third stroke, i. e., between the plants.

If you think you can afford it, edge-hoeing carrots materially lightens the work of the singlers, a. l, after all, as a lad of eighteen, properly instructed, can edge-hoe an acre a day easily, it can cannot be an expensive job.

**Singling-carrots.**—This may be down cheaply enough, if done wisely. We saw, when we first went to Sorel, Senator Guévremont's people singling carrots with their fingers alone, and were not surprised when M. Pierre, the Senator's son, told us that he did not think it paid to grow them, as the singling alone cost fourteen dollars an acre. How he changed his mind may be seen by the letter on p. 66 of this volume.

What distance shall we allow between the carrots? We must not compare widths with that allowed for swedes and mangolds, for those plants do not dive down so deeply as carrots, and their tops spread out a good deal more. Let us say three plants to fifteen inches.

To single carrots five inches apart, a special tool will be required, and one made of an old scythe-blade answers well. This hoe should be 2½ inches wide at the cutting part, and being very sharp, a woman chops out the gaps with the greatest ease, using a *pushing* and a *drawing* stroke, alternately. Observe: in using the hoe for this purpose, the woman must stand squarely at right angles to the row; we had great difficulty in impressing this on the minds of the *Soreloises*.

The hoer is followed by a boy or girl, who pulls out all the plants but the strongest one from the bunch left, and thus the job is completed. It may possibly cost one dollar an acre more to single carrots in this way than to single swedes, but certainly not more, and the crop is certainly worth it. The horse-hoe will of course be kept going as often as the master can find an opportunity, and the subsequent crops of grain and grass will testify to the good effects of thorough cultivation. Clearing the land of weeds is a very small part of the benefits derived, from frequent judicious horse-hoeing.

**Harvesting-carrots.**—Cultivated as we have advised, Belgian carrots are easily pulled up when the time of harvesting arrives: a boy of twelve can draw them. Care should be taken to pull them up straight, as the lower part of the root is easily broken. An active man walking up between two rows can draw the carrots out with both hands and put them together in the centre. Then, the *toppers*, with sharp knives, or part of an old scythe set in a handle, follow; the tops should be cut off without cutting the carrot itself, and either carted off for the cows, fed off where they grew by sheep, or carefully spread and ploughed in.

After exposure to the air for three of four days the carrots may be put into the root-house or cellar. As long as they are in the field after being pulled, the heaps should be covered at night with the tops, which should be removed as soon as the danger of morning frost is over.

Are the tops of carrots, &c., worth much? They must accumulate, as the root harvest begins with mangels and carrots, about October 15th, and ends with swedes about the 25th. They might be ensiled with a mixture of straw—pease straw for choice—; they certainly increase the flow of milk, but an extra allowance of them causes looseness of the bowels, and young stock lose condition in them if they get as much as they like to eat.

As to the use of carrots when grown, you cannot do wrong in giving them to all your stock. They are the best roots for milch-cows; growing pigs do well on them; ewes, after lambing, nurse thier offspring all the better for a liberal allowance of them, and horses in full *slow* work do as well on carrots, straw, and oats, as on hay and oats. In fact, on light soils, the Belgian carrot should be the main root-crop of the farmer. We *like* swedes and mangels: we *love* Belgian carrots.

## PARSNIPS.

We observed, just now, that the carrot is the best root for milch-cows, because we do not suppose that any farmer is likely to grow more parsnips than he requires for his table. The parsnip—*pastinaca sativa*—is, doubtless, a very valuable root for all kinds of stock, in fact, rather more valuable than the carrot, but the seed is so costly, it takes so long to come up and the dipping is so troublesome and expensive, that we cannot recommend its cultivation.

The seed of the parsnip is very light; in England we used to sow ten pounds to the acre, and the seed here cost sixty cents a pound, or six dollars an acre!

If you try it, steep the seed and treat it in every way as recommended for carrots. A good strong loam is the best soil for parsnips; we never did much with them on light land. The finest crop of them we ever saw was one grown near Brighton, England, at the foot of the Southdowns; there were fourteen acres of old grass-land in the piece, of first rate quality. It was trenched two feet deep, the turf thrown to the bottom of the trench, and the crop, which was sold in Brighton of fifteen dollars a ton, was thirty-five tons to the acre! The trenching cost thirty dollars an acre, so the crop paid well, but the land was *very* good and the market handy.

Parsnip-seed sown in May, 1884 lay six weeks in the ground before it came up! It may be doubted whether the frost resisting power of this roots is of much advantage to the Canadian farmer. It is true parsnips can stand the winter in the ground, but we want them for use in winter, and though we can get them up in April, the land is so wet at that season that it does more harm than good to go poking about after them. No, we had better store parsnips, if we grow them at all.

**Gypsum.**—It seems that, in many parts of the State of Michigan, the use of *plaster*—sulphate of lime—has been given up, as it is no longer effective. That it was once upon a time of very great service in producing large crops of clover and pease, there is no doubt, and it must have been a very profitable application, as the cost was only $4.50 a ton, and from 50 lbs. to 100 lbs. an acre was the usual dose.

In England, many farmers, hearing of the almost miraculous effects of gypsum on leguminous plants on this continent, tried it on their land, and found it absolutely useless.

In many parts of the Province of Quebec, farmers have told me that on heavy clay soils, where hardly anything will grow, pease dampened and rolled in plaster before sowing, produce a good crop!

The question seems to be this: does plaster become ineffective when, owing to improved farming, land, previously run out, is sufficiently provided with sulphuric acid and lime, in which elements it was previously deficient, by the dressings of manure applied to it?

However, we learn, from a correspondent of the *R. N.-Yorker*, that Prof. Kedzie, of the Michigan Experiment-farm, has been enquiring into this subject, and finds, as we should expect he would find, that "the analyses of *the soil* were unsatisfactory." The samples analysed were taken from fields "that had had annual applications, and from fields that had received no plaster recently, but the percentage of sulphate of lime was in both samples about equal."

**Erratum.**—Looking over some of the earlier numbers of this year's Journal, we find that, in a note, the printers have had the goodness to make the addition of an *h* to the name of England's greatest dramatist, after Shakspear of course, Ben Jonson.

**Clover** coming into blossom to-day, June 7th, on the Prie-t's farm, Sherbrooke St., Montreal. Quite fit to mow for green-meat, "without impeachment of waste."

**Rape.**—At the Ontario Agricultural College, the result of feeding lambs on rape was, that 1 acre of rape would pasture 36.8 lambs for 8 weeks, making in that time 762 lbs. of mutton! Now, allowing the crop to have weighed, say, 15 tons, a decidedly heavy produce, it would only have taken 40 lbs. of that plant to make a pound of mutton, a decidedly cheap way of growing meat. A well grown lamb would certainly eat and tread down 20 lbs. of rape a day, and yet "sixty lambs placed in a field of 2.18 acres of rape for 25 days, made an average daily gain of 0.26 pound:" there must be an error somewhere; rape is good, oh! very good, but it cannot work miracles.

**Experiments.**—"One of the hardest things to do is to make a trustworthy experiment in the field of agriculture," says an exchange. We should say: making a trustworthy experiment in agriculture is by no means difficult; to draw correct conclusions from the experiment when made: that is where the difficulty lies, and the well educated, practical farmer is the man who is most likely to solve the problem.

**Mr. Shepard's letter,** which will be found at p. 000 of this No., advocates cold water and out-door exercise on every winter-day for milch-cows. Mr. Hoard, who knows what he is talking about, does not agree with him; *v. infra.*

"In the matter of hitching devices, Mr. Hoard recommended anything but the rigid stanchion, which he called barbarous and advocated plenty of space, always. He said that all drink for cows in winter should be warm, as warm water increases the flow of milk, and a cow weighing 1000 lbs. will drink, on an average, 80 to 150 pounds per day. As little exercise as possible, consistent with health and vigor, is all that should be allowed. The more perfect the environment the less need of exercise.

To feed for butter alone is impossible, as a certain amount of food must go to build up the organization of the animal, but in feeding, give such foods as will best promote the flow of milk rich in butter fats—cottonseed meal, oil meal, pea meal, bran, and gluten meal."

**Mangels.**—At one of the States' Experiment-farms, it was found that, in feeding hogs, 8 lbs. of mangels possessed a feeding value equal to 1 lb. of grain. This would make mangels

worth, for the purpose, $3.12 a ton, and is not, we should say, very far out.

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**Nutritive ratio.**—A correspondent wants to know all about the *nutritive ratio*. It means the proportion of albuminoids to carbo-hydrates; the former are nitrogenous the latter non-nitrogenous. Fat is, of course, a carbo hydrate, but is estimated to possess 2.4 times as much heat-producing and nutritive power as starch, sugar, and cellulose. Carbo-hydrate simply means carbon and water.

Now, to get at the nutritive ratio of any substance used as food, all that is needed is to multiply the digestible fat by 2.4, add the product to the digestible carbo-hydrates, and divide the sum by the digestible albuminoids.

Thus, taking, as an instance, milk, we find that there are 3.80 %, say, of fat 4.55 of milk sugar (carbo-hydrate), and 4.05 of casein (albuminoid); then:

3.80 × 2.4 = 9.12 +
4.55 = 13.67 ÷ 4.05 = 3.37

that is, the ratio stands as 1 of albuminoids to 3.37 of carbo-hydrates; or, as it is commonly written 1:3.37.

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**Feeding fat into milk.**—We have often expressed our dissent to the opinion of several of the principal chemists in the States as to the possibility of making milk more rich by feeding cows on fat-producing food. To the best of our recollection we advised that an experiment should be made to test this point by feeding a certain number of cows for a given number of days on wheat straw, mangels, and brewers' grains, and then, for an equal number of days on crushed linseed, bean-meal, and clover-hay.

Now, as will be seen below, an unfortunate milkman, in the suburbs of London, has been feeding his cows on the former of these rations, with the exception of using hay in place of straw, and has been fined in consequence, though, upon investigation, the fine was remitted, as the analyst and inspector together agreed, a sample having been taken from the cows in the presence of the latter, that the poverty of the milk in fat arose from the poverty of the food given to the cows. Is this not just what we said we were told by a London dairyman? "Give me plenty of grains and mangels, and I don't want no pump."

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At the West London Police Court, on Saturday, week a curious test was applied in a case in which a defendant was summoned for selling milk which, according to the analyst's certificate, had 10 per cent. of the fat extracted. For the defence it was denied that any of the fat had been extracted, and it was asserted that the milk was sold in the same state as it came from the cows. The summons had been adjourned to test the truth of the statement, and upon a sample being taken direct from the cows, in the presence of Mr. Clark, the inspector, the deficiency of fat was found to be exactly the same. The attention of the defendant was called to the poorness of the milk, and he fed his cows upon mangel wurzel, hay, and grains. Mr Finnis said it was an important case, and the question was whether a dairyman was allowed to sell poor milk which was not of the substance and nature demanded. Mr. Curtis Bennett observed that the gravamen of the charge was that defendant had extracted the fat. Mr. Bevan, the analyst for the county of Middlesex, who made the analyses, said the milk was not a fair sample if the cows were properly fed. *The poorness of the milk indicated something wrong in the feeding of the cows. It would increase the quantity at the expense of the quality.* —*Eng. Ag. Gazette.*

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**Barley, again.**—It is clear that the editor of the *Country Gentleman* and the editor of this paper do not agree as to the harvesting of barley. In the following extract it will be observed that the farmer is advised to "cut neither too early nor too late." We hold, as an old maltster and brewer, that barley can hardly stand too long. If dead-ripe, it of course requires careful handling. Of course, if there is no clover, or other grass, in the barley, it may be cut and bound at once by the machine, but we should prefer letting it lie in swath for a day or two, turning it and not binding it at all. Indeed, with long experience in the *Eastern counties*, where some of the best barley in the world is grown, we can say, positively, that we never saw a field of barley bound into sheaves in our life. In Scotland, on the contrary, we believe it is often bound, but, as a rule the climate of that country is much damper than our S. E. of England.

As for dew injuring barley, the old saying was that good malting barley should have "three dews on it between cutting and carting." The advice, to let barley "remain in the stack until the sweating process is over," is quite correct: in fact all good maltsters are in the habit of giving all early threshed barley a gentle sweat on the kiln before steeping.

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**Harvesting Barley.**—Some of our farmers of the Sandy Spring neighborhood are trying barley as a crop; in one case last year the result was very satisfactory. Will you or some of your readers inform me as to the proper mode of saving the crop? Last year it was cut with a binder machine, put up in small shooks, hauled to the barn when apparently dry, but was moldy when threshed. Any information at an early day will be appreciated. W. P. M., *Spencerville, Md.* [The harvesting of barley is substantially like that of wheat, allowing for the fact that no grain is so easily and quickly injured by dew or rain as barley. It should be closely watched and cut neither too early nor too late. If cut too early, the grain is likely to shrink; if too late, it shatters and much is lost. Getting wet after cutting and before drawing injures barley very seriously. The use of the self-binder is a great advantage, enabling the grower to wait until the grain is fully ripe, and then cut, draw and stack or house in the same day. It should remain in stack or mow until the sweating process is over, and it is thoroughly cured. Your barley that came out moldy may not have been thoroughly dry when drawn, or was too closely mowed away for thorough curing, and might have come out in better shape if stacked or given a freer circulation of air in the mow.]

We should fancy that the climate of Maryland is too hot to grow good *malting* barley. It takes nearly, if not quite, 5 months to ripen in England.

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**Lawes sheep-dip.**—Anything that comes from the Lawes Chemical Company, 59 Mark Lane, London, E. C. may be trusted. Several people have enquired of us in regard to a dip for sheep, and we are happy to see that Sir John Lawes' firm has brought out one that is death to ticks, lice, and other parasites, but perfectly harmless to men and animals. It is a remedy for scab, stimulates the growth of wool, and has the great advantage of mixing easily with cold water. The fluid may also be used *internally* for worms in calves and horses, and *externally* for mange, red-mange, ringworm, ulcers, wounds, grease, cracked heels, &c.

Needless to add that the name of Lawes will be a sufficient guarantee as to the quality of the materials used in the compounding of this new preparation. We are of rather sceptical tendencies, but we would trust any assertion of Sir John Lawes implicitly. The sooner our friend Mr. Gray, or some other druggist lays in a stock of this sheep-dip, the better. (1)

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## THE STATE OF THE CROPS.

June 1894.

**Wheat.**—Not a great deal of this cereal sown, but the few pieces that were sown early are looking very well.

**Oats.**—Early sown grain seems to be doing well, where it has not been drowned out with the wet.

**Pease.**—We have had a great deal too much rain recently for this crop; the plants look yellow and puny. (2)

**Barley.**—There are some very good looking fields of this grain, but the recent frosts in some localities have had a bad effect. It is rather difficult at the present time to say really how great the damage done may turn out out to be.

**Rye.**—There is scarcely any of this grain sown; a few pieces of fall rye on the high sandy soils are to be seen. It seems to have stood the frosts of last winter fairly well.

**Corn.**—This has been bad weather for corn, the season came in so early that most of the farmers were afraid to plant it so soon. They waited for they hardly knew what. Then the wet weather came along with the frosty nights and cool days — corn wants the rays of old *Sol* before it can thrive, so taken all in all corn looks very poor, a good deal of it brings to my mind the story of the Kentucky Traveller: he asked a farmer why his corn looked so yellow; the reply was that it was "Yaller when he planted it." Some farmers have tried a little late planted. The heat of the last few days, if it continues, will make a wonderful difference. The amount for ensilage purposes does not seem to be in excess of last year.

**Potatoes,** appear to be doing fairly well, *hardly as great a breadth planted* as usual.

**Turnips.**—There appears to be more turnips sown than usual, and the little plants look well. I have seen several large pieces and I was quite struck with the appearance. (*Hurrah! Ed.*)

**Carrots.**—I have observed only a few pieces of this root, carrots are a little hard on the back, (what with the thinning out, and then the pulling of them up in the fall, it is no wonder they get the name of being hard on the back,) doing fairly well. Sugar beets and mangolds: there are more of these grown than carrots. The former in localities near the factories to be sold for sugar making purposes, and the latter for cattle feeding. The plants seem to have come up fairly well.

**Apples.**—There was a fine show of blossom, and the frosts did not seem to come just in the right time, and now to all appearance there seems to be a very fair chance for this kind of fruit.

**Other fruits.** — Are doing well; farmers are studying their interests better and are using the remedies recommended to kill the pests, although the farmers do not cultivate very many of the small fruits.

**Hay.**—This crop seems to be the most uneven crop of any, new meadows look exceedingly well, while old meadows and even the second and third crops, are very light. A good *many fields were winter killed, and* had to be plowed up.

**Clover.**—Generally it is a very good crop: "a leaky May makes great hay," and as the latter part of May has been wet, clover and hay, especially new crop, are doing well.

**Pastures.**—The early season, some 15 or 20 days at least earlier than last *one, was very favorable for the pas*tures, and a very remarkable flow of milk has been the consequence, so that the dairy business has been booming as it were. The exports of cheese to the end of *May were over* 42,000 boxes more than last year! If we could only keep up this pace to the end of the season, the totals would be enormous, but the make of cheese last year from June to the close of the season was a heavy one, so that we cannot expect from this time onward to do much better than last year. The quality so far this spring has been better than usual, but in many sections they have been selling far too green. Why people will be so short sighted as to sell their cheese so close to the hoop, thereby injuring our good reputation, is a matter of national importance. The make of butter seems at the present moment to be very great, and if there is no outlet in the *English market* will be a drug very soon.

Thistles and weeds are doing well, the cold and wet weather have been on the whole favorable to them *Farmers usually do not take up with* the idea of under-draining, a very grave mistake. Surely there have been lessons enough the past 3 years: crops enough destroyed to pay for a lot of underdraining.

PETER MACFARLANE,
*General Inspector.*

St. Hyacinthe,
9th June 1894.

This report includes the South-West portions of the Province.

(1) There was clover fit to cut at Valois, June 15th!—ED.

(2) At Beaconsfield the pease are looking marvellously well: in bloom, June 18th.—ED.

# Fruit and Garden.

## PROVINCIAL FRUIT GROWER'S ASSOCIATION.

The executive of this organisation held a meeting in Montreal on Thursday 7th June at which the President, Mr. J. M. Fisk of Abbottsford presided, Mr. N. W. Shepherd, Vice-President and Messrs N. Brodie, Lachine, W. H. Dunlop, Outremont, D. Hudson and S. Fisher, Knowlton, were present and W. Hamilton, the Secretary, took down the record.

The date of the summer meeting to be held at Knowlton was fixed for the 14th and 15th August. The secretary was directed to send a formal invitation to Prof. Saunders, Director of the Ottawa Experimental Farm and Professors Craig and Fletcher, of the same *institution, hoping for their presence* and addresses from them.

The programme for that meeting was discussed and the details of it left

to a committee of Messrs Shepherd Brodie and Dunlop, though the general outline of it was decided As the trains reach Knowlton early in the evening it was agreed that on the evening of the 14th there should be a meeting for an address from the President on Summer apples and a discussion and that the Directors should meet at 10 P. M. for business.

On the 15th the forenoon should be devoted to paper on small fruits and discussions of them. The afternoon would be given up to a drive round the neighbourhood and visits to some of the orchards. The evening of the 15th there would be a grand public meeting with address from Prof. Saunders, Hon. Mr. Joly de Lotbinière and Mr. J. C. Chapais who are Directors and expected to be present and others. This is the first summer meeting of the kind to be held in this Province, and it is earnestly hoped that all lovers of fruit and those interested in horticulture will make a great effort to attend. Knowlton is first noted for its beauty the lovely Lake of Brome and many beautiful drives about it, while the people of Brome County, maintain a florishing Fruitgrowers Association and have done considerable towards the introduction of many new varieties of apples, etc.

The Directors and members of the Association are particularly requested to come while all the public are cordially invited to attend the meeting and partake of the benefits which are sure to be derived from the papers and addresses of the leading fruit growers and experimentters of the Province.

DEAR MR. JENNER FUST,

The above explains itself. I was deputed to prepare an item for the Journal of Agriculture which is sure to reach the hands of all who are interested. Will you kindly see that this gets into the July number? We shall send the detailed Programme for the August number. Allow me to congratulate you on the great improvement in the Journal. With kind regards. I am

Yours very truly,

SYDNEY FISHER.

## MONTREAL HORTICULTURAL SOCIETY

AND

## Fruit Growers Association of the Province of Quebec.

### A FEW REMARKS ON STRAWBERRY CULTURE.

Any one in possession of an acre or more of good deep land, underdrained, and if possible within reach of a sufficient supply of water for the purpose of irrigation (1) at the time the strawberry plants require that supply in no stinted allowance would, with the above requisites make a success that would satisfy the most ambitious strawberry grower. The above would form an ideal strawberry farm to begin with. The process of preparing the land for successful strawberry culture differs little in the way of preparing the ground from the manner explained in a previous article on preparing the soil for fruit culture in general that it need not be all repeated here; only the strawberry will be able to take the benefit from a very much more liberal application of well rotted manure worked well into the soil, than was advised in the preparation of the soil for any of the tree-fruits such as apples, &c. A very liberal quantity can be applied if properly made and properly incorporated with the soil. The soil best adapted to the successful culture of the strawberry is a rather heavy loam; and in nearly every place where this sort of a soil is to be found it is deep; and the strawberry demands that the soil must be prepared deeply and well cultivated; loosening the bottom soil to the depth of two feet at least; never turning up this bottom soil. How many have impoverished their land for years and years by simply trenching up the poor bottom soil, and putting the good soil away down in the bottom? It is when the plants are young that they require all the nourishment they can get, and the cultivation of any crop properly is in the assisting of nature to supply the demand made on the soil. Any one may observe that nature supplies all her fertilizers; or nearly all of them that we term fertilizers from the surface of the soil, distributing them with the rains and chemical action to all parts surrounding the roots and that especially where young plants start life near the surface. With the proper appliances and a more extended knowledge of the requirements of our crops we could apply a great many of the fertilizers now in the market with decided benefit by giving it to our crops in smaller quantities and oftener. Natural fertilizers have all to undergo the process of decomposition; in fact it is during that very process that the valuable properties of decaying vegetable matter are being continually transferred to the surrounding soil; collecting as they advance; or distributing as the case may be thier own and other suitable elements of plant food to invigorate and sustain the crops in their immediate vicinity. The whole meaning of the term cultivate is in assiting by every available means the supply of plant food, together with keeping down all other growth but that intended; vigorous determined war must be continually practised against all weeds. The proper way to conduct that war is to never allow the enemy to show his face on the place, or get possession of a single corner: Scuffle and hoe before the weeds do more than germinate is the most successful means of wholesale destruction to them. This serves the double purpose of killing weeds and in dry weather prepares the surface of the soil to imbibe a considerable amount of moisture from the passing atmosphere. The mode of propagating the strawberry in quantity perhaps can be worked out by each according to his own conveniences. A good plan is to raise young plants in pots and set then out early in August in well prepared soil. Keeping it clean of weeds afterwards being about all that is required, until they commence to send out runners next season. These must be controlled. If enough plants were set out at first the runners should at all times be removed unless those wanted for future planting.

*(To be continued.)*

(1) *Compton* to wit.—DD.

## MIXED FLOWER BORDERS.

The fashion of bedding out subtropical plants certainly produces magnificent effects of color in flowers and folinge and cannot be dispensed with.

But it is a pity that it should have ever been allowed to supplant the mixed borders of annual, biennial, or perennial plants, so dear to our forefathers. The masses of rich or delicate hues of the various species, of tropical plants, if properly arranged, are dazzling and enchanting to the beholder, and give ample scope for the artistic skill and taste of the florist, but when the plants have attained to a certain degree of perfection, they remain the same throughout the summer, and lose part of their charm by this very monotony.

On the other hand the border in which herbaceous plants are judiciously mixed yield a continuous charm of *kaleidoscopic* beauty from early spring until late autumn, each succeeding the others in their season, ever varying, ever new. To the true lover of flowers there is more sentiment, more delight in matching the growth and developement of each lovely gem of Flora in its turn, than can be gathered from all the rich mosaic of the geometrically correct parterre, at least after the first glimpse or two of its beauty has left its impression upon the mind.

It has been said that

"A thing of beauty is a joy for ever"

which is no doubt true, but beauty, may pall upon the appetite even as rich viands or luscious wines pall. Who has not experienced a thrill of pleasure at the peeping out of her wintry prison of the delicate snowdrop, first harbinger of spring, soon to be succeeded by the modest Hepatica, Crocus, Violet, Tulip, Primrose, Narcisus, Heartsease, and later by the more gorgeous and imposing, poppy, Pœony, Larkspur, Golden rod, Anemone, and as summer advances by the elegant and attractive sword-flower (*gladiolus*) in all its varieties. The many hued autumnal Phloxes, prim Dahlia, or stately Hollyhock, while annuals and biennial, such as the Phlox Drummondii, Aster, Zinnia, Dianthus, Aster, Wallflower, Stock, Mignonette, &c., may be introduced with advantage and will fill their proper places.

The planting and care of these mixed borders will tax the skill and knowledge of the gardener no less than the sub-tropical beds, not so much as to pictorial effect as to knowing which should be planted in the front, or which in the middle or rear ranks, therefore the growth of each individual species must be carefully studied.

Autumn is the best time to prepare such a border. In the first place it must be thoroughly drained. Then the maiden earth removed, if poor, and a compost of well decayed sods and leaf mould substituted,—or if the earth is already good, an addition of the above may be used. Rich manuring of herbaceous borders is not advisable, because many species do not require, or flourish so well in rich soil, and to those which do, manure either in solid or liquid form can be applied.

The bed having been prepared early in the autumn, most of the hardy kinds of Herbaceous plants and hardy bulbs can be put in and will give a fair show of flower the following season, while such as will not stand the winter, annuals &c., can be added in the spring—places being left for them.

The careful cultivation of these borders so as to prevent even the first appearance of weeds is a "sine qua non"—neatness, as to staking such as require it; reducing rampant growth of some, and removing dead flowers and stems, must be duly attended to, then the mixed border will be a constant, because ever changing source of delight.

I remember when the main alley of our kitchen garden used to be lined, on either side with such a border and was a "midway plaisance" if not so extensive and curious, quite as enjoyable as the celebrated one at the World's Fair. Oh ye lovers of flowers, for their own sakes, no less than for the brillant effects that can be produced by contrasting or harmonizing their colours—dont let the good old mixed border be entirely neglected and forgotten. It is an old but pleasure giving fashion not to be despised.

GEORGE MOORE.

# The Dairy.

## CHEESE-MAKING.

### Notes for July.

Examine every can of milk carefully, reject all cans that are of a bad flavor or turned sour, "give your patrons line upon line, precept upon precept, on the aeration of milk, cleanliness of all vessels that come in contact with the milk; and also show by your own cleanliness, in and around the factory that you practise what you preach.

As soon as the milk is received, heat to 85 or 86 F.; try your milk with the rennet test, not so much to advance it but to know in what condition it is in, and in case some have not preserved the notes on April and May, I will again repeat the instructions. After the milk in the vat is heated, as above, take 8 oz. of milk from the vat; drop a speck of a burnt match into it, take 1 drachm of rennet extract (a common teaspoonful is about that quantity); drop the rennet in with a teaspoon and stir rapidly, with a circular motion, for 10 seconds; note the time from the moment you drop in the rennet until the black speck stops, and if it takes from 17 to 20 seconds to coagulate, your vat is ready to set. A very slight variation from this may be necessary to suit the different localities, or perhaps different kinds of rennet, but after a few trials you will soon get accustomed to it, you should have all the whey run off the curd in 3 hours after setting.

Should you wish to make colored cheese, add your coloring matter say 5 minutes before adding the rennet, mix the color and rennet with cold water; use rennet enough to have it fit to cut in 35 to 40 minutes after adding the rennet; cut, when it breaks clean before the fingers, with the horizontal knife first, finish with the perpendicular one; cut closely and evenly, remove the curd from the side and bottom of the vat with the hands, stir very gently at first; heat to 90° F., remove, say, half of the whey as soon as possible; stir well in the whey and get your curd firm if possible before the acid starts Draw off all the whey when the curd shows from ¼ to not more ½ an inch by the hot iron test, and continue stirring until the curd is firm enough (although it is better to stir well in the whey); pack or pile on each side of the vat or lift into the curd sink to allow it to drain. Do not allow the whey to gather round the curd in pools. In 30 minutes cut into strips and turn over, then every 20 minutes turn your curd over piling double; continue adding each time you turn until you have it at least 4 deep, keep it between 94° to 98°. When your milk is well advanced, use same quantity of rennet, cut finer, heat to 100° F., draw off nearly all the whey, stir well and do not give quite so much acid in the whey. When the curd has that nice glossy, buttery appearance, grind it at 90° to 92° F. In case of gassy curds, mature well before grinding. Air it well after it is ground and salt at the rate of 2½ lbs per 1000 lbs of milk, in case of moist curd use

a little more, put to press, in good large sized cheeses, in about 15 minutes after salting, at a temperature between 80° and 83° F. Apply pressure gently at first, and in about 50 to 60 minutes take the cheeses out, pull up the bandage neatly, not leaving over 1 to 1½ inches on each end. Use warm water for the end cloths; see that you apply full pressure before leaving them for the night; turn them again in the morning, if possible; pare off the the corners or edges, have them in the press full 20 hours, keep the curing room as cool as possible, sprinkle occasionally with cold water during the hot weather, turn them every day, keep well greased, or the ends well covered with cap cloths, do not sell under 8 days, on the other hand do not hold too long. Stencil the weights and brands at the end of the lap on the box. Cut down your boxes level with the cheese. Give good weight; and shou'd you happen to make an inferior lot, do not put on your usual factory brand, but notify the buyer of them, and all will go well.

Yours respectfully

PETER MACFARLANE.

*General Inspector.*

St-Hyacinthe 3 May 1894.

## SHOTS FROM HYATT.

ED. HOARD'S DAIRYMAN:—If C. P. Goodrich would try partial soiling for his cows, and feed ensilage, rye, grass and ragweed, as I feed turnips, he would know more about "butter flavors" after awhile Cows eat leeks. One mess of milk is spoiled. Why? Ten hours have not passed since the leeks were eaten. Ten-hour turnips, ten-hour rye, grass, ragweed, leeks, and wild onions! Can t you get this through your head? Bro G., as usual, gets some things right; he's right and Brown's wrong about taints being mostly drawn in by the breath. Bad food and feed fed wrong are the potent factors.

Right again when he says "if the greatest part of a cow's food is turnips, the flavors will be very pronounced." A cow will eat from 4 to 6 bushels in a day, but who would be simple enough to feed so many? A townsman had a yoke of oxen that he wanted to make juicy beef of quick. He said the pair got away with 18 bushels of turnips a day. He laid gas pipe from the stable to the Onion river, and as that emptied into Lake Michigan, turnip flavor was "very pronounced."

He gives Mr. Morrison good advice about shipping butter. His reputation saved him for once. Mr. Goodrich says "a cow can be fed a small amount of turnips safely."—Probably 4 quarts to a little Jersey and 50 pounds to a grade Short-horn! I have claimed no more. The Hon. A. D DeLand, dairyman, factoryman, buyer, expert, has a nose that probably knows more about scents and taints than anyone's whole body in Jefferson county, Wisconsin. He can smell sour milk acros an 8 acre lot. While carrying milk to his factory I could feed my cows turnips and sweet corn one week, and oat meal and sweet corn the next, and he could not tell by the milk or its product what was being fed. After feeding heavy on turnips three weeks one fall, he said one morning "I hope you won t commence feeding turnips this fall till we are done making cheese." I promised not "to commence."

Bankers, editors, lawyers, deacons and saloon keepers have had my butter and wanted more—butter made when feeding rutabagas and turnips. My whole milk went mostly to Chicago, daily, last October, when my cows were eating more turnips daily than I ever fed them before. In all our leading hospitals now, a turnip diet is being prescribed for the sick, instead of salts and ginger, Do you see? A. X. HYATT.

Sheboygan county, Wis.

P. S. One silo filled in this town, of two cheese factories to each mile square, scores of dairyman feeding turnips. Our friend, H. K. Loomis, raised hundreds of bushels of flat turnips last year and he did not sell them. He, his wife and little daughter, and his three Jersey cows got away with them.

## FAT IN RELATION TO PRODUCT.

EDS. COUNTRY GENTLEMAN — Mr. Arning, page 333, does me an injustice, unintentionally doubtless, by perverting my meaning. My contention always has been, not that all the fat in the milk comes from the fat in the food, or that some of it may not come sometimes and under some conditions from the protein, but that the proportion of fat in the milk may be increased by feeding foods rich in fat. What Dr. Voelcker says, to the effect that the fat comes mostly from the protein in the food, and that it never has a close relation to the fats in the food, may be taken for just what it is worth; and with its antidote, that our Dr. Collier of the New-York Experiment Station, a gentleman who possesses considerable persistence in his beliefs and conclusions, and who in saying this goes somewhat contrary to previous statements from that station, has distinctly stated the contrary, and that he has found there is a relation between the fats in the food and those in the milk. Of course, Mr Arning has a right to his opinions, but so has another person a right to wrestle with him to bring him to a better way, one that is—I think I may say — universally practised by butter-makers in efforts to increase their products in the easiest way.

It may be pertinent to say here that the amazing products of butter that have been reported should be quietly and reverently buried, as having lived past their day; for if there were cows able to make such yields, why were they not at Chicago? It may be asked, does Mr. Arning think that if Mary Anne had no carbonaceous food and no fat in the food, she would have made any butter worth speaking of? Could she have eaten only foods rich in protein and made her butter, except at the expense of what fat had accumulated in the tissues previously —considering, of course, that that the alleged quantity of butter made was not a mistake? H. STEWART.

## TUBERCULOSIS.

(1) Dairy cattle have to be well and closely housed in winter, and are kept in large herds. This fact makes it easy for the disease to spread when once an infected animal is introduced.

(2) There is such a large number of dairy farmers who are absolutely unfit, by nature and education combined, to keep cows; who herd them damp, in foul, diseased stables; who let them lie in their own manure the whole winter long. Any man can see this if he will ride through the dairy districts in the spring of the year and look at the manure plastered cows, that stand by the roadside, advertising their owners ideas of keeping a cow clean.

Cows cannot be kept *healthy* and warm enough to give milk *profitably* in this way. Their milk will not only get diseased from the cow herself, but it is exposed to the foul air of a foul disease breeding stable, and there is nothing in the world which will absorb foul germs quicker than milk. Dairy farmers, whether they realize it or not, are deeply interested in this matter of *preventing disease in dairy* cows. The consumers in the cities are being greatly agitated over the statements of physicians on this question of the conveyance of disease in milk. They are already moving to have some system of herd inspection established, whereby they can be reasonably sure that their children are not being poisoned with foul milk and butter. Who can blame them for invoking the severest measures of law in this particular? Already parties have established milk dairies near some of our larger cities which are weekly inspected by a skilful veterinarian, and his certificate of the health of the cows statedly sent to the consumers.

There is a serious movement all *along the line in favor of preventing* disease by the introduction of noxious germs in food. The farmer is the only natural food producer and he must put himself in sympathy with this movement, or his food will become an object of suspicion. The dairy farmer in particular is greatly interest in every well organized effort to promote the health of cows. His occupation is gone when once his cattle or his practices come under condemnation. Hence he must at once take up this study of cattle sanitation, how to build and keep healthy stables and so produce healthy milk.

*Hoard.*

## CHEDDAR CHEESE MAKING.

In the Journal of the Bath and West of England Society, as reported by our esteemed English contemporary, *The Dairy*, we find a series of very *interesting observations on Cheddar* cheese making, from one of the most skilled English experts, Mr. Lloyd. The following is a summary of three years experiments, and these conclusions will prove valuable to American makers if well studied and understood.

Mr. Lloyd says:

To make Cheddar cheese of excellent quality, one, and one single organism only, is necessary in the milk, that is the Bacillus acidi lactis; every other organism present will tend to make the work more difficult. Hence it is imperative that *scrupulous cleanliness* be the primary consideration of the cheese maker, as of all those who have in the least possible respect to *deal with the cows, the milk or the* apparatus employed.

Secondly. No matter what system of manufacture be adopted, two things are necessary—two results must be obtained. The one is that the whey be separated from the curd so that when the curd is ground it shall contain not less than 40 o/o of water nor more than 43 o/o; and the other is that the whey left in the curd shall contain *developed in it before the curd* is put to press, at least 1 o/o of lactic acid if the cheese be required within four months, and not less than 8 o/o of lactic acid of the cheese is to be kept for ripening.

Lastly. The quality of the cheese which complys with the foregoing standards will vary according to the quality of the milk from which they have been made, and proportionately to the amount of fat present in that milk. The fat is the constituent which most effects the quality of the cheese; hence it is not possible to expect the same quality of cheese to be made from land which yields large quantities of poor milk as from land which yields small quantities of rich milk. But with due care (in making) the larger yield of cheese which can be obtained from the poorer milk should balance, *in value, that of the higher quality* which can be made from the richer milk yielding pastures.

Mr. Lloyd, in the above last paragraph, has forgotten one consideration in his calculations as to relative value. It is this: that the poorer cheese, in proportion to value with the richer cheese, costs more to make per pound It is cheaper to make ten pounds of good cheese, worth one dollar, than to make fifteen pounds, worth that sum. The cost of labor is just the same to make a pound of poor cheese or butter as it is to make a first-class pound. Here is a very important fact in economics almost always overlooked by the careless and indifferent.

# Science.

## LECTURE ON AGRICULTURAL CHEMISTRY.

*Lecture given by R. Campbell before the Farmer's Club of St. Colomba de Sillery.*

Agriculture is the art of cultivating the soil with the object of raising the largest crops at the smallest cost and with the least injury to the soil, and therefore the farmer ought specially to know the nature and composition of the crops he raises, of the land on which they grow, and of the manures which he ought to apply to the land.

The farmer has also to employ himself in rearing and fattening stock and in manufacturing butter and cheese, and consequently he ought to know the *composition of the animal, the kinds* of food it requires and the composition and properties of milk.

Thus we have to consider the plant, the soil and the animal, which all three, consist of two principal parts: the organic which burns away in fire and the inorganic or mineral one which does not burn away; this can be shown by burning straw, earth, and flesh.

The animal derives its mineral or inorganic matter from the food it eats, the plant from the soil, and the soil from the rocks from which it has been formed. The animal derives its organic matter from the food, the plant partly from the soil and partly from the air, and the soil from the remains of dead plants and animals *that have gradually been mixed with it.*

Now having traced the source whence these three objects derive their organic and inorganic matter, let us see of what compound bodies does the organic part of plant chiefly consist. They consist chiefly of woody fibre, starch, gluten and oil or fat.

You will no doubt ask me to explain each of these four substances as we constantly come across them in all agricultural papers, and many of us are in the dark about them.

Well then *woody fibre* is the substance which forms the greater part of all kinds of wood, straw, hay and chaff, of the shells of nuts and of cotton, flax, hemp &c.; they are insoluble in water.

*Starch* is a white powder which

forms nearly the whole substance of the potatoe and about half the weight of oatmeal, Indian corn meal, wheaten flour and of the flou of other kinds of grain cultivated for food.

*Gluten* is a substance like bird lime, which exists along with starch in almost all plants. It may be obtained from wheaten flour by making it into a dough and washing the dough with water.

*Oil or fat* is found in all plants, though it is generally most abundant in their seeds or nuts, linseed, rape seed, hemp seed, poppy seed, castor oil bean, walnut &c.

The 1st of these four substances, woody fibre, is usually most abundant in the stems of plants, and starch in their seeds and roots as the potato and other similar roots.

Now the substances which chiefly compose the solid parts of animals are muscle, fat, bone and skin.

The muscle consists chiefly of blood and a white fibrous substance called fibrin. Now if you take a piece of meat and wash it in successive portions of water till it becomes more or less void of colour, it will show you the fibrin. Now, the fibrin is almost exactly the same thing as the gluten of wheat.

The fat of animals bears a very close relation to the fat of plants, the solid fat of olive oil for example is the same substance as the solid fat of the human body.

All natural fats or oils consist of a solid and a liquid part. Thus, solid animal fats, like lard or tallow, and vegetable fats, like palm oil, yield a liquid oil when submitted to pressure, and leave a solid fat behind; so olive oil when cooled down becomes partly solid, and if pressed in the cold state, yields fluid oil and a solid white fat. It is this solid white fat which is identical with the solid fat of the human body.

The organic part of bone and skin consists for the most part of gelatine or glue. When bones or skin are boiled long in water they give solutions which when cooled down solidify into a strong jelly or glue.

The most important difference thus between the organic part of plant and of animal is, that the plant contains a large percentage of starch and that of the animal contains none.

We are still treating of the organic substance, and let us now divide the organic substance of plants, animals and soils into elemetary and compound bodies. By the elementary I mean those which can be separated. The elementary bodies in plants, animals and soil are four in number and are carbon, hydrogen, oxygen and nitrogen, with minute quantities of sulphur and phosphorus. In 1000 lbs of dry clover the quantity of sulphur amounts to 4 or 5 lbs only and that of phosphorus to 2 lbs; in animal substances the proportions of sulphur and phosphorus are somewhat greater.

*Carbon* is a solid substance usually of black color which has no taste or smell and which burns more or less readily in fire: wood, charcoal, lamp-black, coke, black lead and the diamond are varieties of carbon.

*Hydrogen* is a kind of air or gas which burns in the air as coal, gas does, but in which a candle will not bur nor an animal live; when mixed with common air it will explode if brought near the flame of a candle. It is also the lightest of all known substances being 14½ times lighter than air.

*Oxygen* is also a kind of air or gas void of color or taste or smell, a candle burns in it with great brilliancy, animals also live too rapidly in it. It is 16 heavier than hydrogen gas and ⅛ part heavier than common air.

*Nitrogen* is also a kind of air differing from both the other two. *Like* hydrogen, a taper will not burn nor will an animal live in it, but unlike hydrogen it does not take fire when brought near the flame of a candle. It is a little lighter than the atmospheric air.

*Sulphur* is a yellow brittle substance which burns with a pale blue flame and with a strong pungent and peculiar odour.

*Phosphorus* is a yellowish, waxy sub-stance which smokes in the air, shines in the dark, has a peculiar smell, takes fire by mere rubbing and burns with a large bright flame and much white smoke. Five gallons of atmospheric air contains 1 gallon of oxygen and nearly 4 gallons of nitrogen.

Most vegetable and animal substances contain only three of these element, are bodies, carbon, hydrogen, and oxygen, such as starch, gum, sugar, oil, fat, whilst such as gluten of wheat, fibrin of flesh, curd of milk, white of egg, gelatine of bones contain all six. Wheat contains 455 parts of carbon, 430 of oxygen, 57 hydrogen, 35 nitrogen and 23 of ash or in organic matter.

To the agriculturist, therefore, an acquaintance with these constituent parts of all that lives and grows on the face of the globe is indispensable.

It then appears that three of the four elements which constitute the solid structures of animals and plants are, in their pure state, invisible gases, and the remaining one is identical with ordinary charcoal; yet into how great a variety of beautiful forms and valuable products are they transmitted by nature and how interesting and instructive must be the study of the ways in which these wonderful processes are effected! All plants require constant supplies of food in order that they may live and grow, and they obtain it partly from the air and partly from the soil. They take it in by their leaves from the air and by their roots from the soil. They require two kinds of food, organic to supply their organic part, and inorganic to support their inorganic part.

They take their organic food from the air chiefly in the form of carbonic acid gas, which is a kind of air without color, but has a peculiar smell and a slightly sour taste. Burning bodies are extinguished by it and animal die in it. It is one half heavier than common air, renders lime-water, milky and is taken up by its own bulk of cold water. This gas is the cause of the bubbling up of soda-water.

In 5000 gallons of air there are only two gallons of carbonic acid.

Plants drink in this gas in large quantities through all their leaves, which contain small mouths or openings on the under side of their surface. It is a fact that there are no less than 120,000 of these pores or mouths on a square inch of the leaf of the common lilac, or 60,000 on that of the white lilac. Now the leaves do not suck in the carbonic acid gas at all times, it is only during daylight; during the night they give off some of this gas. Six lbs. of carbon and 16 lbs. of oxyen form 22 lbs. of carbonic acid gas. The plant retains the carbon and gives off the oxygen into the air, and this is proved by putting a few green leaves under a large glassful of fresh spring water and setting them out in the sunshine when small bubbles of oxygen gas will be seen to rise from the leaves and to collect in the upper part of the glass.

Leaves also drink in watery vapour from the air, which serves to moisten the leaves and stems and fill their cells, and produce the substance of the plant itself.

Plants take in carbon from the soil by means of carbonic acid, gas humic acid and some other substances which exist in the black vegetable matter of the soil; a considerable portion of the nitrogen of plants enters them in form of ammonia and nitric acid.

Water consists of oxygen and hydrogen; 8 lbs. ox with 1 lb. of hy. make 9 lbs. of water. It is a peculiar thing that water which puts out all fire is formed of 2 gases one of which (hy) burns readily, while in the other, (ox) bodies burn with great rapidity.

The properties of water is important to vegetation, first in dissolving solid and other substances; second, in rising as vapor and falling as rain or dew, and third, in yielding oxygen and hydrogen to growing plants. The dissolving property of water is important to vegetation because it enables it to take up from the soil and convey into the roots and stems of plants the various kinds of food which plants derive from the soil. The rising in vapor benefits vegetation in enabling the winds to carry it every where over the surface of the land so as to refresh vegetation by rain or dew. In yielding oxygen and hydrogen it assists vegetation in enabling the growing plant more easily and quickly to form the various compounds substances of which its parts consist.

Amonia is a kind of gas which has a strong pungent peculiar smell is lighter than common air and possesses alkaline properties.

Water absorbs much ammonia, i. e., 6 or 7 hundred times its bulk of ammoniacal gas. The common hartshorn is only water impregnated with this gas which consists of nitrogen and hydrogen (14 nit. and 3 hyd. make 17 ammonia). Under certain circumstances Ammonia is known to be produced naturally in decaying animals and vegetable substances, in fermenting compost or manure heaps, and in fermenting urine, and it is the principal cause of smell perceived in hot stables. It is perceptible by mixing the substance with quick lime when if ammonia is present its smell will become perceptible. You can detect if ammonia be escaping from such substances by the smell, or by dipping a rod or feather in strong vinegar or in spirit of salt and holding it over them, when if ammonia be escaping into the air white fumes will become visible.

Nitric acid is a very sour, corrosive liquid, also called *aqua fortis* and consists of nitrogen and oxygen, only 14 nit. 40 ox. make 54 nitric acid. It is formed in compost heaps and in soils during the decay of organic matter and in the air wherever bodies are burned in it or lightning passes through it. These two substances, ammonia and nitro acid enter into plant by being dissolved by water in the soil, and are taken up in a very dilute state by their roots.

We have said that woody fibre, starch, gum, sugar are composed of carbon, hydrogen and oxygen; we may go further and say that they are composed of carbon and water because the hydrogen and oxygen they contain are always in the proportion to form water (1 to 8).

Now, the woody fibre, starch and gum contain 36 lbs of carbon and 45 lbs of water and are formed principally from carbonic acid and water which the leaves and roots take in from the air and from the soil, and this is done by the influence of light which causes the carbonic acid to give off its oxygen from the leaf while its carbon unites with the water of the sap to form starch, sugar &c.

Plants draw the greatest part of their carbonic acid from the air which is replenished with the carbonic acid from 3 sources principally from the breathing of animals, from the burning of of wood and coal, and from the natural decay of animals and vegetables. All animals throw off a small quantity of carbonic acid from their lungs every time they breath.

The decay of vegetables in the air, of roots in the ground, and of remains of animals, is only a slow kind of burning by which their carbon is *at last* converted into carbonic acid. Thus, animals produce carbonic acid upon which plants live, and from the carbonic acid and water together plants produce starch &c., upon which animals live. Humic acid is formed by the loss of a portion of their water in the woody fibre and starch of plants, and serves to feed plants and prepare and carry other kinds of food into thier roots.

The fat or oil of plants and animals consists of carbon, hydrogen and oxygen.

The fat of the animal is chiefly derived from the fat of its vegetable or other food (1); gluten and fibrin consist of carbon, oxygen and nitrogen with a little sulphur and phosphates, and the plant draws from the air by its leaves the carbon and oxygen; but the nitrogen, sulphur, and phosphorus which are to remain parts of gluten are taken in by the roots; hence the importance of adding these substances to the soil when they are either present in too small quantity or in a condition in which plants cannot take them up.

The animal does not form the fibrin of its muscles from the elementary bodies carbon, hydrogen, nitrogen, sulphur and phosphorus of which fibrin consist, but it obtains it ready formed from the gluten of the plant. The plant is the servant of the animal as you see, and it *prepares* in fat and gluten, what the animal afterwards *uses* or appropriates to form the parts of its body. The soil consists of two parts like the plant and the animal: that is, organic and inorganic.

The organic part is derived from the roots and stems of decayed plants, and from the dung and remains of animals. In peaty soils, the organic part forms about ⅔ of it, but in rich and fertile soils, the organic matter is from a twentieth to a tenth of the whole weight when dry; that is, a rich soil ought to contain about 5 % of organic matter

The organic matter increases or diminishes in the soil according to the way in which it is cultivated: it diminishes when the land is frequently ploughed and cropped or badly manured, and it increases when the land is planted with trees, when it is laid down to permanent pasture, or when large doses of farmyard manure or of peat compost are given it.

This organic matter supplies organic food which plants draw from the soil through their roots. Now the quantites they draw varies with the kind of plant, the kind of soil, and with the season or climate, but it is always necessary to the healthy growth of the plant. Thus, the soil will become gradually poorer and less produtive from the plants drawing the organic matter from the soil. Then how can you keep up the supply? By ploughing in green crops, by growing clovers and other plants which leave long roots in the soil, by restoring all the hay and straw to the land in the form of manure, by laying down to pasture, by planting with trees, &c.

The inorganic part of the soil is derived from the crumbling down of

(1) And from the *Carbo hydrates* too; the starch; sugar, &c.—Ed.

solid rocks which consist more or less of hardened sandstones, limestones and clays either alone or mixed. All soils consist principally of sand, and clay lime. A mixture of sand and clay with a little lime would be called a *loam*, if much lime was present it would be a calcareous loam. Light land is one containing a large proportion of sand or gravel, heavy land is one containing much clay, a light soil is more easily cultivated and is better fitted for barley, maize and turnips and other green crops, while stiffer soils do better for wheat and beans.

It is better to plough deep, because then the roots of plants are able to descend deeper in search of food. There are occasions when it is better to plough less deep, when the under soil contains substance hurtful to plants, &c., and in such soils it is better to subsoil-plough, which enables the air and rain to descend into the subsoil and so change it as to make it fit to be brought to the surface. Heavy clay lands retain water most and should be drained, and so ought light soils, because the deeper you make it dry the deeper the roots go in search of food. The roots of grain-crops, clover and flax will go down 3 ft. and even turnips in an open soil will go down upwards of 2 feet.

Now, draining serves another purpose besides that of carrying off the water: it perfects the work of the subsoil-plough, it lets the air into the subsoil and allows rain-water to sink down at once and wash out of it anything which may be hurtful to roots of plants. Here is another reason why draining improves the soil; if the rain sinks where it falls, it does not wash the manure out of the soil, and if it contains anything valuable to plants, this is filtered out of it before it gets down to the drain. It is considered in England that the cost of draining land is paid back in from 3 to 5 years. The inorganic part of the soil serves two purposes: 1st it serves as a medium in which roots can fix themselves so as to keep the plant in an upright position, and 2d it supplies the plant with inorganic food.

The inorganic part of the soil contain several other substances as does the inorganic part of plants such as soda, potash, &c., and every fertile soil must contain them all because the plant requires them. If the soil is destitute of any of these substances, good crops will not grow upon it. If the land contained little lime it might grow a good crop of rye grass and yet might not be able to grow a good crop of clover or lucerne; a soil naturally fertile will become barren by continued cropping with the same kind of plant without a proper addition of manure. If you continue same field in wheat, oats or other grain or with hay, it will become unable to grow any of them because the crop draws certain substances from the soil in great abundance, and after a number of years, the soil cannot furnish these substances in sufficient quantity to growing crops. The grain crops especialy draw from the soil phosphoric acid, potash and magnesia. The roots of turnips, and potatoes chiefly exhaust it of potash, soda, lime and phosphoric acid and thus you ought to return to the soil these substances.

Hay is the most exhausting crop, it carries off 130 to 210 lbs of mineral matter to every ton besides the organic substance.

Every crop takes away from the soil a certain quantity of those substances which all plants require. If you are always taking out of a purse it will at last become empty.

Manure means anything that furnishes food to plants and is of three kinds, vegetable, mineral, and animal.

The cultivated grain and roots chiefly consist of starch, gluten and oil or fat. As we have seen 100 lbs of wheat or barley flour contain 55 lbs of starch, 10 lbs of gluten and 2 or 3 of oil; 100 lbs. of oats contain 40 starch, 10 gluten and 4 oil. Indian corn 60 lbs of starch 10 gluten, and 5 fat, beans 45 lbs starch 24 gluten and 2 fat, clover, 40 starch, 8 gluten and 4 fat, potatoes 75 water and nearly 25 nutritive matter, 15 to 20 starch and 2 gluten.

Oats and Indian corn and oily seeds contain most fat, beans and peas, most gluten, and least oil, and oily seeds most gluten and oil together.

The dry substance of cabbage contain, more gluten than any crops.

The wheat of warm climates is said to contain more gluten, the potatoes and barley grown upon light or well drained soil, more starch.

Vegetables are intended to serve for the food of animals. The animal must derive from its food, in order that it may be maintained in a healthy condition, starch, gluten, oil or fat, and saline or inorganic matter.

The starch as we have seen consists of carbon and water and the animal requires it to supply the carbon which it throws off from its lungs during respiration. A man throws off 6 to 8 ounces of carbon in a day and must therefore eat nearly 1 lb. starch per day. 10 ounces of starch contains 4½ of carbon; it is given off from animals as carbonic acid gas, and the purpose for which the starch is recovented into carbonic acid is to keep the animal warm. The carbonic acid is diffused into the air and fed to the plant to form starch.

The gluten serves to build up the muscles or lean part of the body.

A full grown animal requires gluten for the purpose of repairing the daily waste of the muscles of its body. Nearly all the parts of the body suffer certain waste every day. It is believed that all the parts of the body of a well fed man are removed or renewed once in the course of every thirty or forty days and yet the old scars on the body remain. The more exercise a man takes or bodily labour he performs the faster is his body wasted, and if he has food enough, renewed.

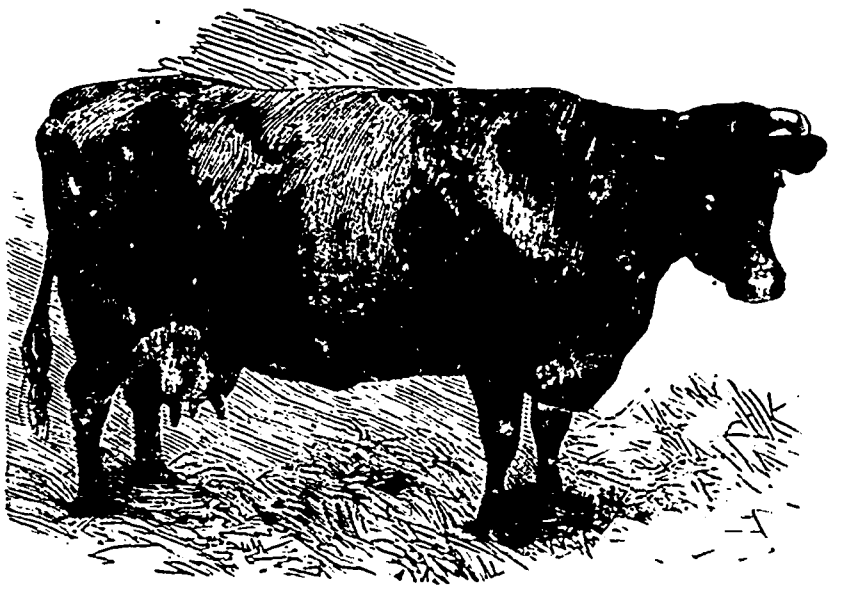
The part that thus wastes away is carried off through the body and forms part of the dung and urine of the animal.

The gluten of plant is almost the same thing as the muscles of the animal, and thus the foods which contain most gluten such as beans, peas, linseed cake, cabbage, build up and increase the muscles or muscular strength.

The animal requires oil or fat to supply the loss of oil or fat and to increase the fat.

Thus, the food containing most oil *fatten quickest. The inorganic matter* of plants is intended to serve in feeding animals to supply the mineral matter to the body as the soil supplies them to the plant, and a certain daily portion is necessary to the animal at all stages of its growth to supply the daily waste of the bone, of the salts in the blood, and the muscles &c., &c. Phosphate of lime is the kind of mineral matter, which is principally required by the bones. Gluten, fat and saline matter serve in growing animals by adding to the weight of its body. To sustain an animal, if not hard worked, requires about $\frac{1}{60}$ part of its weight of good; hay to increase or fatten it or enable it to give milk, about $\frac{1}{30}$ part.

If the same food be given to a full grown animal and to a growing animal the dung of the full grown animal, will be the richer, because the growing animal extract and retains more of the substance of the food.



CHAMPION MILKING SHORTHORN COW RED CHERRY.

## THE DETERMINATION OF THE AVAILABLE PLANT FOOD IN SOILS.

I

MR. R. WARRINGTON, F. R. S, contributes an important article to *Science Progress* for May, which, with permission we propose to reprint in instalments —:

The chemical analysis of a soil, if carried out with completeness and read accuracy, is a work demanding much labour and skill. It has been frequently regarded as a thankless task Agricultural chemists of high standing have proclaimed that such analyses were unreliable, because it was improbable that the very small quantity of soil investigated by the chemist could fairly represent the enormous quantity contained in a field. They further pointed out that the results afforded no information unpon the most important questions. There was frequently no thing to show why one field was fertile and another not. The quantities of plant food shown by the analysis were generally, when calculated on an acre of soil, extremely large; yet experience had probably taught the farmer that the application of a small quantity of soluble phosphate, of a potassium salt, or of a nitrate, had the effect of considerably increasing the crop. Some analysts, like Prof. Hilgard, have continued patiently at work, notwithstanding hostile criticism, and by the accumulation of experience have become able to interpr t soil analyses with considerable success, especially if relating to a district already investigated. In such cases the agricultural meaning of the analysis did not lie on its surface, but was elucidated by bringing the analytical results into connection with other previously ascertained facts.

The main object of a chemical analysis is clearly to show what is the quantity of plant food existing in the soil. Physiologists are aware that the plant food in a soil occurs in two distinct forms. A plant can, in the first place, feed upon substances which are in solution. The water in a soil contains a more or less considerable amount of carbonic acid, and in this weak solution of carbonic acid certain of the ingredients of the soil are soluble. Soil water generally contains a good deal of calcium and magnesium carbonate; it contains nitrates, chlorides and sulphates, with soluble silicic acid. It generally contains no phosphates and only traces of potassium salts; sodium salts may, however, be present. If therefore, the plant were entirely dependent on the soil solution for its nourishment, it would be starved, as two essential constituents of plant food, phosphates and potash, are not supplied by this medium.

The second mode in which a plant feeds by the solvent action of its roots. This extremely important function of the roots has been far too little investigated. *Sachs* was the first to show that the root hairs of certain plants had the power of eroding polished plates of marble, dolomite, and osteolite, by virtue of the acid sap which they contained. *Zöller*, more than thirty years ago, ascertained at Liebig's suggestion that calcium phosphate, ammonium-magnesium phosphate, and the potash of a freshly-manured soil were dissolved when placed on a membrane the other side of which was in contact with a weak solution of hydrochloric acetic acid. It is generally, and probably correctly, held that this solvent action of the roots is especially effective towards the phosporic acid, potash and other substances which have been previously absorbed by the soil from solution, and which are thus held on the surface of the soil particles. As to the nature or amount of the free acid present in root sap little is definitely known. A. Mayer lays most stress on the presence of oxalic acid, which he found in several instances.

The importance of this solvent action of the roots can hardly be over-rated. Most of the phosphoric acid in soil exists as a basic ferric phosphate, is soluble in water and in carbonic or acetic acid, and but for the existence of this solvent power in roots would remain useless to vegetation. The potash, and we may add the ammonia, of soils is held in almost equally insoluble combinations; but analytical chemists are aware that the whole of the ammonia, and more or less of the potash, becomes soluble as soon as the soil is placed in a weak solution of hydrochloric or nitric acid. The acid sap of the roots is thus equally required to bring about the solution of this important soil constituents.

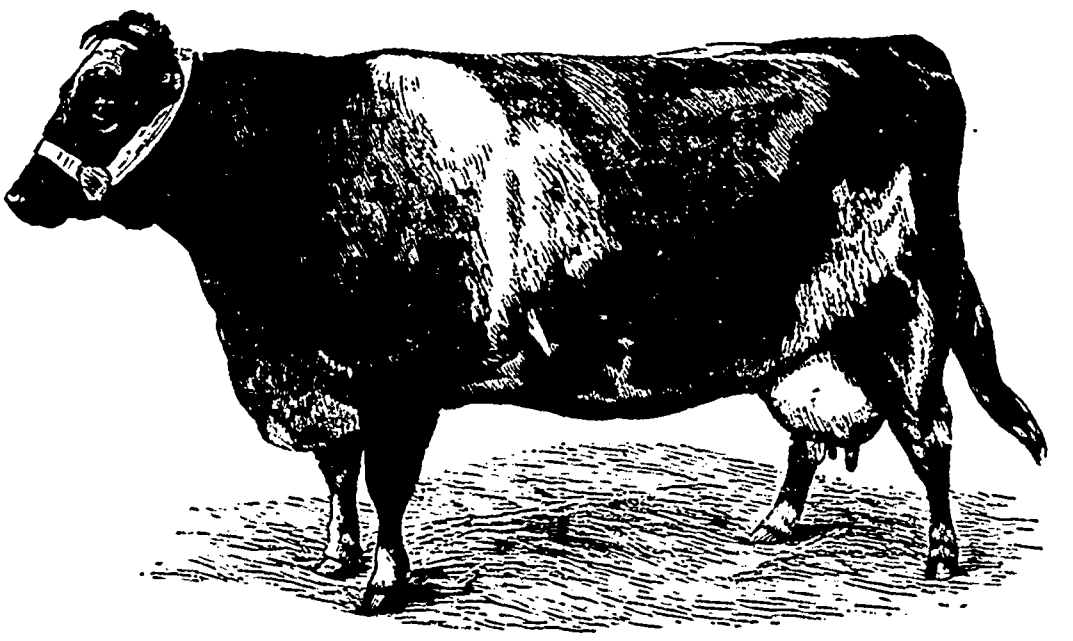
## THE LEAF AND ITS FUNCTIONS.

The leaves of a tree are the most important organs of growth. More than nine-tenths of all the organic matter in tree comes from the air by means of the assimilation of carbon, from the deoxidation of carbonic acid,

by the green matter in the leaves under the influence of sun light. The carbonic acid (carbon dioxide) enters the leaves through millions of tiny pores, mainly on the under side, and the green matter of the plant has the power to decompose it, taking the carbon and rejecting part of the oxygen which returns to the air to purify it for animal life. With this carbon, and the water taken up by the roots in which mineral matters are dissolved, the plant makes all the various substances which are used in its growth. The sap-water reaches the leaves through the tubular vessels of the leaf stalk, which are in direct connection with the vessels in the young sap-wood, and thence through the network of veins which traverse the whole leaf.

Leaves are arranged on the stem in several ways. When only one leaf grows on a node, the successive leaves beyond form a spiral, making one or more turns around the stem before another leaf comes exactly above the one at the beginning. This is called the alternate arrangement. When two leaves grow at a node they are on opposite sides, and the arrangement is called opposite. When more than two grow at a node they form a circle or whorl. The branching of a tree is governed by the leaf arrangement, for the buds that make new branches start in the axil or angle that a leaf makes with the stem. Therefore, if the leaf arrangement is alternate, the branches will be alternate, and if opposite, the branches too are opposite.

Leaves not only take in food from the air, but they also pass off or transpire into the air surplus moisture in the shape of invisible vapor, thus condensing the watery sap brought up from the roots. This evaporation of water is shown by the rapid wilting of leaves when the shoot is severed from its connection with the stem and roots.



MILKING SHORTHORN COW VICTORIA. (First prize, London Dairy Show, 1890.)

## Correspondence.

122 St. Lawrence,
June 9, 1894.

DEAR MR. JENNER FUST,

Yours to hand and am much obliged to you for the information about the not poisonous sheep-dip.

I have written this day to the Lawes Chemical Co. 59 Mark Lane for circulars and prices. I imagine it will never sell in any large quantity here, for as you know very few farmers wash their sheep at all. My experience with the average F. C. farmer is that he washes the wool after it is sheared, and that is about all he can be induced to do. The paragraph says it will protect horses from the annoyance of flies, if this is the case why would it not do to sponge Cattle in the summer to keep off the "horn-fly"?

I presume it is some by-product of the distillation of Coaltar, which is non poisonous and therefore not so dangerous as Carbolic Acid, derived from the same sources.

Believe me, Dear Mr. Jenner Fust,
Yours very truly,
HENRY R. GRAY.

Abercorn, June 4th 1894.

TO THE EDITOR OF THE
*Journal of Agriculture.*

*Sir,*—In your June number, under heading of "New York Farmer's Institutes Dairy Notes," which the questions of watering, feeding and stanchioning and dehorning cows were discussed, I should be glad to submit some ideas which I have found to be profitable, at least for one situated as I am; and I have no doubt that I have been in more farmers' barns in the last two years than any other man in Canada, consequently have had a wide field for observation, and in speaking for myself I speak from the standpoint of a farmer leasing his land, rather than the one that works his land himself. First, the question of watering the stock: my first idea was to put in running water, then I did not like having my cows kept in for months, and if cattle could be watered without turning out from the stall, the average tenant could and would pile up feed enough before them to last all day, and let them take care of themselves. Then, there would be more or less drip from the troughs, so I decided to bring water to the barn, on the sheltered side, have tight shutting covers to the tank, and turn the cows out twice a day, giving a better chance to clear and leitter the stable, &c., than when cows were in their places. Feeding twice a day I consider better in many respects and one in particular avoiding taking the light into the mow by careless farms hands or tenant early and late. Then came the question of stanchions: the rigid stanchion is an uncomfortable contrivance for a cow to pass much of her time in, but a good arrangement for milking purposes, so I attach a chain to the stiff stanchion, fasten the loose one back for the winter, so that in summer, when the cows come in, only at milking time, use the more handy stanchion again. A few years since I dehorned my dairy and young stock of between 35 and 40 heads having been convinced of its beneficial results in the West. I was prosecuted for so doing by the S. P. C. A. of Montreal, but I was able to convince them of the propriety of my so doing, and now my cows enjoy their semi daily trips out to the tank, which never skins over in the coldest weather under the close fitting cover. Since then, I have been over most of the District of Bedford, and adjoining counties of Ordeans and Franklin, in the State of Vermont, having taken off nearly ten thousand pairs of horns in the last two years. Yours &c.,

J. S. SHEPARD,
Abercorn, Que.

We prefer having the cows in doors all the hard weather. No objection to their taking a walk on mild days, but the water should be always before them and of the same temperature as the stable. We never yet met with a *good* feeder who only fed twice a day.

As for de-horning cattle, more experience is needed before we can decide *pro or con.*—EDITOR.

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Danville, April 18th 1894.

A. JENNER FUST. ESQR.,
Montreal.

*Dear Sir,*

I hope you will excuse the liberty I take in asking you for information.

But I know of no one whose opinion I would follow sooner than yours. We have 25 acres of hill pasture-land 3 miles from home and not requiring it for pasture 5 years ago, we broke it up, put on 300 lbs. of "Victor" superphosphates and 50 bush-hardwood, ashes per acre, sowed it to barley on the sod, and seeded it with clover and timothy, got a *fair* crop of barley and have had 4 crops of hay.

We have on hand, but cannot haul this season 200 loads of manure. We have it plowed and ready for a crop and intended *manuring* it and seeding as before, but cannot get the manure there. Now, what, *special fertilizer* would give me the best crop of *oats* and leave the manuring and seeding down till another year. The land is good strong loam, the rock coming near the surface in spots, somewhat stoney, which we intend to pick off. As your reply through the Journal, will be to late to be useful, I would take it as a great favour, if you will write me

Yours Truly,
A. MCCALLUM.

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I advised a mixture of 200 lbs. high grade superphosphate and 120 lbs. of nitrate of soda to the acre, but fear the latter is too dear now to be profitable.

ED.

## Breeder and Grazier.

### WARM STABLES AND HEALTH OF CATTLE.

EDS. COUNTRY GENTLEMAN — Mr. John Gould on p. 352 has an article under the above title that is of more than usual interest. Certain statements made therein are pregnant with suggestions and others call for discussion. Almost at the outset he states that "it may be well to inquire if, in some of this advance teaching of the care of the dairy cow, there has not been here and there a little too much of the 'hot-house' culture introduced. He then contrasts the method of keeping cows in warm well-ventilated stables with the old times "when cows were toughened by nature, fed hay at the stack," &c.

I make no issue with Mr. Gould on the absolute necessity to profitable dairying of having cows well fed and cared for in well ventilated stables. It is only on the question of degree of warmth of the stables that in this day of 1894 a discussion may take place.

On this point the pendulum is certainly swinging toward the adoption of a lower temperature. It was but a few years ago when at the farmers' institutes and in the dairy columns of the agricultural press it was thought that, since warmth was good, more of it was better, and the stables should be kept at summer temperature during the cold weather of winter; June conditions must be maintained; the water must be warm to save the expenditure of heat to warm it, with the consequent waste of food; no exercise must be allowed, as every movement caused a loss of energy that should be devoted to milk production. In short, the necessary logical conclusion from the arguments and theories put forth was that the true dairy treatment was to keep the cow at blood heat and well supplied with already partly digested food, leaving for her nothing to do but to lie still, digest, assimilate and secrete.

It seems to me that nature has taken this question of the regulation of temperature of the animal body largely into her own hands, and has supplied every cow with an unpatentable temperature regulator. As soon as the thermometer in the stable comes up, the pores in the skin open, perspiration takes place, and the evaporation of water so transpired cools the system. When the temperature of the stable is kept habitually lower, the pores are closed, very much less perspiration takes place, and this source of loss is prevented.

Nature applies still another check on this elevation of temperature. When the stables are kept regularly warm, there is less appetite. With a diminished indigestion of food, there is more than a corresponding diminution of the yield. The tonic effect of cold air is felt not only on the skin, but sympathetically on the membranes of the stomach and intestines as well. All of the internal organs are excited to great activity by it, a larger milk yield results. The appetite is increased far beyond the increased requirement for the heat supply, and the surplus goes

into the milkpail. Moreover, we are still ignorant as to the details of the food metabolism in the body, and it may be that the heat developed by the oxidation of the waste products of the system, after all, is an incident rather than an end.

Several years ago, in fatening a carload of steers in a warm but well-ventilated stable, we found it necessary to take out the windows on the south and east sides of the building, and allow the free passage of a current of fresh cold air through the stable, in which the dishorned steers were running *loose*, to prevent perspiration. Moreover, we could not get them to eat heartily untill we reduced the temperature of the stable, when their appetites became keen and their gains satisfactory.

During the past winter, it has been my pleasure to have under my control the feeding and care of several choice cow making large milk and butter records—one record of considerably over 100 pounds of milk and 3½ pounds of butter per day. Although the thermometer was below zero many nights in February, when the largest record was made, and on several days hardly touched 10° above during the day, still the cow was kept in a loose box stall, away from the heat of the regular stable, and with no protection from the severity of the outside cold but a board wall an inch in thickness with battened cracks, and with a loose door. The temperature in the stall, therefore, was below 20° for days at a time. Her feed consisted largely of roots and ensilage, with a grain ration of corn, oat, brand and oil meal. Note the results.

In this cold weather the economy of food was excellent, as a pound of butter fat was yielded for every 15.9 lb. of dry matter consumed; while in the warm spell following, the consumption of 17.9 lbs. of dry matter of identical composition was required to produce a pound of butter fat. In the week ending Feb. 27, for instance, the cow consumed 331.09 lbs. of dry matter, and yielded 19.74 lbs. of butter fat, or 16.7 lbs. of dry matter to a pound of fat. For the week ending March 6, the dry matter consumed was 320 55 lbs., and the fat yield was 20.05 lbs., or 15.9 lbs. of dry matter to one pound of butter fat. For the week ending March 13, a warm week, the dry matter consumed was 342.67 lbs.; the fat yield was only 19.04 lbs., requiring 17.9 lbs. of dry matter per pound of fat yielded. During the following warm weeks, ending March 20 and March 27, the pounds of dry matter required per pound of butter fat yielded were respectively 19.1 and 1[illegible]4; while in the cold week ending April 10, she required but 16 lbs. of dry matter to make a pound of butter fat. The per cent. of fat was determined by duplicate test with the Babcock test. The weight of the cow gradually increased during this time.

For sake of comparison it might be added that, in the dairy test at the world's fair, with all the advantages of a barn surely warm enough, the best combinations of feed that the best skill in the country could suggest, and with the best herd of Jersey cows that the world has ever seen, it required 19 1 lbs of dry matter for every pound of butter fat yielded, while our record was made by a despised Holstein, in the dead of winter, in a cold shed.

The limitation of space does not permit further discussion of theory or the quotation of additional facts; my sole purpose in discussing this matter at all is to suggest that undue importance may have been attached to the necessity of warmth in stables. What a cow needs first is plenty of feed, and next, and of equal value and importance, is plenty of fresh air. The chemical action involved in the transmutation of over 50 lbs. of dry matter in 24 hours into 11 or 12 lbs. of the total solids in the milk in the instance above quoted, is something enormous, and necessitates the supply of abundance of oxygen. The burning up and disintegration of so large an amount of material in the formation of this 11 or 12 lbs. of milk solids per day necessarily evolves a large amount of heat.

May we not consider this evolution of heat as a necessary attendant upon the formation of this large amount of dry matter in the milk, and not at all an end in the consumption of feed? The consumption of this amount of feed was necessary to furnish the material for the total solids in the milk and the heat evolved by the chemical actions taking place in the formation of the milk solids, and must be amply sufficient to keep up the heat of the body, even in the coldest stable.

*It seems to me that our feeding* theories have been partly wrong in this matter in the past, and the question is of great importance.

CLINTON D. SMITH.
*Michigan Ag'l College.*

## OUR ENGRAVINGS.

The two "Dairy-Shorthorns" cows are really portraits, and are good specimens of their sort. This is what we mean when we speak of the regular "Farmer's Cow." Anything meaner than the miserable things shown at Chicago it would be hard to find.

## PREPARATION and EMPLOYMENT OF INSECTICIDES AND FUNGICIDES.

Bouillie Bordelaise is composed of

| | |
|---|---|
| Sulphate of copper (blue vitriol) | 4 to 6 pounds. |
| Quick lime | 4 " |
| Water | 40 gallons. |

To prepare it, take 4 lbs. of sulphate of copper, in powder, and dissolve it in a gallon of hot water in a wooden tub (no iron vessel must be used, as the sulphate would attack it). Four pounds of lime are to be slaked in water sufficient to make a clear solution. This solution, or milk of lime, is to be passed through a sieve or a piece of sackcloth that will keep back all the lumps. When the two liquids are cool (the cooling may be hastened by adding to the sulphate of copper solution a few gallons of cold water), the milk of lime is to be poured into the solution of the sulphate of copper, stirring continually with a stick. Then, water is to be added until there are 40 gallons in all. Every time this is to be used, the mixture is to be stirred up, and the tub must be covered to prevent any dust or dirt getting in to it.

To use this, on the leaves, a pulveriser (sprayer) should be used; but, if there is none, a watering-pot, with the rose pierced with very fine holes, will do. There are several kinds of sprayer for sale, but the handiest is a force-pump fixed in a cask on wheels, drawn by a horse across the field.

The Bouillie Bordelaise is an excellent *fungicide*, i. e., it will hinder and destroy the growth of parasitic fungi, such as the rust and rot of the potato, the scab and black-knot of fruit-trees, &c.

**Bouillie Bordelaise and Paris-green.** As Paris-green is the best of all insecticides, especially for the potato-beetle, the apple worm, &c., it is often used in conjunction with the bouillie Bordelaise:

To make the mixture, dilute ¼ lb. of Paris-green with a little water so as to make a thick paste, to be subsequently added to the 40 gallons of Bordeaux mixture. No better fungicide and insecticide than this can be made.

During its application to the leaves of plants, the mixture must be kept in agitation — good sprayers are furnished with an automatic agitator,— for the lime and Paris-green quickly sink to the bottom unless the mixture is constantly stirred.

**Petroleum-emulsion.** — This insecticide, very much in use against lice, caterpillars, *tigres sur bois*, the parasites on animals, the horn-fly, &c., is thus compounded:

| | |
|---|---|
| Petroleum—coal-oil | 2 quarts. |
| Common hard-soap | 2 oz. |
| Water | 7 gallons. |

The soap is to be boiled in a quart of water till dissolved, and the boiling solution poured into the petroleum, and, with a syringe or a force pump, the mixture is to be agitated for 5 minutes: when it looks like cream, 27 quarts of water are to be added to it. This petroleum-emulsion is to be scattered over plants and animals by the pulveriser.

**Pyrethrum-powder.**(1)—This powder answers best when used in a dry state. It is generally mixed with 4 times its weight of flour and the mixture should be kept in a tightly covered jar. Kills caterpillars, particularly the cabbage-caterpillar, and is very useful in cases when it would be dangerous to use Paris-green; for instance, on vegetables and fruit a short time before they will be used. It poisons insects, but is, practically, harmless to man. To apply it to the crops, a *bellows* with a reservoir is used; this can be got at any seedsman's.

**White-hellebore.**—A poisonous vegetable insecticide, made from the roots of *veratrum album*, reduced to powder. Used in the same cases as advised for pyrethrum, where Paris-green would be hazardous. Applied as a dry powder or mixed with water at the rate of 1 oz. to 2 gallons. But the best way is to make an infusion to be poured round the roots of cabbages, radishes, turnips, &c., to kill the grubs that attack these plants; ¼ lb. of hellebore to 2 gallons of boiling water.

**Solution of sulphate of copper.**—Dissolve 1 lb. of the sulphate in 24 gallons of water. This fungicide is used to destroy parasitic fungi, such as the rust, the anthracnose on haricot beans, the scab, and other fungoid diseases of the raspberry, pear-trees, apple-trees, vines, &c.

It is also useful for seed-grain; place the grain, in a bag, in the solution for a few hours, say 12; then, take it out, soak it in lime-water for 5 minutes, and let it dry before sowing.

**Eau céleste** (*heavenly water*).—This fungicide is thus made: 1 lb. sulphate of copper, 1½ pints of ammonia and 22 gallons of water. Dissolve the sulphate in about 2 gallons of hot water, and, as soon as cool, add to it 1½ pints of ammonia, then add water enough to make two gallons. Used like the following:

Ammoniacal solution of carbonate of copper. A mixture highly recommended against the fongous diseases of fruit-trees, such as the mildew of the vine, gooseberry, the scab on apple- plum- cherry-trees, &c., and the rust of strawberry-plants.

This solution is made of copper, ammonia, and water, thus: Dissolve 3 oz. of carbonate of copper (1) in one quart of ammonia, and where it is required for use, pour it into 25 gallons of water

**Sulphuret of potash.**—A fungicide against mildew in gooseberries and the rust in strawberry-plants. A solution of 1 oz. of sulphuret of potash in 2 gallons of water.

**Paris-green.**—An arsenite of copper, containing 50 to 60 % of arsenic. A very virulent poison, to be always kept under lock and key. A remedy against all sorts of insects, particularly mandibulars or gnawers. If given too strong, the leaves will be injured. To be used dry, or mixed with water. If dry, mix with from 50 to 100 times its weight of plaster, wood ashes, flour, or slaked lime, and scatter it over the leaves of the plants.

In a liquid form, to be used with the sprayers, take 1 lb of Paris-green and mix with 200 gallons of water; but, if the foliage is tender, as in plum- and cherry, trees, use 250 or 300 gallons. As this green powder is not soluble in water, it is wise to make a thick mash (*pap*) with it and a little hot water before adding it to the bulk of water. In using this insecticide, it should be pumped out forcibly it so as to drive into every cranny of the plant, but change the direction of the shower as soon as the leaves begin to drip. When you find a difficulty in getting these liquid mixture to stick to the leaves of some plants, such as cabbages, &c., add a little soap to the compound: it will make it stick to the leaves.

**Solution of corrosive sublimate.** — This is prepared by disolving 2¼ oz. of corrosive sublimate in 2 gallons of hot water, and 10 or 12 hours afterwards, adding 12 gallons of water. *Scab in potatoes* is cured (or rather prevented) by immersing the seed in it for an hour, a short time before planting. A virulent poison.

**Alkaline solution.**—This solution, recommended by Prof. Saunders, of the Ottawa Experiment, farm, is made by *mixing a strong solution* of washing-soda with soft-soap enough to make a pap. Instead of soft-soap, hard-soap, melted in a little boiling water, may be used. Applied to the trunks of trees, with a coarse brush, it forms a tenacious coating that kills the gnawing caterpillars, and gives vigour to the tree.

(1) This can be had at any druggist's. At Quebec, it is kept by J. B. Livernois, St. John's Street, price 44 cts. a pound.

(1) Carbonate of copper is easily made, thus: dissolve, apart, 1 lb. of sulphate of copper in 2 quarts of hot water, and, in another vessel, 1¼ lb. of washing-soda in 2 quarts of water; pour the second solution into the former, stir hard, and allow the mixture to rest for 5 or 6 hours, to allow the carbonate of copper to completely subside to the bottom of the vessel; decant the clear liquid, and you will find about 8 oz. of carbonate of copper, ready for use.

## ATTENTION.

Remember that most of the insecticide and all fungicides are poisonous!

Put tickets on all poisonous matters, and put them out of the reach of anmals, fools, and children!

Never put compounds of copper into *iron vessels!*

Do not continue the dressing on fruit-trees the fruit of which will be fit for use in 3 or 4 weeks!

Make trials on a small scale, if you are afraid the foliage will suffer from the dressing!

Never dress trees when in bloom!

H. NAGANT,
*Assistant-Rédacteur du Journal d'Agriculture.*
Québec May, 1894.
(*From the French*)

# HOW TO USE INSECTICIDES AND FUNGICIDES.

## A TABLE TAKEN FROM A BULLETIN OF THE AGRICULTURAL COLLEGE OF MICHIGAN, AND ARRANGED FOR THE PROVINCE OF QUEBEC.

Farmers and all fruit-growers begin to see the need of protecting their crops by the use of fungicides and insecticides. We have tried to condense, in a few words, the manner of preparing and using these remedies, under the form of a table easy of preservation and consultation.

**Explanatory Notes.**—Although the number of applications, here recommended, may be useful in seasons when fungous diseases, due to mildew, are more especially severe, it will often happen that a smaller number of applications will suffice.

The asterisk (*) shows that care must be taken, when sprinkling plants or trees in bloom, not to overdo it.

The dagger (†) indicates that it is dangerous to use poison on fruit, and that at least three weeks or a month must be allowed to elapse between the application and the gathering of the fruit.

| Trees or Plants. | 1st Application. | 2nd Application. | 3rd Application. | 4th Application. | 5th Application. | 6th Application. |
|---|---|---|---|---|---|---|
| **CHERRIES** ..... (*Lice, weevils, worms, rust, smut.* | As soon as the flower-buds show, but before they burst, Bouillie Bordelaise; for lice, Emulsion of petroleum. | When the fruit is formed, use Bouillie-bordelaise and Paris-green.* | 10 or 14 days after, if the rust appear, repeat application. | 10 or 14 days after, use the ammoniacal solution of copper carbonate.† | | |
| **CABBAGE** ..... (*Worms, caterpillars, lice.*) | As soon as the worms or caterpillars appear, Paris-green, petroleum emulsion or pyrethrum. | If they re-appear, Paris-green may be used, if the cabbage is not hearting. | When hearted, use saltpetre (a dessert-spoonful in a gallon of water) or pyrethrum. | Repeat, if the worms reappear; against the cabbage-grub, infusion of bellebore round the roots. | | |
| **STRAWBERRIES** ..... (*Rust.*) | Before vegetation begins in spring, Bouillie-Bordelaise. | Just before the flowers open, Bouillie-Bordelaise and Paris-green. | After the fruit is formed, ammoniacal solution of copper carbonate. † | Bouillie-Bordelaise, as soon as over fruiting, if the plants are to be kept on. | *Remark.*—Young beds to be treated from the 2nd and 4th applications to the fruit bearing plants. | |
| **RASPBERRIES AND BLACKBERRIES** ..... (*Rust and Anthracnose.*) | Cut the stems that are badly anthracnosed. Before buds open, sprinkle with sulphate copper solution. | When new stems appear, Bouillie-Bordelaise and Paris-green. | 10 to 14 days later, a fresh dose.† | After gathering fruit, cut away old stems, thin new stems. and sprinkle with Bouillie-Bordelaise if needed. | *Remark.*—If red-rust appear, dig up and burn the whole plant. | |
| **CURRANTS** ..... (*Mildew, caterpillars.*) | As soon as caterpillars appear on the lower leaves and inside the bush, Paris-green. | If they reappear, same treatment plus Bouillie-Bordelaise against mildew.† | If the caterpillars persist, Pyrethrum or Hellebore.† | After fruiting finished, Bouillie-Bordelaise. | | |
| **GOOSEBERRIES** ..... (*Mildews, caterpillars.*) | Bouillie-Bordelaise and Paris-green, as soon as the leaves appear. | Repeat the remedies 10 or 14 days after. | 10 or 14 days after sulphuret of potash on the English sorts.† | Same repeated 10 or 14 days after.† | If mildew persists, after fruiting over, Bouillie-Bordelaise. | |
| **TURNIPS** ..... (*Insects, lice, flies.*) | On young plants, mixture of Paris-green and plaster; for lice, petroleum emulsion. | Repeat in 10 or 14 days. | Again, in 10 or 14 days, particularly the emulsion. | Against grub, round roots infusion of Hellebore. Pyrethum and emulsion of petroleum on the leaves if needed. | | |
| **PEARS** ..... (*Spotted leaves, scab, grubs, caterpillers.*) | As soon as buds shew, solution of sulphate of iron or of copper. | Bouillie-Bordelaise just before the flowers open.* | Bouillie-Bordelaise and Paris-green the week after the flowers fall. | 8 to 12 days later, the same. | 10 to 16 days later, Bouillie-Bordelaise. | Again Bouillie-Bordelaise, if needed, 10 to 16 days later. |
| **POTATOES** ..... (*Rust, scald, scab, disease, beetle.*) | Against scab, &c., steep seed in solution of 2 oz. corrosive sublimate & 16 gals. water for 90 minutes. | Prevent the disease by 1 or 2 applications of Bouillie Bordelaise and Paris-green when the beetles or their larvae appear. | Repeat as often as needed. | When *rust* in leaves, accompanies *rot* in tubers, Bouillie Bordelaise. | Again in 10 days if needed. | |
| **APPLES** ..... (*Scab or black marks, blassom-grubs.*) | Sulphate of copper solution sprinkled on trees before the buds shew. | When the buds shew, but before they burst, Bouillie Bordelaise.* | After the flowers fall, in the same week, Bouillie Bordelaise, and Paris-green. | The same 10 or 14 days later. | The same 10 or 14 days later. | 10 or 14 days later, Bouillie Bordelaise.† |
| **PLUMS** ..... (*Fungoid diseases, Curculio or weevils.*) | Bouillie Bordelaise and Paris-green when buds expand. | In the week the flowers fall, same treatment.* | 10 or 12 days later repeat treatment. | 10 or 12 days later, Bouillie Bordelaise. | 10 to 20 days later, use *l'eau céleste*, or the ammoniacal carbonate of copper solution. | 10 or 20 days later repeat the treatment if needed.† |
| **TOMATOES** ..... (*Scald, rust, rot.*) | Bouillie Bordelaise for rust or rot. | Repeat if needed. | Repeat if needed. | Repeat if needed. | | |
| **THE VINE** ..... (*Fungoid-diseases.*) | Before buds open, sprinkle with sulphate of iron or of copper solution. | When the first leaves are half grown, Bouillie Bordelaise and Paris-green. | When the fruit is set, repeat treatment.* | Same treatment 10 or 14 days later. | 10 or 14 days later, if the disease still exists, Bouillie Bordelaise. | *Eau céleste*, ammoniacal solution of carbonate of copper.† |

## ANIMALS.—Applications to be made as often as needed.

**CATTLE**—*Horn fly*)—1. Coat the horns, near the head, with grease or vaseline mixed with a little sulphur, or with a few drops of oil of tar or of carbolic acid. 2. Sprinkle the whole body of the animal with the emulsion of petroleum, by means of the pulveriser. 3. Prevent the increase of the larvæ by knocking-about the cow dung in the pastures, &c., to hasten its drying up.

**SHEEP AND HOGS**—(*Lice, fleas and other parasites.*)—Emulsion of petroleum with the pulveriser.

**DOGS AND FOWLS**—(*Lice fleas, and other parasites.*)—Blow pyrethrum powder into the nooks and crannies of the hen house with the insect-bellows. (*From the French.*)

# The Horse.

## HORSE-BREEDING FOR PROFIT.

EDS. COUNTRY GENTLEMAN—From time to time in your columns I have urged readers that bred horses to break away from the lines followed for the past ten years, when the only thing arrived at was extreme speed, and to make a good individual the prime object and good pedigree added if possible. No one should place a light estimate on pedigree, for it is the only guide to any certainty in the reproduction of a fixed type. In breeding a trotting horse, little if anything was taken into consideration except speed. If a sire had a long list of 2.30 performers, no matter if many had been trained an entire season to finally secure a heat in 2 30, mares were sent him with little thought as to the other qualifications, or if the union was one calculated to produce good results aside from speed.

We all know how seldom extreme speed has been attained. Among the thousands on thousands bred, only one Maud S., one Sunol, one Allerton, one Directum, one Nancy Hanks, has been produced. It is safe to say that for every one that has brought fame and fortune to the breeder, a hundred have brought disappointment. Size, soundness, beauty, pure trotting action, everything that made a horse desirable was made secondary to the hope for speed. As a consequence breeders found, when speed was missed, there was little else attained. Small, plain, mixed-gaited horses had no attractions for buyers, and with the decline of the unhealthy boom in breeding trotters, pedigrees counted for nothing The country was filled with horses fitted for no special purpose; too small or light or high strung for work, not desirable for light road driving, because lacking in finish or pure attractive action and still less fitted for coach or family use. There was simply a pedigree! Is it any wonder there was no market for such when buyers began to demand *good horses*, with or without pedigrees, instead of a good pedigree with or without a horse?

Farmers were just as eager in the mad rush to breed an Axtel or an Arion or a Nancy Hanks, as were men in other walks of life, and following the plow seemed slow compared to breeding a sensational horse and becoming rich and famous in a day. History has repeated itself, and when the bubble burst, there was a general scramble to get out, and every one wondered why he had ever been in. Then came the general cry of overproduction, and here we are The question was then passed round: Is there *any* type or class or horses that it will pay to breed?

I have long held that if any one could breed horses at a profit, it was the farmer. Not every farmer, to be sure, for horse breeding is a business entirely distinct from general farming, and to succeed in any business, a man must have a special liking and adaptation for it. So, especially in times like the present, *if you are not a born horseman, do not breed at all.* Study well your tastes and capabilsties, and be guided by the result.

That there is a demand for good horses, at prices affording handsome profit to the breeder, has been amply proved by recent sales in this city. Horses bred in the lines often urged upon the readers of these columns have sold recently at astonishing figures, while so-called "trotters" without speed or any special features to recommend them, have sold for next to nothing. Can the business of breeding good horses be said to have gone to pieces when a lot of carriage and driving horses without any pedigree or extreme speed sell for an average of nearly $800?

Mr. E. D. Morgan of this city and Westbury, Long-Island, sold a few days ago through William Easton a consignment of over thirty horses that averaged $770 each, the star of the sale bringing $4,500. Yet the production of such really grand horses has found little favor among even farmers, while they dreamed of producing a possible Directum, 2.05¼. Take even Directum, and what would he bring in a sale-ring if he could not trot a mile faster than three minutes?

A man should breed horses so that every animal would have a selling value *irrespective of pedigree.* Then a good pedigree added is so much added value. These horses sold by Mr. Morgan were all grand individuals, and were presumably nearly all bred in trotting lines, but not in what have been termed fashionable lines.

The lessons of the sale-ring at present are plain. Really desirable horses bring fair prices, but others have practically no value. The general purpose driving really useful type is in most demand, and probably ten devotees of driving use a fancy trap or runabout wagon, with a handsome, substantial horse of the Hackney type, where one prefers the light road wagon and the lighter made horse suited to drive at speed. Whichever a breeder seeks to produce, he must aim only at the best. Mediocrity is a drug.

L. C. UNDERHILL.

*New York, May 15.*

## THE ILLUSION OF THE ARAB.

It is quite curious how seldom Englishmen who have the means of indulging any caprice attempt to put the theory of "my Arab steed" to the severe test of *riding him in England* as a hack. Indeed, he is hardly ever seen, even amongst the crowd of four-legged atrocities whereon the cloth capped, begaitered youth of to-day disport themselves in Rotten Row; and till we see some such demonstration made in his favor, we must really decline to swallow the Indian pig-sticker's tales of yawning *nullahs negotiated,* (1) and of the marvellous courage and surefootedness displayed by the Arab, inasmuch as the "Arab mark" is an Oriental euphuism for a pair of broken knees, and he is always deficient in scope, an indispensable attribute for clearing great width, while for courage the *pig-stickers* themselves allow that not more than one in ten will properly face a charging boar.

Why, too, are these wonders never brought home to England by the men who so vaunt their prowess? It is true that Mr. Wilfred Blount—who, to say the least of it, is eccentric in the choice of his proteges—did his best to boom the "Child of the Desert," and actually succeeded in obtaining from the Jockey club an added £300 to a stake at Newmarket, memorable to all time for the absence amongst the competitors of the qualities which are deemed essential in a race horse. This sorry display was appropriately capped by the spectacle of Mr. Blount wending his way across the Heath on a blue-blooded courser, whose obvious insecurity moved even the wild horsemen of Cambridge to pity. (2)

(1) Wide ravines jumped.—ED.

(2) I. e. the lads of our old University.—ED.

With the merits of "my Arab steed" as a sire we are not here concerned. He has, no doubt, in the past done yeoman's service, and there are those who think that there is yet a great future in store for him on English stud farms; but we do emphatically protest against the romantic views of his charms and capabilities so widely entertained by those who have never made his acquaintance. Let us by all means give him his due, and concede that he is a most agreeable companion in a tent, though an Englishman would prefer his room to his company if obliged to sleep under canvas, and an Irishman might entertain a patriotic predilection for a pig.

A fair hack amongst bad ones, for he stumbles abominably, he is hardy, full of pluck, gay, and usually good tempered. He will carry condition where the English horse would starve, *but he has the worst of shoulder,* is as slow as (1) a man in top-boots, his staying powers consist chiefly in not being able to go fast enough to tire himself, and as an article de luxe he must be pronounced a delusion and a fraud.—*Saturday Review.*

## GOOD HORSES ALWAYS SELL.

Don't think you can make anything by saving the service fees of your mares this year because horse are low. Some farmers, at least, are not in any frame of mind to listen to reason on this subject. Horses do not sell any lower than any other product comparatively. The common kinds of cattle are dull, everybody knows the condition of sheep, and hogs are about all there is left in which there is any money.

Suppose that horse breeders go out of the business and undertake something else. Will they raise wheat? If they do, can they be assured of any more profit? Wheat was never so low as it is now. The same is true of all other grains. A study of market quotations will show conclusively that no one is in any better condition than the farmer.

Horse breeders can bear one fact in mind as a guide. There is little, if any complaint, from those who have bred to superior stallions. The speed speculative market is discouraging, but blood and performance, especially if combined, bring profitable returns. Good draft animals are taken at prices which leave the breeder a profit. Good *gaited* (2) saddle horses are in active demand and stylish carriage horses are sought at figures which pay well.

If you are satisfied that you know nothing about horse breeding, get out of the business without delay. If you are opposed to paying a good price for the service of a good stallion you better leave horse raising to some one else who has money to burn. If you think a horse is merely a horse you have missed your calling and better quit before the sheriff levies upon your possessions

But the man who has a well assorted group of mares, who understands how to mate mares and stallions so as to secure a given type, who isn't afraid to risk something on high-class stallion fees, will succeed, even in face of present discouragements. Merit will always bring good prices whatever the conditions of the business may be.

## Dr. McEACHRAN ON THE HORSE.

Prof. Duncan McEachran lectured in the Natural History's Society room, last evening upon, 'The Horse' past,

(1) Just what we said and Mr. Bouthiller denied.—ED.

(2) We prefer the *words action to gait,* the latter is archaic.—ED.

present and future. The history of the horse is lost in the dimness an antiquity, but the lecturer by means of diagrams traced its evolution from the pigmy fossid horse through various stages, from the fide digits of the foot to four, then to theo, and *finally* to the lateral bones, which are now rudimentary, and constitute the horse a solidungulous animal. Horse were used in very early time for chariots and probably riding in Egypt, and they were in used 1702 years before Christ, for we read that 'Joseph gave them bread for horses.' They were also mentioned B. C. 1686, (Genesis, chap. 1.) 'and there went up with *him both* chariots and horsemen.' David, B C. 1048, had cavalry, and Solomon, who brought large numbers of horses from Egypt, had four hundred stables, 40,000 stalls. From Egypt they readily spread in all directions, east and west, the Greeks and Romans bringing horses *to their* countries and valuing them highly. The Crusades, in which all the princes of Christendom joined, led to importation of horses into their territories. Jullius Caesar found horses and war chariots in Britain, when he invaded the country. Their introduction to America and Australia, the enormous increase in number on both continents, and the development of different breeds were described and illustrated by screen pictures. The commercial value of the horse, his uses for work and pleasure, and his development were dilated upon, the speed of the trotter, the jumping of the hunter, 'Rosebery, clearing' 7 feet 4 inches, 'Ontario,, 7 feet 2 inches, and 'Maud,' 7 feet. The multilation of the horse for fashion was animadverted against, likewise the overdrawn check and bearing, and the avoidance of whip and spurs, and the substitution of kindness was advised. With the universal adoption of electricity and steam, the drudge horse of our streets would soon disappear. He would no more be the badly misused beast of burden, but be treated as a pleasurable companion, and as an animal of his high organization and psychological development ought to be.

## THE OUTLOCK FOR COMMON HORSES.

Common horses are poor property to hold with the expectation of selling. The demand is light, but the supply is like the myriads of the locusts of Egypt An advance of $2 to $5 a head would bring out unnumbered quantities of them. A large number are now received at all markets which are not worth the freight on them and many railroad companies require consignors to guarantee freight before shipping.

It doesn't pay to ship them, it can't pay to keep them. What shall be done with them? They should not be kept to perpetuate their worthless kind. Too many have been kept and bred heretofore. If more breeders had hitherto awakened to the fact that it doesn't pay to keep plugs, the outlock would be different now. Over supply is hardly the trouble, for there never was any demand to supply. If breeders persist in keeping cheap horses the result will be cheap colts and it is better to kill some colts than to raise them. At the prices now prevailing they won't pay for the hay they eat. The only hope for improvement lies in educating owners of worthless mares to quit breeding them and in driving worthless stallions out of existence.

*Farm and Home.*

## Swine.

### SHELTER AND CARE OF BROOD SOWS.

EDS. COUNTRY GENTLEMAN—It is an undisputed fact that very few brood sows have as good care as it would be profitable to give them, and in no other point is this care as deficient as in that of shelter.

I believe the greatest trouble lies in the fact that so many farmers neglect to shelter their sows till warned by their actions that farrowing time is approaching; then, if the weather is inclement, requiring that a roof of some kind be put over them, the cheapest sort of a structure is used. The kind of shelter a farmer should construct, depends very much on the kind of farming he practices. If he follows a regular rotation, and all his land comes under the plow every three, four or five years, he will hardly want permanent buildings. I am in doubt whether such buildings are advisable under any conditions found on the average farm. They are objectionable, because by their location and continued use they become contaminated by the foul odors arising from the animals and their voidings. Very few farmers will keep such buildings as clean as they should be kept; and this will always be true till farmers accept the fact that swine are cleanly animals, and act accordingly in their treatment of them.

Experience teaches us that we can do better with our sows if we have them in separate structures, out of hearing of each other, or at least at such distance apart that the cries of the young pigs of one sow will not disturb the neighboring one. I am aware that it takes more time to care for the sows arranged in this way, but think I am abundantly repaid in the improved quality of the pigs. I built a permanent shed years ago for sows, but after using it for one or two years' abandoned it almost entirely, as I found much trouble in keeping it clean and in controlling the sows and pigs Moreover, the adjoining fields and lots were not always in shape to be occupied by the sows and pigs when they required exercise.

A great many farmers do not have their pigs come till the warm weather of spring is assured, because they have been unfortunate in their efforts to save pigs in colder weather with poor shelter. In cold weather the sows were more apt to become constipated in hands of farmers that allow them to shift for themselves. This is the immediate cause of numerous misfortunes at farrowing time, chief of which is the tendency of the sows to consume their offspring. If the sows do not farrow till warm weather, and grass has come, this tendency to constipation is overcome, and the risk of losing pigs on that account is passed.

A shelter is easily and cheaply constructed that will make a safe farrowing nest in the coldest weather known in the months of February and March. The main points to be considered are warmth and dryness, and there is no floor better than an earthen one. We have houses 6 feet square, resembling the top of a square barn taken off below the plates. They are made as close as it is possible to make them by battening the cracks. If the weather is likely to be extremely cold, rather than take any risk from a possible current of air, we build a square pen, rail lengths, about each house, and cover it completely with straw, having the end with door to the leeward of all prevailing winds. The comb of the roof of the houses is about 4 feet from the floor, and with the door closed, the heat from the sow's body will keep it warm. I do not understand that there is any necessity for more air space above the sow. We have tried a number of structures, but these now in use suit us better than any of them.

By our system of rotation our hogs are changed from one field to another, as the grass crops demand; the houses being portable, it is an easy matter to do this. The sow should come to farrowing time in the best possible condition—in good flesh, but not fat from corn feeding. A mixed ration strong in albuminoids is best to build up the system and lay on the right kind of flesh to sustain the pigs with milk that will produce a strong growth. With the best of instruction there must be coupled a degree of experience to secure success with the sow and her litter. JOHN M. JAMISON.

*Ross County, Ohio.*

## Household-Matters.

### VEAL PIE.

1 Pound of flour, ¾ lb of butter. 2 pounds of veal, 6 hard boiled eggs. ½ lb of bacon ½ lb sausages or sausage meat, 1 cup of bread crumbs.

### HOW TO MAKE THE PIE.

Do not handle the flour, or butter, but put both into a bowl, and chop up the butter, with a knife, in the flour till they are pretty well mixed, then add just sufficient water to hold it together. Now, turn it out, on the paste board, roll out, and keep doing this till every trace of butter has disappeared. You must use just a little flour to keep it from sticking to the board, every time you roll it. but just as little as possible. Cut off a long strip the depth of your dish, and lay it all round. Wet the edges to join, pack in a layer of veal, which has been cut up into pieces of about 2 inches square, next 2 of the eggs cut in two, some slices of bacon, and part of your sausage meat, which you have prepared into force-meat balls by mixing the same with the cup of bread crumbs, pepper and salt with any herb that is liked and one egg beaten up to bind the whole together: make the balls about the size of a very small egg. Continue these different layers till your dish is full, then lay over the top your cover of paste, make a little hole in the centre, and put your pie in to a very moderately heated oven. It will take about 3 hours to cook. You may try it with a steel fork through the hole in the top. All the time you spend in making your pie, the odd bits of meat and bone should be cooking to make gravy; of course with seasoning, when the pie is cooked, strain the gravy, a cup full, through the hole in the top. This is a delicious home made pie, and hot or cold is equally good. Made on Saturday you can trust to it for a good Sunday dinner.

### SALAD.

Two good heads of lettuce washed and cleaned thoroughly; two hard-boiled eggs; they must be boiled at least 10 minutes so as to mix well with the other ingredients. Take off the white of them for garnishing the salad The yolk of the egg, which must be cold, put into a basin and break it up with a fork using the prongs as if it were the bowl of the spoon. A pinch of salt, a teaspoonful of mustard; take a dessert spoon and work these together. 6 dessert spoonfuls of cream added a little at a time so as to make the whole into a smooth mixture; then add 4 dessert spoonfuls of vinegar and your sauce is ready for use. Cut the salad into a dish, garnish it with the whites of the eggs, and serve the sauce separately. (1)

Illustration No 1

I mean to show, a pretty way of doing up an old, or making, a new dress, for a young girl.

The little zouave jacket will make a dress, that is not quite in the fashion, look better; just now it is very much worn. The jacket and trimmings should be of the same colour. The frill at the bottom, will lengthen a short dress and make it look nicer. The little zouave jacket is not quite straight across the back.

The belt is pointed in the front and straight at the back, showing the dress about an inch between it and the jacket. Take care and put two or three fastennings to it so that it shall not open and spoil the effect. It ought to fasten so well as to appear not to have any fastening. The shoulder pieces and sleeves are so simple that it is useless to describe how to make them.

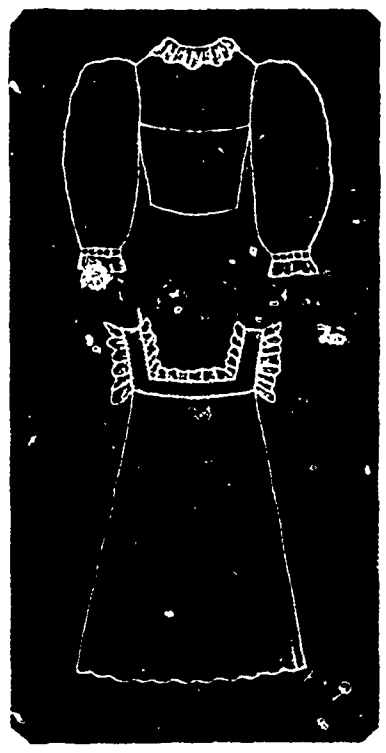

Illustration No 2

A very pretty dress. A white guimpe with the dress of any suitable colour will look so well, the whole made in white, will when wanted serve without the guimpe as pinafore or dress as may be convenient. Hanging as it does from the shoulders, it is so cool for summer wear. I saw one the other day: dress of bright red challis, with just a tiny on it, and the guimpe was made of cream china silk. The whole would wash well and not be much the worse for it. The china silk so much worn now, lasts a long time, and only wants washing and ironing to look new again thus saving the trouble of starching and one guimpe will serve for 2 or 3 dresses If your stuff is narrow, you will want about ½ as much more than if wide, so much depends on the height of children, that a given quantity for a tall child will not more than half make up for an extra stout one. The best measure to take, is from the shoulder just below the knee, allowing for hem, and turning in at top for puffing to put on the band at top. The shoulder pieces are formed by a straight piece gathered, turned in so as to form a little frill on each side and sewn firmly on to the shirt just at the arm hole of where there must be just a little, curve to form the arm hole and hemmed frilling of the same to form a sleeve. If made in white muslin, embroidery or frilling must be used to suit the taste, or pocket, of the maker.

(1) If the lettuce is not dried after washing, the salad will not be good.—ED.

### DO NOT DRINK VERY COLD WATER.

The same person that would never dream of giving his horse cold water, when hot, and just off a journey, will drink freely of it himself, well knowing that it is equally dangerous, for man or beasts. One can scarcely hope to keep children from this bad habit, when they see their elders doing it every day. If a mouthful or two of water is taken, and rejected a few times before swallowing, thus rinsing out the mounth and preparing the way for a little drink at a time, in this way a very small quantity of water will satisfy thirst just as well, as gulping down a large quantity into the over heated body. It only wants a little, strong will to do this and you will have the satisfaction of knowing that you have done right, and perhaps saved a long illness, and, may be, a doctor's Bill.

### SAFE DRINKS.

#### COLD TEA IS VERY GOOD, AND NOT DANGEROUS.

Oatmeal drink is nourishing, and good at any time. Two tablespoonfuls of oatmeal, a few slices of lemon cut up, half a cup of sugar. Put all into a jug, and pour over the whole about 2 quarts of boiling water. Stir up the contents, for a few minutes, and let it settle. It is well to make it over night and then pour off the clear top for use. You can dring of this freely without the least danger.

### TOAST AND WATER.

Take a good piece of bread, toast it all over, just as much as possible without burning, it must be stale bread, a good way of using up the first slice of the loaf, which I fear is often thrown out. Put the toasted bread into a jug and pour over it cold water; this is a very wholesome drink. In colour if well made it resembles weak tea.

## GREEN FRUIT.

At this season of the year, care should be taken to keep the children, from eating green fruit. It is so hard, the more so in this country where fruit is not easily found, and after the long winters passed, sometimes without or with very few vegetables. So the first green fruits that comes to hand proves so tempting, that a child takes it freely, never heeding the after payment. The first little green apples are very alluring to the unwary. It may not be known to everyone, that if they are stewed whole in a little water, with just a little sugar, they may be eaten with impunity. They are only good in this way as long as the pips are soft. I might say should the after punishment come, as it usually does, in the shape of worms, there is a sure cure in santonin powders. Send to the chemist for 3 and give one every night for 3 days, and in ordinary cases this will do. Signs of these pest with a child are scratching of the nose, pains, and irritability, in fact the poor little thing can't help feeling cross all the time till the trouble is over. If the first powders do not quite cure the complaint, give 3 more, after a week or so, and you will hear nothing more of this trouble, perhaps for months. There are children who are constantly suffering from these little pests, but take up the case on the first symptoms, and you may make a permanent cure.

## THE SITTING ROOM.

(*Continued.*)

We left off last month at making a cushion for each chair. The picture frames, if the walls are papered, will be all the brighter for a coat of white paint. If the walls are white, they should be painted a dark shade. They look very well stained or painted brown. A very cheap pair of curtains can be made from cheese cloth with a coloured frill down the middle on each edge of the curtain. If you cannot get a rod with rings to hang them on, you will find a deep hem, say five inches with a second running, one inch from the hemming, into which you run a strong string or tape will do. Drive in a good strong nail on each side of the window to which you tie it. An old sofa with a bright covering, a cushion for the same. A few bright strips of home-made carpet, and any other little ornament you may happen to have with a flower pot or hanging basket of flowers in the window and you will have a pretty room

# The Flock.

## SHEEP NOTES FROM OHIO.

EDS. COUNTRY GENTLEMAN.—Every day that I am with our sheep I learn something, or confirm or deny some previously formed idea of the nature of the sheep. I find them a very interesting study There is very much to be learned by experience after all the book knowledge has been mastered.

I make a few mistakes and failures One of my best ewes this winter gave birth to a beautiful Dorset lamb. It grew and thrived amazingly, and I resolved to keep it, as it was a ram, for use in our flock. It easily out stripped its comrades in growth. One night, through the accidental displacement of a partition, three ewes got into the part of the barn containing the fattening lambs, and gorged themselves with corn and bran, which I have always at hand for fattening lambs In the morning they were promptly put back in their old quarters, and noticeable ill-results ensued to the ewes, but one ewe's lamb died in two days, and my fine lamb began to scour, and run down, lingered for two weeks, then died. I had had similar experiences before, but had not seen the reason. I will now lay down the general rule that when anything affects evilly the digestive process of the ewe, the lamb will suffer in greater degree than its dam.

We have made the experiment of wintering ewes entirely on hay. We gave all the good early-cut clover we could get in to them, allowing also the run of the blue-grass pasture when not raining or snowy. We were careful not to turn the ewes out too early in the morning, but kept them in until they had eaten some hay. We find they needed some compulsion to make them eat enough hay when the field was full of grass.

Last year many of our ewes got too fat, although fed only bran and hay. Lambs were sometimes small and weak, or overgrown and dead. This year our success in lambing is complete—very satisfactory indeed. I do not say that at the relatively high price of hay and low price of corn, we took the cheapest way, but we did the easiest, and the way in which no mistaken kindness could cause mischief. Let me say here that your best "sheep man," to my notion, is "A Farmer's Daughter." I remember what she said about ewes needing exercise. She is right. Let me add that they need bulky food, and plenty of it, and do not need grain. (1)

I bought a carload of lambs in Chicago last fall, some of which, unfortunately, proved to be with lamb. I meant to market them in March, when their condition would not have mattered, but the deplorably bad market caused me to hold them until now. They have dropped quite a number of lambs, dead without exception; this is the experience with feeders everywhere, so far as I have learned; yet a fine young Shropshire dropped a strong lamb in the pasture a couple of weeks ago, and has given milk enough to cause it to thrive remarkably. It was a chance lamb I do not approve of the practice of breeding so young. (2)

I believe I am ready to lay down this general rule: Fattening lambs should be confined closely—never disturbed by inopportune visits or visitors; given all the good hay they can eat, and more; should have corn (3) and bran at all times accessible, and pure water in unlimited quantities. I took a bunch of lambs this evening down from the second floor of the shed. They rarely saw their feeder, as everything was given to them without going into their quarters. They suffered somewhat from impure air and heat; yet they were the fattest lambs I ever saw—they had nothing to do but to get fat.

This morning a shipper took a load of our lambs, and as we drove them to the cars we looked over the different sorts. There were full blood Shropshires, South-Downs, open wools from Chicago stock-yards and half-blood Dorsets from Montana French-Merino ewes. The finest lambs there, I think, were a Shropshire South-Down cross, next came the Shropshires, but the most profitable lambs by all odds were the Dorset Merinoes. They were admired by every one who saw them.

My Montana ewes are dropping me their second crop of lambs. I must say they are a fine strong sheep, very certain in results if not overfed. There has been much money lost in lamb-feeding this year as in other branches of feeding; yet every one says he will try it again next year. Let me predict that he who pays above 3c. per lb. for his feeders next fall will rue the day as he did this spring.

*Champaign County, April 26.*

J. E. WING.

(1) But they do need nitrogenous food: pease-straw, clover hay, &c.—ED

(2) We hope not!—ED.

(3) Pease and linseed cake.—ED.

## MONEY IN FEEDING SHEEP.

We are feeding 1700 lamb this winter. Nearly all of them were bought in the month of November; the last carload reached here Dec 14 They were bought in Buffalo, N. Y., by a commission man whom we have employed to buy stock for us in that market for the past 10 or 12 years.

The lambs most profitable for us to feed are thrifty medium weights. Those we bought this year averaged 66 lbs. in Buffalo. The best feeders, to our mind, are the grade Shropshire or Hampshire. Not being able to get all we want of these breeds, we buy medium wooled lambs of other crosses, being careful not to get the wrinkled Merino. These latter do not make first class mutton, neither are they profitable feeders.

We feed our lambs from three to five months before turning them off to the butchers. How to keep them in a healthy, thriving condition upon a heavy grain ration for that length of time has been a study with us for a good many years. Of course for so many lambs we are never able to provide rowen (1) enough to even give them all a taste for any length of time This year we did not cut a load, owing to the drouth. Our recourse has been to the silo, and you might as well place our success in feeding right there, for there is where it belongs. We have been feeding silage now for three or four years, and we think we have only just learned how to feed it to the best advantage.

Our method is to feed the grain ration mixed with the ensilage in certain proportions. If we have plenty of ensilage, we mix 3 lbs. of ensilage with 2 lbs. of grain, never more, and give them all they will eat of the mixture twice a day. At noon they are fed hay, as much as they will eat up clean if the hay is good. One of the best grain rations we have ever fed is the one we are using now—equal parts of pea meal, bran and corn. Our 1700 lambs are taking of that about 2700 lbs. daily, mixed with about the same weight of ensilage, for our crop of corn was short last year and we have to use economy in order that our supply shall hold out. We expect to get them up to 3000 lbs. of grain a day in the course of two or three weeks.

As soon as we bring our lambs into their winter quarters the men are set to work shearing off their wool, for our experience has taught us that they thrive better without a fleece to burden them and harbor the ticks which are sure to multiply and worry them later on. All our animals except the poultry are kept under one roof, and everything is so arranged that in the coldest of weather the shorn lambs do not suffer from the cold.

The lambs are divided up into flocks of from 100 to 500, and are kept in pens in which three is a tank of spring water always running. They have access to rock salt at all times. Some feeders claim that sheep to thrive should not be allowed to run in large flocks We can see no difference in the thrift of our different flocks. In fact, we think a goodly number together do the best, for they hustle about more after their feed.

*In regard to the proper gain a lamb* should make during the winter, we should say that for a large number 2 lbs. a week is a satisfactory increase. Of course individual lambs may do much better. We had one thoroughbred Dorset ram last winter that made a gain of a pound a day for a period of between one and two months.—Of course such a record is rare. (1)

Now to come to the profits. Of course the profits vary with the seasons. We expect this year will be quite a prosperous one with us, for we bought low and hope to get a fair price when we sell. Our lambs cost us 4c per lb. in Buffalo. To that is to be added cost of buying and transportation, about ½c per lb. All our lambs are sold to wholesale butchers in New Haven. They have established a trade for our lambs in this part of Connecticut, and they get better prices than Western stock brings for the reason that it is better, and come as near being as good as spring lamb as anything in the mutton line that is put on the market. Last year we were paid 6½c per lb. live weight, and we hope to get the same price this year. You can figure for yourself the profits are fair, but not immense. We get about 4 lbs. of wool to the lamb so you can figure that in. It however, comes off from the lamb and will have to be figured out at the same time.

The best part of the whole business is that the work all comes in winter. Unlike the dairy business, when spring and summer come the lambs are gone to market and our whole attention is turned to growing and harvesting our crops. The immense amount of manure judiciously applied has a tendency to increase the fertility of our farms year by year so that where ten years ago one blade of grass grew, now there are two.—[Charles E. Lyman, Middlesex Co., Ct.

*F. and Home.*

(1) Second crop of hay.

## IN-LAMB EWES.

Mr. J. S. Woodward, in the Rural New Yorker, gives some valuable advice in regard to handling ewes at this season of the year. (1) They should be kept in a dry, warm and roomy building. Ewes which will lamb in February or March should have, every day, some sort of green food once a day; a flock of fifty should receive on bushel of cut turnips, increased to two bushels in a short time, as they become used to them. Clover hay or well-saved pea straw are both excellent for forage; nothing could be better. Oats make splendid grain food if they are not too high, but bran as it is usually sold, answers better for pregnant ewes.

If it is intended to place the lambs on the early market the ewes should have all the clover hay and pea straw they will eat, with the daily feed of turnips, enough bran to keep them gaining a little up to the time of lambing; a few cracked peas may then be added to the bran, also a little oil cake meal to increase the milk flow. The amount of turnips may be considerably increased after lambing. As

(1) i. e. winter.

(1) *Very* rare!—ED.

soon as the lambs will eat, a liberal supply of oil cake should be given them; to this may profitably be added cracked peas and a sprinkling of wheat bran.

The ewes and lambs should have an abundant supply of good, fresh water and the pen kept clean and well bedded. A judicious use of new milk from a fresh cow will hurry the poorly-fed twins along quickly to market.

## Poultry-Yard.

"What shall be do with our broody hens?" is a puzzle for poultry-keepers. All kinds of cruelties are practised by ignorant people with the vain idea of getting rid of a hen's natural desire to sit. Whirling the bird round until she becomes giddy, keeping food from her, and even throwing cold water over her are practices as useless as they are cruel; a good hen will sit in spite of these. The best plan is to remove her to a place with which she is not acquainted, and where a nest is not easily made. The common way of dealing with broody hens is to cast them all together into a coop; the floor being hard, they cannot scoop out the semblance of a nest, and, even were this a possible achievement, the hens, being numerous, would drive one another from a stationary position. Throwing broody hens from their nests is an ill advised proceeding, as of course they are easily scared when wanted to sit. I cannot recommend, as some do, a free permission to the hens to sit as long as they like on nothing at certain seasons. I have never discovered the utility, but have seen often the bad effects of protracted sitting or incubation. It does not afford the rest and after-invigoration that some writers claim for it, though the natural period of three weeks undoubtedly, like a barrister's fee, acts as a "refresher." If so beneficial, why is not a protracted sitting necessary for Minorcas, which lay so many and such large eggs, and yet scarcely ever desire to sit? If poultry-keepers would only remember the nuisance and inconvenience of having no broody hens in the early part of the year, they would put up more readily with the annoyance of broody hens when sitting is not to be encouraged. To sell broody hens is not fair to the purchaser of poultry, who thus buys a fowl under most disadvantageous conditions. My advice is to keep the good sitters and to sell off the wild, uncertain hens at a time when neither nesting nor moulting will injure them for the table. Eggs are cheap now; consequently this is the time for pickling. The vendors of an egg at a shilling have had their day, as fancy poultry must be hatched early, and though the practical poultry keeper may still be hatching out for some weeks to come, even he is not wanting so many broods when June is over, and so he has an extra quantity of eggs to sell. Eightpence the dozen is an unsatisfactory price when we consider that the same eggs pickled, at no cost and little trouble, may be worth eighteenpence at Christmas.

Perhaps this may be the most suitable time for me to say a word about 'gapes,' as they have made an appearance. I have nothing new to advise, only the old remedies, which for over forty years I have found most successful. I shall not recommend any expensive apparatus; as I have stated before, a stable bucket, a cloth to cover it, and a pipe with tobacco will suffice, though I prefer a box in which is inserted a small pane of glass; then we have only to place a dozen affected chickens in this box, blow the tobacco fumes into them through a hole or short tube, and when a stirring of feet and a clicking of throat is heard, look through the glass, and, directly some are seen to be overcome and fall, to turn them all out. (1) They soon recover, but an extra stay may prove fatal to the whole batch. In the more expensive arrangement carbolic fumes are employed and various kinds of highly-finished boxes. If properly treated the chickens cannot stand long against tobacco, neither can the worms located in the windpipe, and so by a succession of "clicks" they are cast up. Gapes are anyhow a troublesome disease, and hinder the growth of young birds vastly. Dorkings suffer as much, if not more, than other kinks. As with the human subject all kinds of other disease follow upon a bad attack of influenza, so atrophy and other ailments often trouble and kill a chicken reduced by gapes. Onion chopped and mixed with meal I still believe in as a possible preventive, but change from an affected run is the more efficacious. One word about eggs, as I see this week an amusing allusion to them in a law court. It appears that at Covent Garden Market the practice is, in the case of fruit from abroad, to sell on the understanding that buyers should sort and destroy the unsound portion. The arguments drifted away to French eggs, and the difficulties of those who retail them—what shall they do with their eggs if not sold within a fortnight? This brought on a specification of some of the uses to which bad or doubtful eggs are applied; for the feeding of young pheasants, for confectionery, and for photography bad eggs are represented to be as good or better than sound eggs. The photographer may perchance play a winning card if he should photograph some unhappy victim who had just feasted on rotten egg, but why do not buyers in England buy good eggs laid in England, and not bad eggs manufactured between some foreign country and their own. W. J. P.

(1) We tried this 50 years ago and it is a perfect cure.—Ed.

### WHOLESALE DUCK RAISING.

Eds. Country Gentleman—In connection with a letter which appeared in your issue of April 5 (p 269), by F. E. Dawley, some account of the duck raising industry met with in the counties of Buckinghamshire and Bedfordshire will prove of interest. For a long period of time the Vale of Aylesbury and the district around has been noted as the special centre of this industry, but of late years it has moved somewhat, and is by no means confined to the Vale; in fact, probably the greater portion of the ducks produced in the spring of the year are raised outside that district. A few days ago I had the opportunity of visiting the chief centre, namely, Leighton Buzzard, around which there are a large number of farms devoted chiefly to this pursuit, although in every instance it is by no means the only occupation. One farmer we visited has about 168 acres in all, and though he marketed last year something like 10,000 ducklings his attention is given all around. Others are fruit dealers, in some cases pig breeders, while during the spring of the year they have little else to occupy their attention than the care of the ducks. The chief station from which the ducks are conveyed to market is Stanbrige, between Leighton Buzzard and Dunstable, and it is estimated that from 30,000 to 40,000 birds are forwarded every year from this one place.

It is not necessary that we should detail the places visited, but a few general observations will describe the method of culture. We may say, however, that the chief centres are Stanbridge, Eaton Bray and Great Billington, that the duck rearers are by no means confined to one class, both farmers and cottagers sharing the work. One cottager we called upon whose occupation does not exceed one-fourth of an acre kills 1,800 to 1,000 birds every year. Another breeder, who has rather better shed accommodation and more land, had 2,000 ducklings of various ages from one day old to six or seven weeks and kills something like 6,000 a year. At the time of our visit he had between 200 and 300 hens sitting, chiefly in wooden boxes. The third, who has only recently started the business, being a young man, is now killing about 2,000 a year, while the largest kills annually 8,000 to 10,000. This however, is the large farmer to whom reference has already been made. Almost without exception the smaller breeders keep no ducks, or at any rate very few, purchasing eggs from the farmers all around the district, who find this a profitable part of their live stock. Contracts are usually made between the "duckers" and farmers for a supply of eggs right through the winter, and the average price is from 3s. to 3s 6d. per doz, but during periods of scarcity 10s. 12s. per doz. is often paid, and we were informed by one breeder that he has paid as high as 15s. per doz. The eggs are set almost entirely under hens, and when the ducklings come out they are allowed to remain with the hen for about a week, kept in small coops. Then they are removed, placed in roomy sheds, which are usually divided into compartments. In one place a single shed had upwards of 2,000 ducklings in it, divided into flocks of about 25 each by L-shaped boards, so as to prevent overcrowding. As they grow these places are increased in size, and then they are put out into open runs with sheds attached, from 100 to 200 in a flock. On the largest farm visited there were two long low sheds divided by 18 inch boards into a dozen compartments, each of which held 100 birds. The ducks are allowed out when younger three times a day for feeding, at 7 A. M., 12.30 and 5 P. M., then put back and penned off in the manner stated. They are not given any water for swimming as a rule, but there are exceptions to this arrangement. Water for drinking is given in troughs, which are half filled with a special gravel brought from Long Marston in Buckinghamshire, and which seems to have some special qualities to recommend it. It is inexpensive, costing 1s. 6d. per load without cartage.

The food is of course varied a little in accordance with the individual ideas of the breeders, but as a rule the first consists of hard-boiled eggs chopped fine and mixed with bread crumbs, but some of the breeders use at this period in addition toast soaked in water. After three or four days of this feeding they are put upon rice, which is properly boiled, and for this purpose Burmah rice is preferred, and it has more feeding in it. Next they are given rice and toppings, which latter is a local name for fine sharps or middlings. During the latter stages of the process they are fed upon barley meal and fine graves or tallow scrap cake, though on one farm we saw that horse flesh and mutton were used for the same purpose. It is customary to give boiled nettles mixed with the food at various stages of their growth, this having been found most helpful in keeping the blood cool.

As might be expected in such wholesale conditions, deaths are by no means infrequent, and there is in this respect a good deal of difference in accordance with the seasons; but we were informed by one who feeds very largely that upon an average he was enabled to market 85 per cent. of the ducklings hatched, which seems to be an excellent proportion.

The birds grow very rapidly, and what are known as ducklings, that is birds killed before they have cast their first feathers, are ready for market in about from seven to eight weeks, when they weigh from 4 to 5 lb. There is, however, a number kept until 14 or 15 weeks, when it is no uncommon thing for them to scale nearly twice that weight. The season lasts from February to July, that is when game is out of season, and a visit to the district after June would show that it was almost entirely denuded of ducks, save those retained for breeding purposes. The prices obtained vary in accordance with the season, and the following are average prices for well-grown birds: January, 10s. per couple; February, 16s.; March, 14s; April, 22s.; May, 8s., and June, 7s. The kind of bird here without exception, is that known as the Aylesbury no other equalling it for rapid growth and flesh properties.

Carefully looking round the district, it is evident that an infusion of fresh blood is needed, the people here having that weakness which is found in so many places of neglecting this consideration. The one trouble which appears to affect ducks during the early stages of growth, is that known as soft bill, and when very bad sometimes the birds cannot break the shell. This is we think due to in-and-in-breeding, and can be obviated by attention to this point, and also by the use of more mature stock. That the industry is a profitable one can hardly be doubted when we see the people who carry it on. There is no special reason why it should be restricted to this one district; there are many other parts equally suitable if the same conditions are regarded. It is a most interesting sight to see great numbers of these pretty little balls of fluff with yellow down and light flesh colored bills.

Stephen Beale.

*H.—England.*

## The Farm.

### CROP ROTATION AND STEADY FARMING.

Much has been written on this subject, yet many cases have been within my observation in the past, and are before me at the present time, which go to prove that farmers many times disregard the fact (either from carelessness or ignorance) that to do otherwise than continue a regular rotation of crops and farm steadily is to impoverish their lands and bring calamity on their own heads. The cry "it don't pay," before giving an impartial and intelligent trial to some particular branch of farming, kills many a man as a successful farmer. Last season, and at present with the high price of hay, many will continue to mow the same fields five or six years, until the seeding is run out and the land exhausted. The result will be that the price of hay will go down—

too low for profitable hay-raising. Then we must raise something else, and that means grain, and it what condition will these lands be to raise grain? It does not need an expert to tell that unless they can be restored by heavy coats of manure, or something equally as good, the yield of grain will be very light, and the same result is true in continuous cropping with grain without seeding to clover or other grasses.

I have been over these "bare spots," to my sorrow, and know what it costs. Sever ears ago last season sheep were ld here at a great sacrifice by many farmers; they said it did not pay; so the sheep had to go, and every one was in for raising hay, which was then high. In two or three years good hay sold at from $4 to $6, and then the same men were sheep crazy, paying from $6 to $9 per head for common stock. Now another change has come; sheep are down and hay is up, and many are slaughtering their sheep and mowing their lands to death.

About seven years ago horses were high, and every man who had a horse wanted to sell him or trade him for a mare, so great was the craze for raising horses. And where is the horse market today? Many farmers will answers the question with a long face, nearly every farmer's yard is filled with horses and colts for which he has little use, and cannot sell at anything like the cost of growing. Two years ago I reduced my own stock of horses at public auction, but did not escape a "big cut" in price in comparison with prices one and two years before.

The same is true of the cattle market; it has its "ups and downs"—also of hogs in the past two winters—in fact, it is the same with everything a farmer raises. If he undertakes to follow the high markets it will lead him a merry chase. Many men and women to-day are striving with the winter-laying hen, which is commendable, but I predict that eggs will soon reach a price even in winter that will sicken them of the hen business. Wheat is "flat," and many have not even sown any for their own bread.

In fact, the only rational view seems to be that steady work in the one direction of all around and diversified farming is the only true way to success. Stop "plunging." Raise grain, hay and all the adapted crops in rotation; keep a few sheep and cattle; raise now and then a good colt. Remember that the "rolling stone gathers no moss," and never allow high prices to be an incentive to abrupt changes.

G. M. H. *Cayuga County, N. Y., Cultivator.*

## MAKING CLOVER HAY.

M. J. S. Woodward, in the *Rural New Yorker*, was questioned about his method of curing clover hay which he had recommended, and replied that what was meant was that it should stand in cock until sweating to such an extent that much of the juice of the stems had passed into the leaves. This, of course, depends much upon the weather. It will then, on being exposed to the air, very quickly dry out; and, if the weather is good, may be drawn from the cock without being opened. If, however, it be allowed to lie in the swath too long, the leaves become so much dried as to lose the power of absorption through the cellular tissues, and the sap will pass much more slowly from stems to leaves, and it will then have to lie in cocks a much longer time. When left too long a time in the swath, it loses many of its leaves, and those not broken off become blackened.

While clover hay will keep much better, and may be put in much greener, in close mows, I have put hay cured as above into lofts where the bottom was made of poles or rails and had it come out in splendid order. I have also put it into large stacks or ricks with swale grass or long hay for a covering and had it come out in good shape. It is not the juice of this plant that spoils the hay, but the outside or rain which is put into the mows that raises the mischief. (1) If Mr. J. will consult the tables of feeding values he will find that clover, even before blooming has the greatest feeding value, although yielding a less quantity per acre; that after blooming, its digestible albuminoids, carbohydrates and fat rapidly decrease, while the crude fiber as rapidly increases. At the same time, its nutritive ratio becomes wider. While it is more trouble to cure when just in bloom than when half the heads are brown, the greater value will amply repay all trouble. If I had 100 acres to cut with a single machine, *I would begin cutting at the earliest moment after full bloom* and, *then much of it would become far too woody before it could be reached.* (2)

## EARLY OR LATE—CUT HAY.

A Missouri inquirer writes to the *Breeders' Gazette* for information as to the relative value of early and late cut timothy hay. To this inquiry Prof. Henry makes an interesting answer, and as he furnishes a certain amount of data which it it well for a dairy farmer to remember, we append a portion of what the Professor says:

From 1878-81 Prof. Sanborn conducted experiments at the New Hampshire Agricultural College and showed that for feeding steers late cut timothy gave better returns than early-cut. This novel proposition was doubted by many, and to test it further I conducted experiments two winters with steers, feeding one lot timothy hay cut when in bloom, and the other lot hay from the same field cut fifteen days later. To my surprise in both the cases the steers fed the late cut hay gave the best returns for the food.

Prof. Sanborn also fed early and late-cut timothy hay to dairy cows, and secured the largest yield of milk from the early-cut hay, so the cows gave opposite results from the steers. Several investigators have studied the yield of hay and nutrients from early and late cutting, the most extensive work being that of Prof. Thomas F. Hunt, when at the Illinois Experiment Station. Space will permit giving but a summary of a portion of this most excellent investigation. The following table shows the yield per acre of timothy and clover hay cut at different times:

TIMOTHY.

| *Time of cutting.* | *Hay with normal moisture.* | *Water-free substance in hay.* |
|---|---|---|
| In full bloom..... | 4,480 lbs. | 3,287 lbs. |
| Pollen and half anthers dropped. | 4,320 lbs. | 3,423 lbs. |
| Seed in dough..... | 5,240 lbs. | 4,012 lbs. |
| Seed nearly ripe... | 5,180 lbs. | 4,064 lbs. |

MEDIUM RED CLOVER.

| | | |
|---|---|---|
| Full bloom..... | 3,600 lbs. | 2,526 lbs. |
| Three-fourths heads dead..... | 3,260 lbs. | 2,247 lbs. |

MAMMOTH CLOVER.

| | | |
|---|---|---|
| Beginning to bloom | 4,340 lbs. | 3,196 lbs. |
| Full bloom..... | 5,440 lbs. | 4,038 lbs. |
| Nearly out of bloom | 4,212 lbs. | 3,392 lbs. |

These experiments show that with timothy there is a gradual increase in the yield of hay per acre from delaying the cutting, the gain between full, bloom and seeds nearly ripe amounting to 700 pounds increase on 4,480 pounds of hay. There is also an increase in the amount of muscle-making and fat making elements. With red clover there is a decrease in the amount of the hay where the cutting is delayed as shown by the table. There is also a decrease in the protein and carbo-hydrates with medium red clover by delaying the cutting. With mammoth clover the largest yield is when in full bloom, but the yield when nearly out of bloom is not much less than when beginning to bloom. For timothy hay, then, we may say that by delaying the cutting a larger yield of hay is obtained and the experiments of Prof. Sanborn and myself show that a given weight of late-cut timothy hay produces more gain with steers than early-cut hay, while the Sanborn experiments for the dairy cows are in favor of early-cut hay. That for clover cutting when in full bloom gives a larger yield of food elements than delaying the cutting until the heads are two-thirds dead or later.

This is not all of the question, however. Where meadows are cut early the grass plants start into growth with much more vigor and give a much heavier aftermath than where the cutting is delayed until late, in which case plants seem almost and sometimes actually dead through exhaustion and exposure to the late sun which follows removing the crop The farmer must decide therefore whether he prefers to get the maximum nutriment from his meadow at a single cutting or from a single cutting made early and the heavier aftermath that follows. Late cut timothy hay seems preferable for horses, because it carries far less dust than when cut in bloom. I seriously doubt if such hay is as valuable for producing milk as when cut earlier.—*Hoard.* (1)

(1) Very true.—ED.

(2) Thank you, Mr. Woodward.—ED.

## SUPERPHOSPHATE AND LIME.

We have often explained that a real superphosphate is a soluble form of phosphoric acid. Take bone-black for example. It is really a charcoal made from bone and the phosphoric acid in it will not dissolve in water. Add sulphuric acid and the phosphoric acid *will* dissolve in water. What happens? The acid makes a new chemical combination. Before it was put in the phosphoric acid was combined with lime in the proportion of one to three—insoluble. The acid took away one part of the lime and left two to each part of phosphoric acid—a soluble combination. No observe why we speak of this. Lots of people talk of buying dissolved bone black, rock, etc., and adding lime to it! They get in the habit of adding lime or plaster to manures. Don't you see what they do? The simply give the superphosphate a chance to take back that atom of lime which the acid took from it, and change back its condition from soluble to reverted or insoluble. "Lime loves a superphosphate" and will always unite with it when the two are put together. One man thought he did a smart thing when he mixed wood ashes with dissolved bone black. There are 1,200 pounds of lime in a ton of ashes and this man simply threw away the money he had paid the manufacturer for treating the bone black with acid. *Never* use lime with a superphosphate.

*R. N. Yorker.*

(1) Timothy-hay is not good for milk production, either in cows or ewes.—ED.

**Nitrate of Potash** has been discovered in the republic of Colombia, according to a recent consular report. The cost of shipping from Colombia to New-York will be much less than from the fields in Chilli and Peru and the new deposits will naturally cause a decrease in price of nitrogen in the next few years, provided the newly-discoved deposits are good.

**Best fertilizer for the Money.**—Obtain from the leading firms the analysis of their brands. Multiply the per cent of nitrogen by 15½c; this will give the value of the nitrogen in 100 lbs. of fertilizer. Always use the lowest per cent given, for manufacturers are only compelled by law to come up to that amount. If nitrogen is given in ammonia, multiply that per cent of ammonia by 0.8235 and this result by 15½c. Multiply the per cent of phosphoric acid by 8c, insoluble phos. acid by 2c and the per cent of potash by 5½c. If the per cent of potash is given in sulphate of potash, multiply the per cent by 0 54 and that by 5½c; if given as muriate of potash, multiply by 0.63 and the result by 4½c. All of these added together will give the value of 100 lbs. of fertilizer. That multiplied by 20 will give the value of a ton of fertilizer in cents. The selling price to the consumer after manufacturers' and agents' profits are deducted is from $8 to 12 per ton above the cost to make. By applying these rules, we can select a brand where we are getting the most for our money. I know of brands that cost the maker $25.60 and can be had for $30, while other brands costing the manufacturer $22.-50 sell for $35.—[G. E. Nichols, Chenango Co., N. Y.—*R. N. Yorker*

**Value of Basic Cinder.** — Kindly inform me, through your paper, if you consider basic slag, containing from 30 to 40 per cent, of phosphate, of equal value, as a source of phosphates for grass, roots, and grain crops to mineral superphosphate of 26 per cent. of sol. phosphate (equal weights being used of each)? Am I correct in supposing that the phosphates in basic slag are all insoluble, but become double when brought in contact with the soil? P. [We do not say that it would produce equal effects if equal weights of the two fertilisers were used, but we think if equal money values were used, the effects of the basic cinder would be greater than the mineral superphosphate. The phosphate in basic cinder is not all insoluble, but is in an unstable condition, and is readily rendered soluble in the ground through the action of the soil and the atmosphere.]

**Basic Slag.** — Tenant-farmer.—Will your chemist kindly inform me if basic slag or mineral superphosphate is the better manure for swedes at present prices? and, if slag, is it too late to apply it, as I am told autumn is the proper time for dressing grass land and clovers with? [See answer to "P." You would find it necessary to use more basic cinder, say double the weight, and you would find it then a capital manure for swedes. To avoid risk, we advise the use of 2 cwt. of superphosphate to drill with the seed, and 4 cwt. of basic cinder ploughed in just before drilling. It is high time to apply mineral manures to grass land, but the present month, April, is not too late.]—*Ag. Gazette.*

## F. JEHIN PRUME

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Letters of congratulations from musicians are continually being received at L. E. N. Pratte's Piano Factory, and the following from such an authority is specially valuable:

Montreal, March 19th, 1891,

Mr. L. E. N. PRATTE,

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DEAR MR. PRATTE,

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With best wishes,

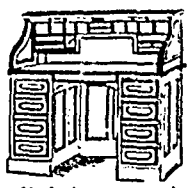
F. JEHIN PRUME.

## NOTES AND NOTICES.

—We would draw attention to the advertisement of W. Gordon & Co., Scale manufacturers. This firm are successors to Alexander Gordon who established the business at the same address then called 73 College St., in 1852.

The goods sent out by this firm have always maintained a high reputation for occurency and durability. The writer was shown a scale which had been in use 25 years and was still fairly accurate, needing only slight adjustment and repairs to be nearly as good as new.

—The Locked-Wire Fence Co, of Ingersoll, Ont., whose advertisement appears on our front page, are meeting with great success in this province, Mr. W. H. Smith, the general agent is located at London House, Montreal, and has done quite a large business during the last few months, he has already sold several county rights, and made some large contracts for fence. The locked-wire fence is much admired, and wherever a piece is erected it ensures the business of that neighborhood for the Locked-wire Fence Co. Mr W. H. Smith has just put up a lot of fencing for Messrs. Sheppard Bros, Brick manufacturers, Montreal, and Mr. Robert Reford, St Anne's de Bellevue.



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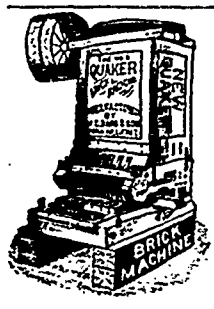


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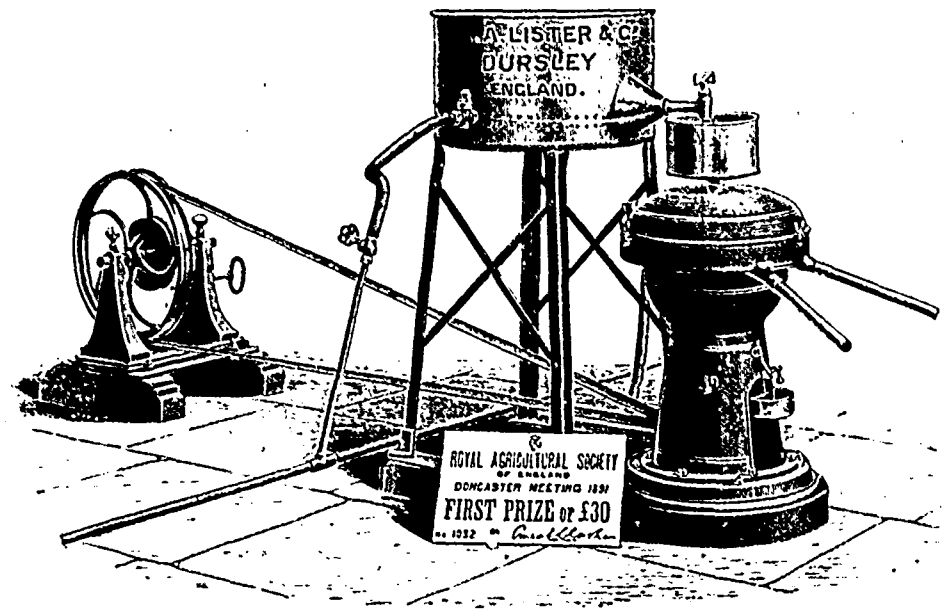


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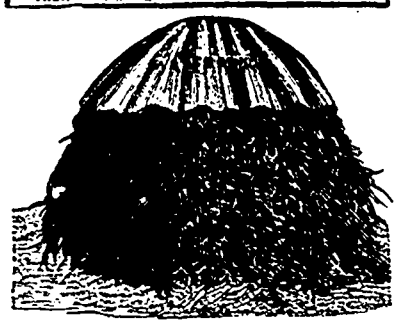

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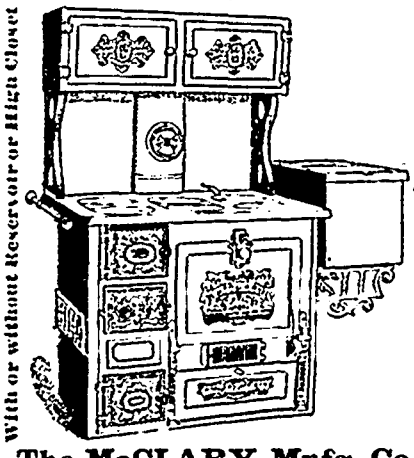

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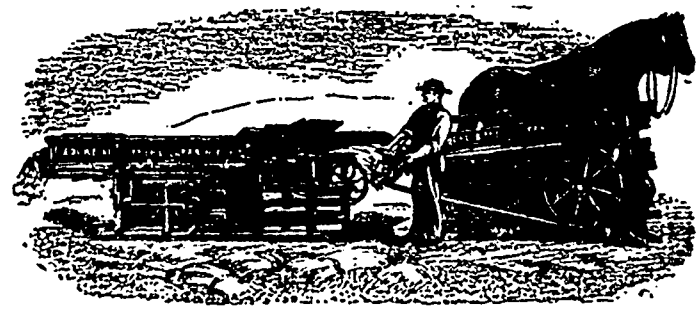

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