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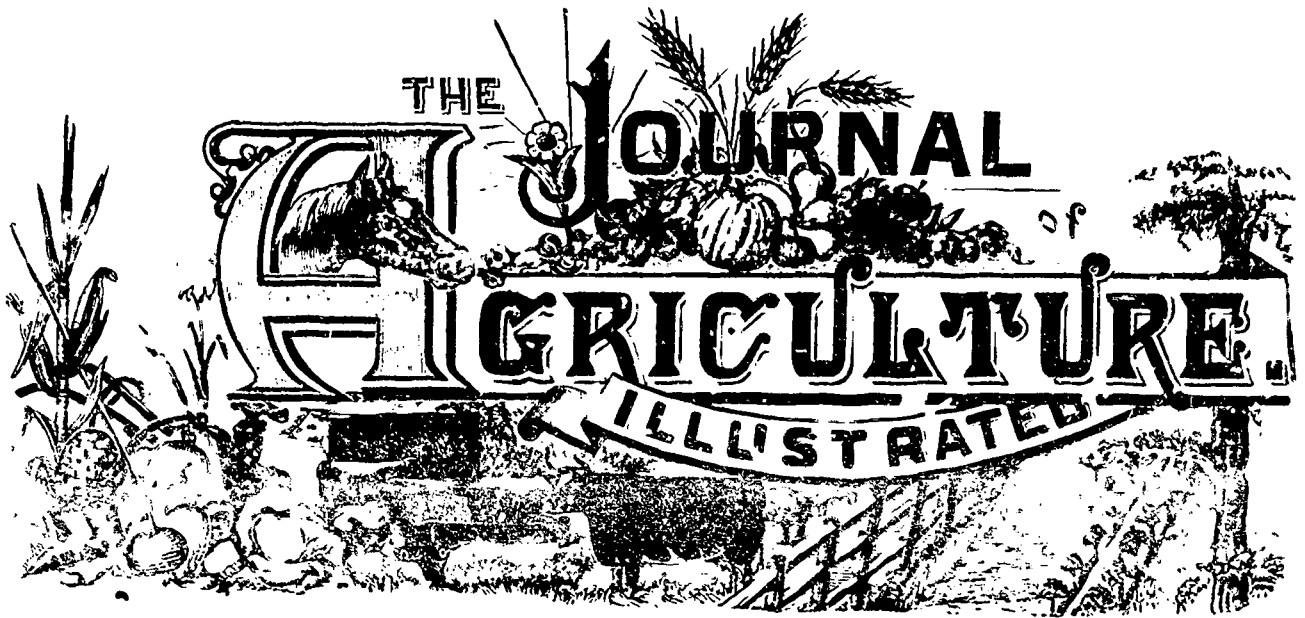
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Quebec Dairy-men's Convention.

The Quebec Dairy-men's Association will hold their annual Convention at Saint-Hyacinthe on Wednesday the 13th and Thursday the 14th instant. These meetings for several years past, have been most interesting to all dairy-men, to cheese and butter makers, as well as to the patrons of butter and cheese factories.

The fee of one dollar covers membership, a right to one copy of the annual report, and also to a certificate enabling said member to obtain a reduction on railway fares of 33 1/3 per cent, in order to attend the St. Hyacinthe Convention. For all details, write to J. de L. Taché, Secretary Quebec Dairy-men's Association, St. Hyacinthe.

We have every reason to hope that the attendance this year will be as large as ever and we know that the programme of operations at the Convention promises to be unusually good.

CARROTS.

Sorel, December 2nd 1885.

A large extent of land, combined with want of capital, is the main source of many of the grievous errors in cultivation which even a careless observer may see as he traverses the province of Quebec. Among these errors, no one is more injurious to the farmer than the practice so common here, of allowing more distance than necessary between the plants of our vegetable- or root-crops. This practice may be traced to the time when the stumps and stones of newly cleared land prevented the cultivator from drawing out the rows intended for potatoes, maize &c., with anything like accuracy: drilling up the land with the double-mouldboard plough was impossible, even if the process had been known, which it wasn't,

and the use of "hills," made with the hoe was a necessity. Hilling is still largely employed, even in the Eastern Townships, where it is not uncommon to see potatoes, as well as corn, planted in that fashion and this has had the unhappy consequence of causing those farmers who have learned to use the drill system to plant their crops at unreasonable distances apart. I have often seen, even in such an advanced district as Compton, potatoes set twenty inches from plant to plant, with three feet intervals between the rows! Corn, I see every season sown in patches of three seeds at intervals of three feet each way, and this with our small Canadian corn!

Well, what has this to do with carrots? I can hear some of my readers ask. It has this to do with them: no crop grown demands more thoughtfulness as to the distance between the plants than carrots. There are three distinct sorts of carrots, and each sort requires a separate mode of treatment to ensure the greatest possible yield.

Daucus carota, the name of the plant given by Linnæus, the great Swedish naturalist, was, as far as we know, very little cultivated by the ancients. Its field culture was hardly in England in my younger days, in fact, I believe that to the Journal of the Royal Agricultural Society is due the first development of the Belgian carrot as an English cattle-crop.

There are three principal sorts of carrots: the half-long, the long red, and the long white, and these, again may be divided according to their form: the early horn, the stump-rooted, the Orthes, and the Belgian.

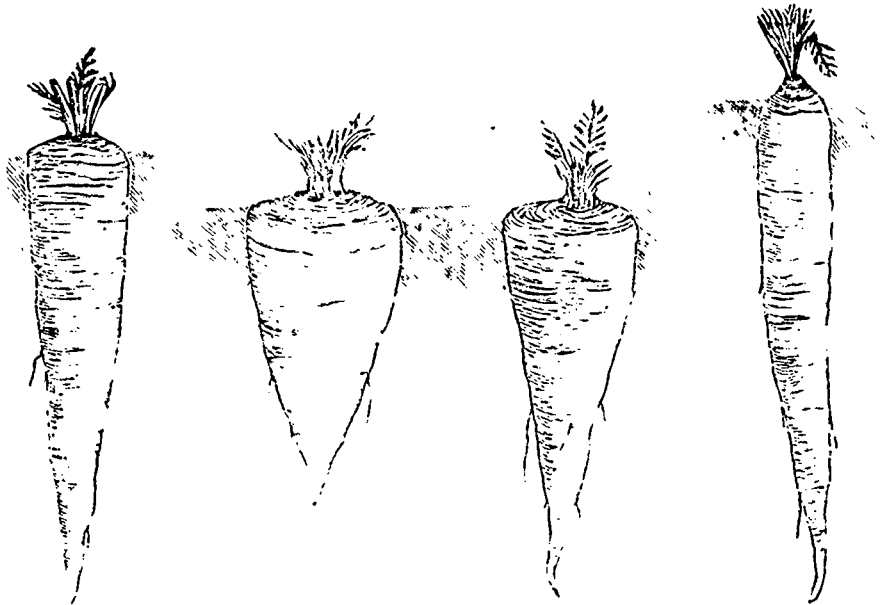
The Early-horn carrot.—This is a very valuable vegetable for early consumption in families where soups are *de rigueur* all the year round. It is small and short, rapid in growth, and takes up but little room in the garden: it would be absurd to sow it in the field. After soaking the seed as will be hereinafter described, sow *thinly* in rows—on the flat—twelve inches apart, and not more than half an inch deep. I say sow *thinly*, because this carrot alone should be drawn from the rows for use, instead of being thinned out for a crop. The land should be in good heart for the early-horn carrot, but dung should not be given for this, or indeed, for any of the table-carrots, as it makes them grow *forky*, and forked carrots are invariably stringy.

The early-horn sown in April will, on good light land, often be ready to pull by the end of June. The seed cannot be got in too early, as all carrots take a long time to germinate. After early potatoes, or after any other crop that is cleared by the 1st August, this carrot may be sown with prospects of a fair yield; indeed, I have grown two crops of early-horns in the same year, in succession, but the land was good, the season propitious, and the hoe was kept at work during the whole period of growth. That excellent pea, Bliss' American Wonder, does well in fifteen inch intervals, and when the last hoeing is to be given, a few early-horn seeds sprinkled thinly between the rows will produce carrots fit for the table after the pease are pulled; besides, they will help to smother any possible weeds. I do not care much for soups myself, but this root is absolutely necessary for their proper confection, and the above is a cheap and handy way of growing it. There is a very quick-growing, tiny carrot, smaller even than the early horn, for forcing in hot beds; but

on so fast that sufficient hands could not be got together to do the work in time; and, lastly, the yellows do with less manure than swedes. There is a small yellow turnip grown here—called the *Altringham*—for market purposes: the poorest cropper I ever saw, but the people like it, and so, I suppose it will survive.

Of these half long carrots, I think I prefer the Nantes, but there is not much choice: they are all good if grown on suitable soil. One thing I know: carrots grown in the much abused Sorel sand are as far superior to the carrots one buys in the Montreal market, as Kentish Golding hops are to the Sussex Grape hops, and I can't use a stronger comparison! It is just the same with cabbages; Sorel cabbages are the tenderest and most succulent of any I ever tasted, even in England! A good gardener, with a Montreal connection, would soon make a fortune here; lots of dung at ten cents a load, and land as cheap as dirt!

Long red carrots.—Of these the Surrey and the Altring-



Scarlet Altringham
Carrot.

Large White Short-
vosges Carrot.

Planders Large Pale
Red Carrot.

Long Red Surrey
Carrot.

as I never saw it except in France, I need not expatiate on it here.

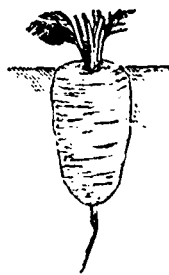
Half long carrots.—All these sorts, the Nantes, the Stump-rooted, the Danvers, &c., are for garden purposes, and may be sown on the flat in rows fifteen inches apart in rich land, without manure, and singled out, by hand-pulling, two or three inches apart. On *very* shallow soils, near the rock, the stump-rooted carrots might be grown for cattle—for milch-cows particularly.—and would yield as well—with a much superior quality of crop—as the swede or yellow-turnips. By the bye, I cannot conceive why people grow the Yellow Aberdeen for cattle. It is the worst cropper of all the turnips: the swede, with the same cultivation and manure, yields 25% more weight of roots, and its flesh is infinitely preferable. I know the yellow is constantly grown in Scotland, and a very good reason why: swedes have to be sown early in that country; there is a great extent of land to sow with roots of some sort, and, consequently, when the season for swedes is over, the yellows—Aberdeen, Lawton hybrid, &c.—are sown, and afterward, the whites. Besides, if all swedes were sown, the hoeing, singling, &c., would come

ham—the latter is an orange-coloured carrot, if my memory serves me—are as good as any. They answer equally well for table and for cattle, but they demand, peremptorily, good deep soil and deep cultivation. I prefer the half-longs infinitely, as easier to grow, superior in flavour, and not one-tenth of the trouble to harvest. The long red carrot must be dug up with a fork, and that mode of extraction in this country, where people are not fond of digging in any fashion, is excessively expensive. The long-reds can be sown at 18 inches apart, and singled to four inches, but I do not recommend their cultivation. I have seen hardly any of them on the markets for many a year, the half-longs having almost entirely usurped their place. Near Kingston, and in other backward districts, I believe they are still grown.

Field carrots.—And now we come to the farmers' crop. the field or cattle carrot. Of this root, there are, as far as I know, only two sorts: the Orthes and the Belgian; the former a light orange-colour, growing almost entirely in the ground, and the latter white with a greenish-white top, growing from four to six inches out of the ground, and to an almost unlimited depth in the ground. This is the carrot for

our use, and a most valuable root it is; easy to grow, prolific in yield, good in quality, and as little difficult to pull as a swede. Not choice as to their soil, I have seen twenty five tons an acre of white Belgians on an acre of heavy clay; but on light sands it will exceed the swede in yield, and is, though slightly more expensive to cultivate, far more than equal to

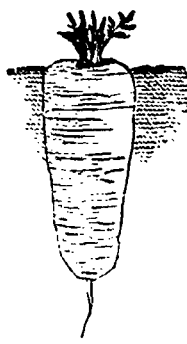
pay for it. Or, which is better, let one plough go before the other, and let the latter work without the mouldboard; the share should be at least nine inches wide with a very slight dip. This will thoroughly disturb the soil to the depth of a foot or even fourteen inches. On heavy land treated in this fashion, I should be inclined to plough down the manure in



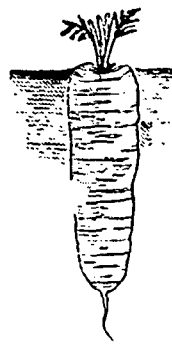
Early Short Scarlet Horn Carrot.



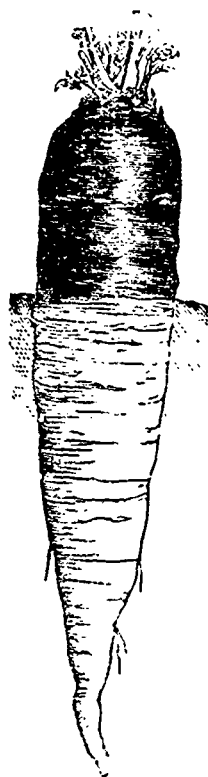
Early Half-long, Scarlet Pointed Rooted Carrot.



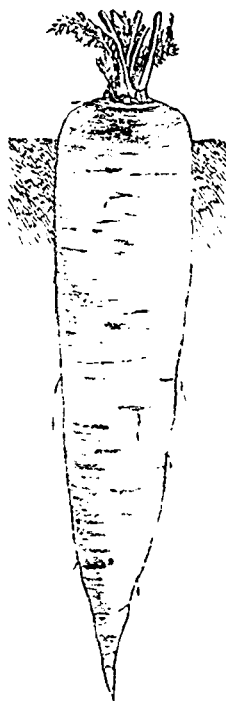
Half Long Scarlet Nantes Carrot.



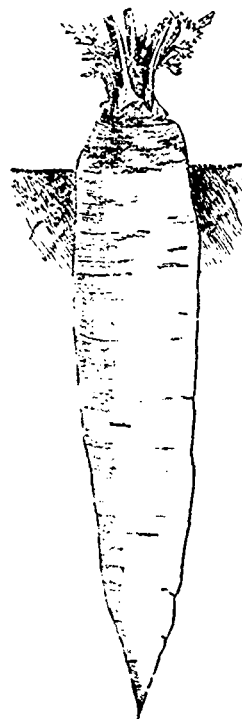
Early Half Long Scarlet Stump Rooted Carrot.



White Belgian Carrot.



White Green Top Orthe Carrot.



Long Orange Carrot.

that root in quality. It is the food for milch-cows, as it adds colour and richness to the milk, and positively never gives any unpleasant taste to the butter. Is not this what all dairymen want?

I have said so much lately about the preparation of the land for root-crops, that it is needless to go over the ground again. Only, if you can make up your minds to hang a couple more horses than usual on to the plough and break up the soil as deep as the four can manage it, the carrot-crop will

autumn at the double-furrow time, as I think the breaking up with the plough-share would mix the dung with the sub-soil to the great benefit of the crop of carrots as well as to the certain improvement of the subsequent grain-crop.

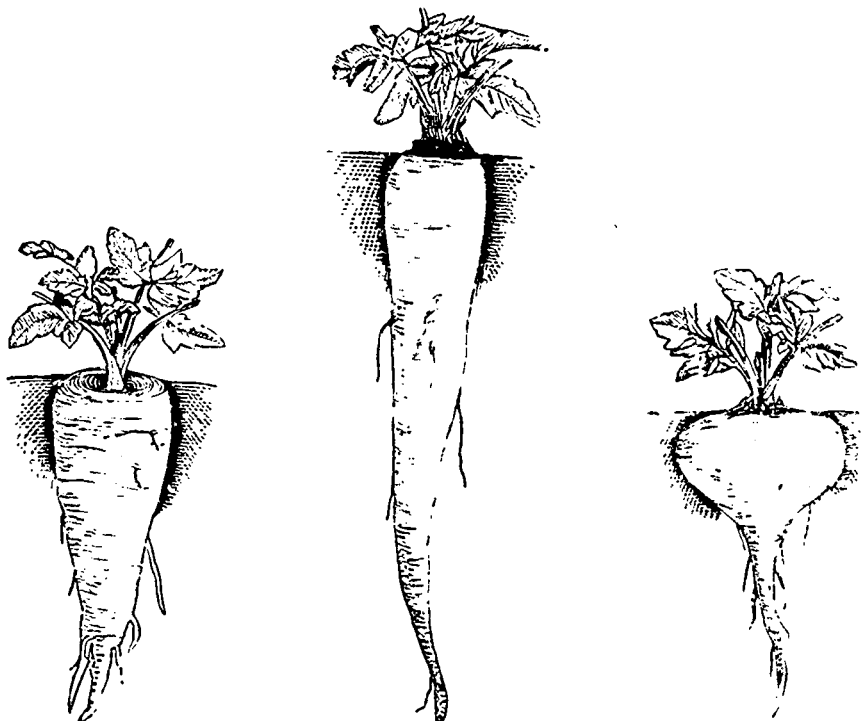
Preparation of the seed.—The carrot-seed I used last year—1884—disappointed me greatly: half of it was Orthes and the other half Belgian, and the yield was at least four tons (160 bushels) less than it would have been had the seed been pure Belgian, to say nothing of the extra trouble in

drawing the Orthes. Always test your carrot seed before sowing, thus: take twenty-five seeds and soak them in lukewarm water for twenty hours or so; place them on earth in a tin or earthenware vessel, cover them very lightly with finely pulverised mould, and keep the earth moist by laying a piece of flannel on it, which should be watered three times a day. If from twenty to twenty-two grains come up, the seed may be called good, and four pounds an acre will be sufficient to sow. And this experiment will be a guide to you as to the inferior qualities, as thus: if only sixteen seeds germinate, then, according to the rule of proportion, 16 : 20 : 4 : 5—that is, five pounds an acre will be necessary, and so on. The trial should be made at least a fortnight before seedtime to give yourself a chance of procuring other seed in case the first lot should not turn out well.

The seed being all right, the next process is the steeping

made much more easy by the rapid germination of the rape-seed.

Sowing field carrot-seed.—And, first of all, how shall we sow it, in drills or on the flat? Well, I sow always in drills, except when the land has been very deeply ploughed and the dung interred before winter. White Belgians, the only field carrot I sow, are not, like the red sorts, impatient of dung; that is to say, they do not throw out branches or forks in search of dung. Therefore, I prepare my dung carefully by turning once, or even twice if it is very long, and spread it in drills twenty-four or twenty-six inches wide; the drills I raise as high as possible to give the more earth for the long roots to grow in; I roll them down both before and after sowing; the seed is deposited by hand in a shallow drill, made by the point of a stick, exactly in the centre of the drill, and is covered by a careful use of the iron garden-rake. By



Hollow Crown Parsnip.

Long Smooth Parsnip

Short or Round Parsnip.

of it, and you may proceed thus: place the quantity chosen in a linen bag and keep it under water for forty-eight hours. The steep-tub should stand in a moderately warm place. At the expiration of the time, wring out the bag pretty dry, and hang it up in a moderately cool place—if it is kept too warm the germs will sprout too lengthily and be weak and easily broken off. The seed should be turned and well mixed twice a day to start all the germs into life at, as nearly as possible, the same time. When germination has taken place—you can tell this by a tiny white speck appearing at the side of each seed—sowing may be preceded with; but before sowing, I prefer mixing a quantity of charcoal powder with the seed, to dry it up, and about a quarter of a pound of rape seed to the quantity of carrot-seed necessary for an acre. As carrot and mangel seed can hardly be sown too early in this country, they will, however carefully steeped, seldom come up in less than a fortnight after sowing; and as the weeds get at least an equal chance with them, the hoe should go to work as soon as possible between the drills, a proceeding which will be

this form of treatment, in a few days the rape seed will begin to show itself along the rows, and 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 seed bed. The early use of the hoe—horse or hand—will save dollars an acre, for the only really expensive part of carrot-growing is the singling, and if the weeds are kept down, and the proper system pursued, even the singling can be done for two dollars an acre.

The carrots having shown themselves along the rows and having arrived at a decent height, the singling may be proceeded with at once, if you please, though I confess my preference for what we call, in England, *edge-hoeing*, which is practised thus: two or three days after the first horse-hoeing, a woman or boy with a four-inch hoe goes up each drill, and with a *chopping* stroke works over each side of the drill at a fair depth. A *chopping* stroke, because a *drawing* stroke covers up the weeds and encourages their growth. Again, the stroke I recommend cuts deeper than the other stroke, and

the object in view is to make the earth all round the young plants perfectly loose and free. There is plenty of nonsense written in the U. S. agricultural papers about cultivation rendering manuring unnecessary; it is not so; but half-manuring and good cultivation, are better than heavy manuring and careless cultivation. An active hand can edge-hoe an acre in a day.

Singling carrots.—This may be made a very cheap or a very dear job. If the fingers are the only tool used, it will cost a good deal to single an acre of carrots, but I can show you a cheaper plan than that, and one I have practised both here and in England with advantage. But, first, let us see what distance ought to be preserved between the plants to have the greatest possible weight per acre. We must not compare widths with swedes or mangels, for they do not send their main root down so deeply as does the carrot. I should like three Belgians to the foot, if I could be sure of getting them set out at that distance, but, I fear, unless I did the work myself, I should be disappointed. Let us say three plants to fifteen inches.

To single carrots at five inches apart, a special tool will be wanted, and the one I use is made from an old scythe-blade. It is two and a half inches wide at the cutting part, and being very sharp, a woman chops out the gaps with the greatest ease, employing, alternately, a pushing and a drawing stroke. The hoer is followed by boy or girl who pulls out all carrots but the strongest one from the brunch left by her predecessor, and the job is completed, except that a careful looking over by a trustworthy workman may be necessary to correct any negligence on the part of the singlers. The horse-hoe will of course be kept going as long and as often as the master thinks fit. He must remember that, though he may find no apparent increase in the carrot-crop, all fallow-crops have a specific regard to the succeeding crops of grain and grass, and though they clear the land thoroughly of weeds, that is only a very small part of the benefits derived from good and frequent horse-hoeing. I am told, and I almost believe it, that on the Fosbrooke farm, where I grew Belgian carrots and swedes last year, the yield of barley from three-quarters of an acre after those roots was thirty-eight bushels, or nearly forty-eight bushels to the acre! An unheard of crop here, but the previous cultivation had been thorough.

Harvesting carrots.—Belgian carrots leave the ground with ease; a boy of twelve can pull them. They should be thrown into heaps—five rows are a handy width to clear at once—the tops cut off with a sharp knife or a piece of a scythe-blade set in a handle, and after exposure to the air *by day* for three or four days, they can be carted away to the root-house or cellar. Be careful in taking off the tops not to cut into the root itself; it will bleed, and besides losing its quality will very probably mildew and affect its neighbours with that disease. Cover the heaps up at night with the tops; there are always plenty of them and to spare. What to do with the tops of all root-crops is a puzzle. They must accumulate as the root-harvest begins with carrots and mangels about the 15th of October, and ends with swedes about the 25th. It would not cost a fortune to ensile them in a pit-silo, when they would keep till spring. They are not worth much, though they increase the flow of milk, but a very little extra dose causes looseness of the bowels, and young stock, particularly, fall away rapidly under it. At all events, don't leave the heaps of tops in the field, but spread them as carefully as if they were heaps of dung and plough them in.

As to the use to be made of carrots when you have grown them, you cannot do wrong in giving them to all your stock. They are the best roots for milch-cow; growing pigs do well on

them; ewes after lambing nurse their offspring all the better for a liberal allowance of this root, and horses in full work do as well on straw, oats, and carrots, as on hay and oats. In fact, on light soils, the Belgian carrot should be the main root-crop of the farmer. I like swedes and mangels but I love carrots.

Parsnips.—I said just now, that the white Belgian carrot is the best root for milch-cows, because I do not suppose any farmer is likely to grow more parsnips than he requires for his table. The parsnip—*pastinaca sativa*—is a valuable root for stock, in fact, slightly more valuable than the carrot, but the seed is so expensive, it is so loath to come up, the singling is so costly, and the digging so troublesome, that I cannot recommend it. However a few words on the way this plant should be grown will not be amiss.

The seed is very light, and in England we used to sow ten pounds to an acre! I see parsnip seed marked in Evans' seed-list at sixty cents a pound, equal to six dollars for an acre's seeding. Steep the seed and treat it in all ways as advised for carrot-seed. The soil the parsnip prefers is a strong loam; I never could do anything with them on light, sandy soils. The finest crop I ever saw was one of fourteen acres on the bottom land at the foot of the chalk-hills near Brighton. The land—of first rate quality and full of manure—was trenched out of old meadow two feet deep, the turf thrown to the bottom of the trench, and the crop was thirty-five tons an acre, which sold for fifteen dollars a ton in the Brighton market—\$525 an acre! The trenching cost thirty dollars an acre, and the market was only half a mile from the field.

Parsnip seed sown in the May, 1884, lay six weeks in the ground before it came up. It is, I think, questionable whether the frost-resisting power of this root is of much advantage to the Canadian farmer. It is true they don't require storing, but we want them for use in winter; and though they can remain in the ground till April, the earth is so wet at that time of year that even if it is thawed, it does more harm than good to go poking it about in search of the roots. No, I think we will leave parsnips alone.

A. R. JENNER FOST.

DE OMNIBUS REBUS.

Superphosphate.—If I use superphosphate this next season, I shall try the following preparation for swedes: roughly crushed bones two hundred pounds; brown sulphuric acid one hundred pounds; sulphate of ammonia one hundred pounds; and enough wood-ash to dry up the mass thoroughly. As nitrate of soda is the best form of nitrogen for grain-crops, so sulphate of ammonia is best suited to roots, but as when combined with ashes, or with potash in any form, the sulphate of ammonia is apt to lose its strength, so the spreading of this fertiliser should follow immediately after mixing.

Plaster.—It seems, from my last despatches from England, that Mr. Warrington, the well known chemist, has found that a fair dressing of sulphate of lime has the effect of hastening the liberation of the constituents of farmyard manure in a marvellous fashion. Such being the case, I strongly recommend every one of my readers, who wishes to reap the full benefit of manure, in the same season in which it is applied, to spread about two hundred pounds of plaster over the dung when deposited in the drills to be planted with potatoes, or sown with mangels, swedes or other roots. In point of fact, no land that I am acquainted with in this province would re-

fuse to respond to a dressing of plaster once in two years. Caustic lime is so dear that it cannot be used for its mechanical effects; but plaster is so cheap, and, at the same time so effective in supplying lime as a plant-food, that I am surprised to see how much it is neglected. On our lighter soils, cropped has they have been year after year with grain, the lime must be almost entirely exhausted, and plaster is the easiest and cheapest form in which lime can be restored.

Black or bog-earth.—As I have mentioned before, caustic lime in some form is absolutely necessary to the reduction of peat or bog-earth to a good vegetable mould, but we can't use it at forty cents a bushel. The gas works at Sorel give away their gas-lime, and at Quebec, I believe, it only fetches forty cents a load! Sixty bushels an acre constitute a fair dressing, or for a very deep peat, perhaps eighty bushels would not be too much. It may be turned up with twice its bulk of earth, for meadow land, and kept for six months or so before carting out, for of course it will, if applied in its fresh state, burn up all the grass.

Dairy-Shorthorns.—An American, who ought to know better, writes as follows "The modern Shorthorn as a dairy-cow is another boom which will tax our credulity." Now, as I have often said, the English dairy-shorthorn is utterly unknown in this country, none have been imported, and they don't run about loose. At all event, there has been no attempt to boom this breed, only they have won the first milking-prize again this year, and, except when local breeds interfere, they are the universal dairy cattle of England. You may buy scores of them from Gloucester to Darlington for from £18 to £26 a head, and as there is not the slightest attempt at pedigree-making, I don't see how they are to be boomed.

Rotations.—Really, if all accounts be true, the general farmer is very much behind the times. Maize, oats, wheat, grass, I see, is the course of cropping practised by people some parts! No wonder the average grain-crop is so low!

Infield and Outfield.—Farming in ancient days in Scotland must have been not unlike, in some points, the farming in some parts of the province of Quebec to-day. The land under culture was distinguished as "outfield" and "infield." The infield land, or field adjacent to the homestead, was cropped constantly without intermission with grain-crops, and its fertility maintained by applying to it all the dung produced upon the farm and all the compost that could be collected. Whereas the "outfield" land, or the land at a distance from the homestead, was only ploughed and cropped occasionally. All the carriages of the farm were at this epoch still performed by small horses with creels or paniers; wheeled carts and roads for their use were still almost unknown. The rude but effective plough, drawn by a team of ten oxen, was kept ploughing in the moorland, gathering up the surface soil in high, narrow ridges, and so creating a certain depth of vegetable mould on a naturally shallow and barren surface by paring and leaving bare the spaces between the ridges. But no manner of dressing of any sort was applied to the outfield land and the cropping was continued until its capacity to grow grain was exhausted. We don't plough with ten oxen,

but, I regret to say that cropping the *outfield land till its capacity to grow anything at all is exhausted*, is an every day occurrence.

Dairy cows prize—The prize of £50 offered by the President of the English Dairymen's Association for the best herd of dairy-cows, any breed or cross, numbering not less than twenty animals, the property of a tenant-farmer renting not less than seventy-five acres, has been awarded to Mr. E. G. Mothersall, Lightfoot House, Preston, Lancashire. The cows in question are all *dairy-shorthorns*.

OUR ENGRAVINGS.

Parsnips and carrots.—v. article p. 1.
 Trotting Stallion, Abe Downing.—v. article p. 4.
 Lucretia Dewberry.—A new and valuable fruit for preserves.
 Corbett's pulveriser.—A remarkable addition to the means we already possess for cleaning grassy land.
 Mahomet, Holstein bull.

Pears—At the Chiswick autumn exhibition of the Royal Horticultural Society of England, two Belle Angevine pears were exhibited by M. Leroy which weighed two pounds three ounces each! They must have been baking pears, I am sure. I thought the Guernsey Chaumontels I saw in the island in 1856 large enough—one pound four ounces—but a pear a pound heavier than those I never thought to see.

Work on the land is very backward this year. Very-little land has been ploughed, and if the snow hangs about next spring, and is followed by rain, we shall have a late seedtime.

Herefords, Polled-Angus, Shorthorns, and Jerseys, have all fallen terribly in price in England this autumn. Short-horns seem to have averaged at some of the sales only £23 a head; good Jersey pedigreed two-year-old heifers only brought £6 to £8 a piece; and Angus £22 to £23. What a jolly price for us to stock at! Sheep, too, are equally low, good Hampshires and Shropshire full-mouthed ewes bringing only sixty shillings a head; they were worth eighty to ninety shillings a twelvemonths ago. The hot sun of July and August seems to have played the very mischief with the root crops at home, there is no aftergrass, and the pastures are bare of keep. I fancy exporters of Canadian cattle will find their trade but a poor one this year, to the great benefit of the consumer, who latterly has had to put up with the "culls" of the herds; and to pay, at Montreal at least, fifteen cents a pound for the roasting pieces of these inferior beasts.

Autumn cultivation.—Rather a fuss in going on in the columns of the English Agricultural papers as to the advisability of cleaning the stubbles in autumn. Even there, with our open winters, all the best farmers practised it, and here, with our long hard winters, we need fear no loss by nitrification and washing. Any one here who autumn cleans an acre one year will clean five acres the year following.

Cowmental food.—Some of my friends are paying at the rate of one hundred dollars a ton for a mixture of $\frac{1}{5}$ ground grain—cheap enough now—and $\frac{3}{20}$ drugs. Now, here is a recipe which they can, if they please, make up for themselves, and which I engage shall do more good to cattle and sheep than any condiment they can buy in the market :

	lbs.
Pease.....	1500
Linseed.....	200
Coarsest sugar (or molasses).....	150
Sulphur.....	35
Saltpetre.....	35
Common salt.....	35
Fenugreek.....	20
Gentian.....	10
Sulphate of iron.....	5
Aniseed.....	4
Ginger, ground.....	3

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Or just about as near a ton as can be. If molasses are substituted for sugar, an additional weight of them must be added to make up for their want of saccharum.

Separators.—I see by the English papers that the Danish separator, small size, is advertised for sale at £27.10 complete; that means in our currency about \$135! At that price, workable by one horse, I should expect to see a great many sold in this province.

Mr. Blundell, a well known *agronome* in England, complains that he has lost several lambs from feeding them on mangels. Stoppage of the urine by small crystalline substances forming at the entrance of the urethra into the bladder seems to have been the immediate cause of death. I was with poor William Rigden when he lost four of his best rams preparing for the R. A. S. exhibition from the same complaint, but I doubt whether the cause was the same, for Rigden continued the use of mangels for all his show rams, and he told me he would rather give two pounds a ton for mangels in June and July than be without them.

The English farmer is not a good hand at figures. It is astonishing what a mess he makes of his calculations sometimes, when he has an object in view! Lately, the *Agricultural Gazette* has been making inquiries into the cost of growing wheat, and replies have been forwarded to its questions by farmers from various districts. By these replies we learn that the cost growing wheat on an acre of land varies from £6.14 in Somerset, to £10.15 in Kent: which is too childishly ridiculous to need any comment from me.

CORRESPONDENCE.

'Quebec,' after speaking of the articles on mangels and swedes which have appeared in late numbers of the *Journal*, proceeds as follows:

"And yet with no field workers what ca. I do? Again, with hay at \$8 to \$10 a ton, peas and grain as you know,

which would give me the best value, supposing I could have them grown? Of course, remember, my cow food is all prepared by steam, and roots would have to be *handed* during the winter at the rate of 35 lbs. x 35 head of cattle; and last, not least, our butter fetches 30 cts. a lb., on an average, during the winter months. Roots would certainly not improve it.

Reply—In answering the question, Which would give me the best value, say at a certain price with peas and grain? I should have to know a great many things not mentioned in my correspondent's letter: the soil, amount of available manure, price of labour, &c. He has no field-workers, apparently, so I really do not see how he can grow roots of any kind. But, surely, no great number of hands are required for four or five acres of mangels and carrots, for I find one man and a couple of girls can, if properly superintended, get over a vast amount of work in a few of the long days of summer.

I do not recommend steaming food for any cattle except for cows giving milk for purposes of sale. For butter, I am convinced that mangels and carrots, with a few pails of boiling water dashed over the mixed grain, peas, linseed, and chaff, will answer all purposes. Swedes, unless great care is taken, undoubtedly do give a certain unpleasant flavour to the butter, but mangels do not, and carrots absolutely improve, both the flavour and the colour. In my favourite Devonshire mode of scalding, the heat carries off even the taste of *white turnips*, and cabbages are rendered quite innocuous—of course, I add saltpetre.

But, how about the health of the cattle without roots? If linseed is used, it will doubtless keep their bowels in good order, but I do trust very firmly in the effect of a moderate use of roots, particularly if the water the stock have is not warmer than that usually provided here. (1)

Again, why should my correspondent give his young cattle 35 lbs. of roots daily per head? That is a large amount for full-grown animals, if, as I suppose, his stock are of a small breed. I should say that 25 lbs. a day for the milch-cows, and 10 lbs. for the yearlings would be quite enough. After so much steamed food, would not the young cattle be rather delicate on turning out to grass in the spring? I know that the old Scotch system of boiling food for cart-horses has been decried on that account by all the best veterinary surgeons.

"Quebec" goes on to ask:

I have about thirty acres of poor, very poor, sandy land, which I cannot manure thoroughly next spring. Half of it received about ten tons of good manure and some superphosphate—Brockville—300 lbs. to the arpent (354 to the acre, a heavy dressing with ten tons of dung. A. R. J. F.)—but this showed very poorly on the maize. This was frozen, and fed to the cows on the field. It is still, apparently, very poor indeed, although a great deal of couch-grass was destroyed through the summer. I propose trying Alsike clover early in the spring, with plaster and ashes, and just enough buckwheat to shade the clover. What say you? In a year or two, I hope to give it a good dressing of manure for potatoes or silocorn. Would you act otherwise?

Reply.—Buckwheat sown early in spring would run the risk of being frozen. You are on the North side of the St. Lawrence, are you not? Bousingault recommends, if I remember rightly, grass-seeds with buckwheat, but not in our climate. Why not try *rape*? No sheep to feed it off, perhaps, but your young stock would do well on it (*crede experto*), and all you would have to do would be to keep them from the rape till the dew was off. With the Alsike I should mix two bushels of *orchard-grass*; the yearlings would tread

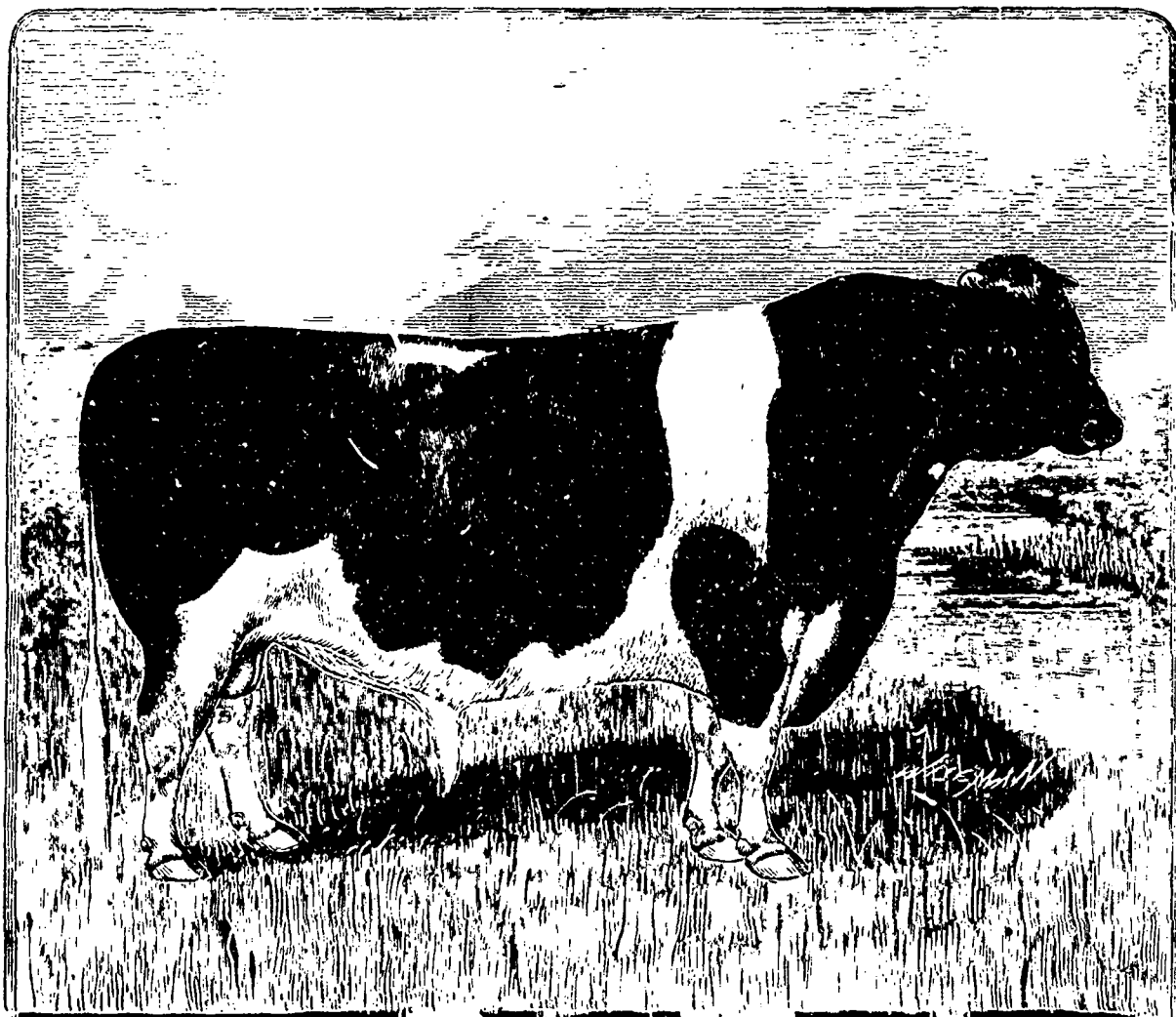
(1) It is not the least likely that "Quebec's" cattle get ice-cold water to drink. A. R. J. F.

in the seeds while pasturing the rape, and you would find a good thick bottom in the autumn if the young grass was kept fed down level. As the Alsiko seed is very small (and very expensive too), six pounds to the acre with the two bushels of Orchard grass, and perhaps two pounds of white clover, should be sufficient.

In my article on carrots I forgot to say that I never found much good come from any artificial manure for that crop. Fifteen tons of well rotted dung is about the dose. One of the finest crops of white carrots I ever saw were grown by

of soil that experiment only will reveal to its owner. No more striking proof of the truth of this statement has lately been given than we find in an article by Professor Atwater of Middletown, Conn., published in the *Rural New Yorker's* "Fertilizer number." From this article we make the following extract:

On the outskirts of this city (Middletown, Conn.) is a farm on which the proprietor, Mr. Sage, has made several series of field experiments with commercial fertilizers containing nitrogen, phosphoric acid, potash, sulphuric acid, lime etc. In his tests with corn, nitrogen, whether in nitrate of



HOLSTEIN BULL MAHOMET (289 H. H. B.)—PROPERTY OF THOS. B. WALES, JR., IOWA CITY, IA.

M. Louis Beaubien, at Outremont. Had they been properly singled, instead of being allowed to grow as they pleased, I verily believe there would have been thirty tons to the acre.

ARTHUR R. JENNER FUST.

THE VALUE OF EXPERIMENTS TO FARMERS.

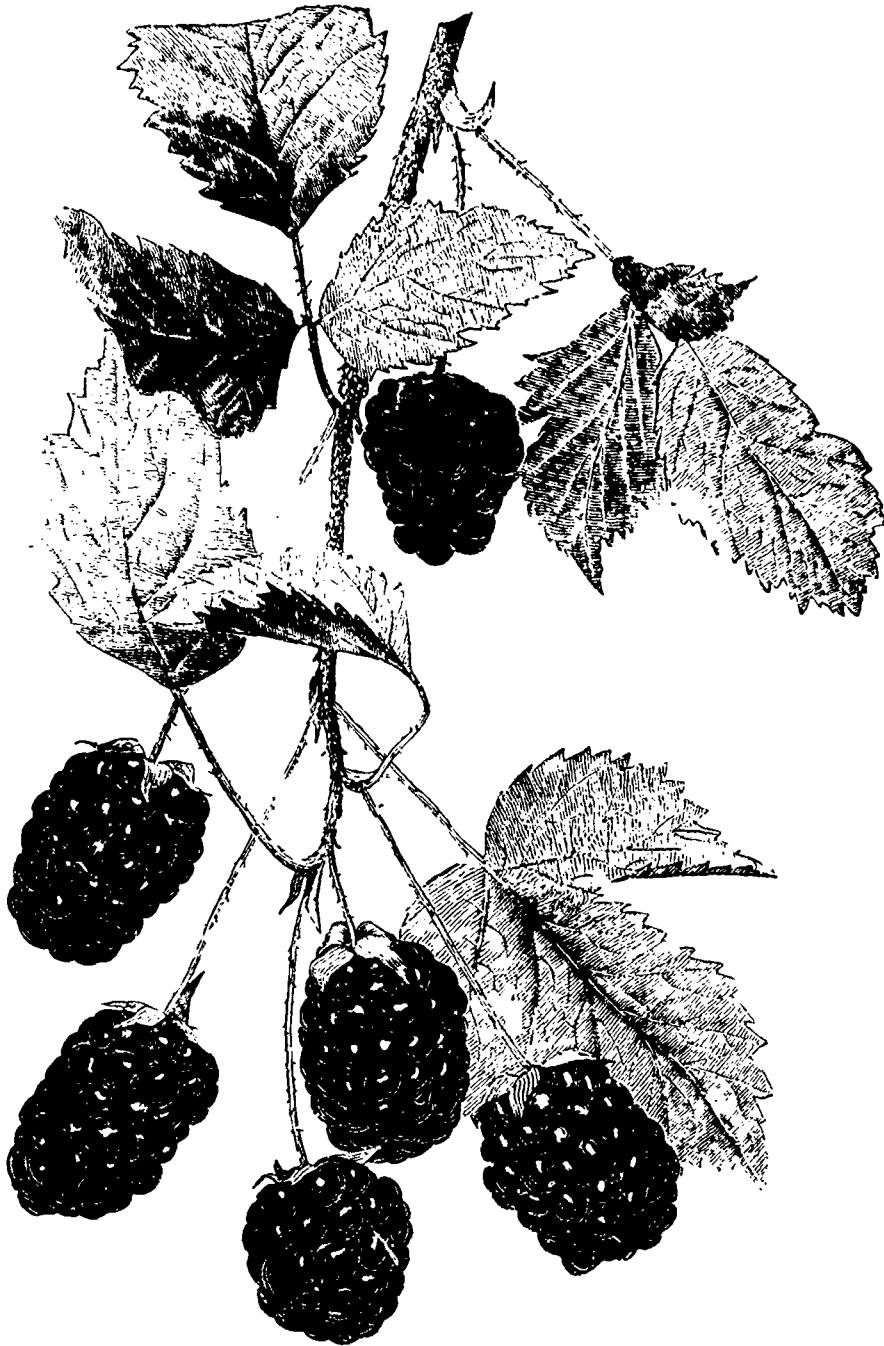
In reply to the assertion of the *Boston Cultivator* that only "fancy farmers" can afford to make agricultural experiments, we lately said that no farmer can afford *not* to experiment, because nearly every farm has some peculiarities

soda, sulphate of ammonia, dried blood, or other forms, has uniformly failed to bring any considerable increase. Phosphoric acid in superphosphates and bone, has likewise had little effect. But one hundred fifty pounds of muriate of potash per acre, costing in Middletown, \$3.00 or \$3.50 and containing seventy-five pounds of "actual potash" has, on the same old, worn-out soil, made a difference between corn hardly worth the husking and a crop of sixty bushels (shelled) of what Mr. Sage calls "as nice corn as I ever saw, and a magnificent growth of stalks." But while corn has responded so nicely to the potash and paid so little heed to nitrogen or phosphoric acid in any form, potatoes have given a profi-

table return for each of the substances--nitrogen, phosphoric acid and potash -- whenever and in whatever form they have been applied.

Such is the outcome of Mr. Sago's experiments with fertilizing materials of attested quantity and quality upon more

Mr. Sago. Neither superphosphate nor bone helps the corn on one farm more than on another. But the potash, which Mr. Sago found so efficient, does no more good on Mr. Newton's land than the phosphoric acid, while the nitrogen, which had scarcely any effect on Mr. Sago's corn, works



LUCRETIA DEWBERRY.—(From Nature.) At it fruited last season at the Rural Grounds.

than fifty different plots during several successive years, and his practice on a larger scale has substantiated the results. A large number of other gentlemen, in this state and elsewhere, have had an experience more or less similar.

Five or six miles from here, in the town of Durham, is the farm of Mr. Newton, who has conducted similar experiments. With phosphoric acid he has had no better success than

wonders with Mr Newton's. In whatever form the nitrogen is used, its effect is apparent, and one could almost tell how many pounds had been applied per acre by the number of bushels of corn in the crop. Mr. Newton's experience with nitrogen on corn, however, is a very unusual one.

Mr. Bartholomew of Putnam, Conn., has a still different experience. His experiments have been even more nume-

rous than those of Mr. Newton or Mr. Sage. They have extended through a period of six or seven years and covered fifty or sixty plots, and, like the others, have been carried out with the skill of a good farmer and the spirit of a scientific investigator. Barring effects of drought, cold and the like, every plot which has received phosphoric acid in any form has brought an abundant return. On every plot without phosphoric acid the crop has failed. The amount of corn has risen and fallen with the amount of phosphoric acid applied, while potash and nitrogen have had every little effect. But while the corn has thus uniformly responded to the phosphoric acid and paid so little heed to the other materials, potatoes have been invariably and largely benefited by the potash and the nitrogen as well as by the phosphoric acid.

Coming back now to Middletown, we have, on the one side of the city, opposite Mr. Sage's, the farm of Mr. Fairchild, who has likewise been testing the effects of the fertilizers. Like each of the other gentlemen, he has been working an old, worn-out soil. His results, however, are different from those obtained by either of the others. Neither nitrogen, phosphoric acid nor potash alone, nor any two of them together, bring him very profitable returns; but with a complete fertilizer, containing all three, he has a large and well paying increase of crop. By applying the results of his experiments to his practice, he says that his farming is by far more profitable than it ever was before, and his neighbors all about him are following his example.

Here, then, are four different stories. Each is told in answer to the soil with fertilizers. Each answer is given by the crop produced. Each man's experience extends through several years, and each differs from all the others.

MR. EDITOR,

I have thought for some time of writing a letter for your paper on "Fish Culture," but, not being used to writing, put it off until now. If you think the following worth publishing, do so, and oblige a reader.

Respt. yours,

W. BAIRD, Pittsburgh, Pa.

I have a few thoughts to present to my fellow farmers all over the country. I know the times are hard and we are all anxious to turn an honest penny. When wool is only 28 cts, and wheat 80 or 90, we must look sharp to make both ends meet, and a free exchange of thought often does much to assist us. I feel that I owe all I have to ideas gleaned from different papers. I bought a farm near the City in 1881. Then, it was thought that every thing was at its lowest, and times *must* brighten up. But, expecting good times, did not make my payments, I could not raise sheep, hogs or cattle with any profit, so I was driven to look for something new. I struck on raising fish. I will say, to start with, that the government is doing all in its power to advance Fish Culture, and will give, free of charge to any one desiring to start in the fish business, from 12 to 20 German carp to breed from. This is a new field, and almost entirely unoccupied. It requires no capital, and yields a large revenue. One eighth of an acre devoted to German carp will make a clear profit of \$800 at the very lowest estimate; I think I hear a host of fellow farmers say just as I did: "I would like the \$800, where can I get information regarding the fish business? Write to the U. S. Fish Co., Columbus, Ohio, inclosing a plainly addressed envelope, and you will receive free the information you desire. Will they tell us how to get the fish, offered by the government to beginners? Yes, they will send you blanks to be filled up, by which you can get the fish without cost. Is there any doubt of my making money in the fish business? No, do you think the government would go to

the expense of raising fish and sending them to different parts of the U. S. and then giving them without any pay to the Citizens, unless it was positive it was a profitable trade for those Citizens to engage in. How large a pond must I have to start with, and what will it cost? A pond 15 or 20 feet across will do for a start, and it will cost you nothing but a little digging. There is no stream on my lot, what will I do for water? Carp do not require running water; they do better in still water, even in swamps, they delight in mud. What sections of the U. S. are best for raising fish? Any part will do. Carp are such excellent fish, that they command a ready market and good prices everywhere. Will it not take a long time to get a start with the 20 fish supplied by the government? No, indeed, each female carp lays from forty to fifty thousand eggs every year. They increase amazingly fast, and will increase your dollars just as fast, if attended to. What season is best to make a fish pond? Right away. The U. S. government will send you the fish between Nov. 1st and March 1st. Do you have to feed the fish in winter? No, they eat nothing during the cold months, but lie in a dormant state while sheep and cattle are eating their heads off. If the government would offer to send a fine pair of pigs to any one who asked for them, every farmer in the land would send in his name, then why not get some fish, when they cost you nothing, care for themselves, and bring you more money than any kind of farm stock? I wish all the papers in the land would urge this matter on their readers, as I know they would be conferring a lasting benefit. W. B.

If these German carp are the same as our English fish called "*Prussian carp*," I cannot recommend them. Our large common carp, when stewed in port wine and sent up with a sauce of capers, tomatoes, stock, &c., are not bad—when you can't get sea-fish; a state of things not to be contemplated now-a-day. This ought to have appeared last month, but was crowded out. There are in the Eastern Townships plenty of cold springs for trout, and I should advise any one going in for fish-culture to try that fish first. In the clay soils, carp would do, but I doubt their being worth the trouble. In England, no fresh-water fish is saleable except trout, and even they, with the exception of these which come from the Thames—fishes *per se*, which fetch three shillings a pound—are hardly ever to be met with in the fish-mongers' shops. The Pike—a very much better fish than our Canadian pike—is only eaten by those who catch it, and then it has to be dressed *à la Chambord*, which requires about twenty-five different ingredients to make the sauce &c. Strange to say, the *halibut*, which, particularly the head, is so good a fish here, is literally never seen on a *commé il faut* table in England. A. R. J. F.

EDITORIAL NOTES AND COMMENTS.

THE NEWER GRAPES.—Out of large numbers the Rural New Yorker gives the following which have proved free from faults and disease: Niagara, Ulster Prolific, Wilder, Early Victor, Pocklington, and Lady. Lindley rots badly, and Herbert rots somewhat, as well as Moore's Early and Brighton. Among those which rot considerably are Poughkeepsie Red, Duchess, Lady Washington, and El Dorado. The leaves of the Jefferson are small and yellow, and the grapes fall.

FRUITS RUNNING OUT.—Col. Wilder says he does not believe in the deterioration of varieties. The White Doyenne pear prospers in Nebraska; the Hovey strawberry is sometimes as fine as ever. The Franconia raspberry, known forty years ago, still stands high. Knevet's Giant is still the best raspberry.

LAWN GRASS.—Col. H. W. Wilson, in his address on lawn

before the Massachusetts Horticultural Society, said that blue grass and white clover were undoubtedly the finest plants for lawns, from the beauty and thickness of the turf which they make, and their delicious fragrance when mown. They are both fond of calcareous soils, and the only way that fondness can be met is by a free use of lime while making the lawn; two hundred bushels per acre would not be an excessive quantity for the soil when it is trenched or subsoiled. At least two bushels of plaster should be used with the annual top-dressing. An objectionable practice, which Col. W. mentions, is that of sowing oats or other grain with the grass seed, which puts the grass back nearly a year, and while the grain is growing it is no ornament. (*Good. A. R. J. F.*)

RASPBERRIES IN CANADA—At a horticultural meeting in Barrie, the members of the Fruit Growers' Association gave statements of their experience with the leading raspberries. A. M. Smith said if he were confined to one red raspberry, he would choose the Cuthbert. For shipping moderate distances to market, the Highland Hardy would probably be as profitable as any, on account of its extreme earliness. The Turner is good for cold regions. The Tyler is valuable among black varieties, and the Gregg, where it happens to succeed well. Mr. Morgan regarded the Cuthbert as by far the best red sort. For black sorts, he said, the Mammoth Cluster is better than Tyler. By growing these three varieties, he has black caps three weeks in succession.

MANURING APPLE ORCHARDS.—Last year, most of the apple orchards through the country bore profuse crops, and prices were consequently low. Many were unsold and unused. This year the supply is scant, and prices fair. Fruit-growers desire to avoid these extremes, and to equalize the supply through each year. If this could be done, we should not have a surplus one season and a dearth the next. Nothing will accomplish this result so well as the use of barn manure. Top-dress the orchard broadcast every autumn; or apply the manure every alternate year. As the present is the barren year in most localities, now is the time for applying the top-dressing, so as to give the trees more vigor next season, to compensate for the exhaustion of the coming heavy crops. Farmers generally do not give their orchards sufficient care and attention, but let them take care of themselves. Even those who have cultivated them while young, and thus given them a good start, often entirely neglect them when they reach good bearing age and are seeded to grass. Then is the time of all others when they are benefited by manure; and if good crops are obtained in the odd year, they will be less liable to overbear in the even years.

CRACKING OF PEARS—Many mistakes are made by drawing fixed conclusions from isolated facts. Some of the papers publish the statement that a cultivator by manuring a Virgalien pear tree, entirely prevented the black scab and cracking. We have watched this disease for thirty years, and have not succeeded yet in finding a remedy. There is no trouble in ascertaining the cause—the parasitic fungus, the same or nearly the same that causes the leaf blight in the pear. We have never seen finer specimens than from trees which had long grown in grass, and never finer ones than on trees under high cultivation. We have trees now standing in grass which are bearing fine specimens, with but little of the black fungus; and the worst are on a tree well enriched with manure. Good cultivation and strong growth are usually more likely to prevent disease than the reverse, but the rule does not always apply to the cracking of the Virgalien. This year, as well as in former years, the fruit on Seckel trees in grass was large, smooth and fair, and that on well-cultivated and manured trees was small and scabby; but the reverse is true on the grounds of a neighbor two miles distant.

It is desirable to report all facts, but a satisfactory conclusion is not yet reached.

CABBAGE WORM.

Is there any remedy that will destroy the green cabbage worm? I have tried every thing that I have read or heard of, so far, without effect. J. R. M. Baltimore, Md. [There are many remedies, most of which, being only partially effectual, are usually regarded as failures. As you do not name those which have not succeeded with you, and which may have failed for want of proper use, we are liable to repeat the same in any which we can recommend. We have never found anything more safe and effectual than hot water, applied with a watering pot to the cabbages after the heads have formed. But it must be applied by the owner, and not by a common hired hand, as the medium between hot enough to kill the insects and not to injure the cabbage, (1) must be nicely secured, and the time the hot showering is continued is to be observed. The outside leaves are usually slightly curled. Before heading, the few worms may be killed by hand. Among the many other remedies, pyrethrum (2) has been successful with a large number of cultivators.]

LUCERN.

Will you kindly tell me when, how and what quantity of lucern to sow—also what season of the year and what soil is best adapted to its wants? R. B. L. Buffalo, N. Y. [Lucern has not often succeeded at the North, but occasionally on deep, rich soils, with a perfect natural drainage, it has done well. If the ground is free from the seeds of weeds, rich and in fine condition, it may be sown broadcast, ten pounds being sufficient for an acre. If the condition of the soil is not so good, and if weeds are likely to intrude, it may be sown in narrow drills, to admit of some after care. At the North it must be sown early in spring, thinly covered or brushed in, if broadcast, and the surface rolled. It is most valuable at the South, where four or five cuttings may be made in a single season, and it also succeeds well in California. It lasts a great number of years, and the roots extend downward several feet. Great depth of pulverization is necessary in preparing the soil for the seed. (3)]

SEEDING FOR GRASS.

T. S. GOLD.

The universal custom in this part of Connecticut (north west) has been to sow grass seed with some grain crop. Little other seed is used, except Timothy and Red Clover. Eight quarts of Timothy and two quarts of clover are a common allowance, though double the amount is sometimes applied. It was common to get a "good catch" until the last few years, so that with the old grass roots about the rocks surviving culture, a new thick turf was readily obtained. The repeated droughts of the last five years, or some other causes, have often destroyed the young plants. Of the spring grains, seeding takes much better with barley and wheat than with oats. The increased amount of seed grain used, making a closer shade, may in part account for failure of the grass. Formerly 2½ bushels of oats were sown to the

(1) Theoretically, 140° F.; but as the water will cool considerably in pouring, I should try 160° F. A. R. J. F.

(2) Pyrethrum is good if it be fresh. A. R. J. F.

(3) Twenty pounds an acre. If sown after 15th May, the lucern may come up, but it will most likely die away. A. R. J. F.

acre; now from three to four bushels. The grass seed should be covered with a light bush harrow or pressed by the roller. Timothy is sown with wheat or rye in the Fall, and clover added in the Spring, or they may be both sown in the Spring and left on the surface or covered with a light bush or Thomas' smoothing harrow.

Red Top is used sometimes for permanent meadow in place of a part of the timothy—half a bushel or bushel to the acre. The seed is very light and chaffy, weighing only 15 pounds per bushel, and cheap. I have used Orchard Grass, one-half bushel or one bushel per acre, very satisfactorily. (1) It is a very early grass, and when cut in season, makes excellent hay. If allowed to ripen, it is little better than straw. Mixed with medium or early clover, it helps to hold the crop up and is ready to cut at the same time. (Good. A. R. J. F.,

I have tried Alsike Clover once, with good results, getting a fair crop, easily cured, between Red and White Clover in character. The seed is costly, and adding the trouble and expense of getting it on the farms, this hinders its use. On lands less natural for grass than ours, plowing and reseeding, without any grain crop, is practised, with good success. Turn over the land smoothly after haying, harrow in a good, fine compost, and seed with timothy and Red Top. You lose no crop, as the next year you may expect a good burden of hay. With this summer-seeding, a thin crop of white field turnips may be sown. (2) The necessary conditions for a



CORBETT'S PULVERISER.

good growth of grass seed are, to have the land of sufficient fertility and in good tilth, and bright, clean seed. Seed, the vitality of which has been injured by heating or otherwise, may sprout and then fail to produce vigorous plants. I think some of the failures are due to this cause. Use only that which is clean—we do not want to sow sorrel, daisies or any other weeds.

Litchfield Co., Conn.

FALLOWS.

By SIR JOHN B. LAWES, BART. LL.D., F.R.S.

The *Agricultural Gazette* of April 25 contains a report of some remarks made by Mr. John Roberts before a farmer's club; amongst them I find the following. "Twenty years ago, a bare summer-fallow on high-rioted land like his would produce an unreasonable, flaggy, unprofitable crop, but in sowing it a second year he would get a good profitable crop; now, a summer-fallow might grow a fair useful crop and that was all."

Many years ago the Rev. S. Smith issued his pamphlet in support of what was then known as the Lois Weedon system, (3) which professed to show how wheat could be grown at 5s. a bushel, by a constant system of fallows.

At the time, we thought it advisable to place a few acres of

(1) Not less than two bushels of Orchard Grass. A. R. J. F.

(2) Oh! Rape, please. A. R. J. F.

(3) The Lois Weedon system involved the continuous growth of grain on the same land, one yard wide intervals were left bare and fallowed 18 inches deep, and the alternate intervals sown at a foot apart. A. R. J. F.

land at Rothamsted under experiment, upon the plan laid down in the pamphlet, and we received considerable blame both from Mr. Smith himself, and from those who placed faith in his system, because we did not obtain results corresponding with his predictions.

Our experiments on the Lois Weedon system have long since been given up, but another experiment of an ordinary summer fallow which we commenced at the same time and carried on side by side with the Lois Weedon experiments has been continued to the present date.

In 1851 one acre of land was fallowed in the ordinary manner, and after receiving several ploughings during the summer, was sown with wheat during the autumn of the same year.

In 1853, there was of course no crop, but the disadvantage of having a crop of wheat on alternate years alone, was so obvious, that in 1854-5 the land under experiment was divided into two half acres, and has so remained ever since.

The wheat grown in 1855 was thus necessarily wheat after wheat without a fallow.

The following table gives the produce of the first seven crops, and also that of the land growing continuously unmanured wheat crops.

BUSHELS OF DRESSED CORN PER ACRE.

	Wheat after fallow	Wheat every year.
1853	37	14
1854	42	21
1855	17	17
1856	21 1/2	14
1857	38	20
1858	25 1/2	18
1859	34	18

In 1855 when the experimental plot under fallow was divided into two equal portions, and the wheat followed the wheat of the previous year, it will be seen that the two crops were alike.

The first crop of wheat after fallow is considerably more than twice as much as the wheat following wheat without a fallow: the second crop is exactly twice as much, but, after that, the difference is less than twice as much, and from 1859 to the present time the fallow and the permanently unmanured crop have approximated nearer and nearer to each other, until it has become a somewhat difficult question to decide which of the two crops now growing will yield the larger produce.

The fallow wheat now growing, has been estimated by some who have seen it as not likely to yield more than 1 qr. per acre! In fact one expert stated that he would rather purchase the crop of wheat in the field where the twenty four varieties are now growing, at 56 bushels per acre, than the crop grown on the fallow at 1 bushel.

Whether the fallow wheat yields one bushel, or two, or even more, is of little consequence, but, as the result of the experiment we have this fact clearly before us, that a very large decline in the crop has taken place in unmanured land subject to alternate wheat and fallow for thirty years.

We see now quite plainly why the systems of farming advocated by Jethro Tull and the Rev. Samuel Smith, were based upon erroneous principles. Soils exposed to constant stirring and aeration were said to absorb fertility, from the atmosphere. That considerable amounts of nitric acid are produced where land is fallowed is tolerably certain, but, it is

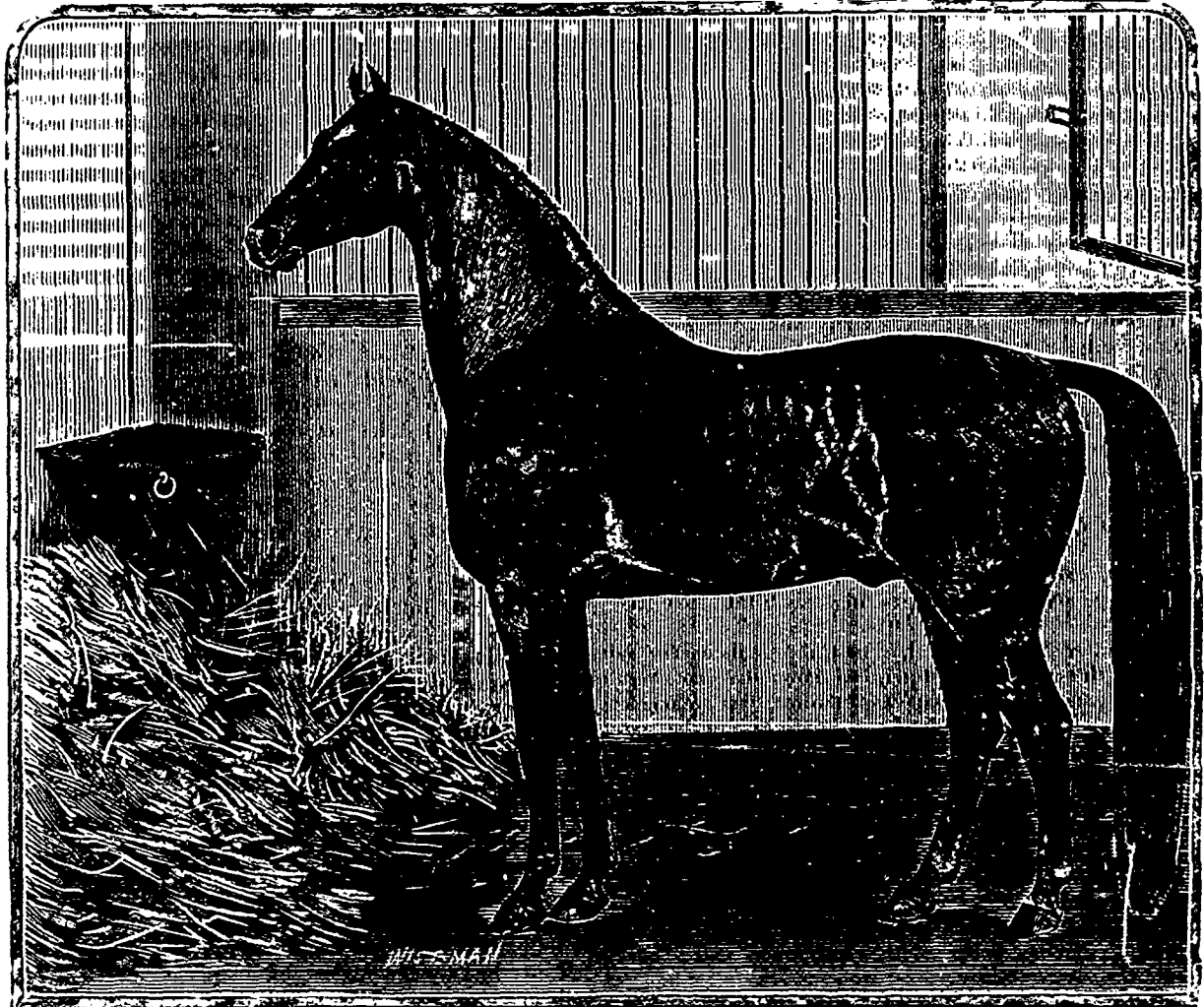
not easy to explain the large reduction in the yield of the plot under experiment, except upon the assumption that the nitric acid proceeds from nitrogen already stored up in the soil in an organic form.

In the *Journal* of the Royal Agricultural Society of 1857 we published a paper upon "The Growth of Wheat on the Lois Weedon System of Cultivation," and in it give the composition of the soil of the fallow plot under experiment: an analysis of the same soil made during the present year shows a very considerable reduction in the nitrogen.

It may be considered as quite certain that an application

important subject. Most of your readers will probably be disposed to agree with me in thinking that further investigation is needed to prove whether the source of the nitrogen of the leguminosæ is to be found in the soil, or whether these plants do in some manner assimilate nitrogen from the air.

I have no complaint whatever to make against Prof. Atwater for the way in which he has commented on our experiments at Rothamsted; though on one important point, to which I am about to refer, he has to a certain extent misunderstood the bearing of our conclusions, when he says: "There are some facts which are very hard to explain without assum-



TROTTING STALLION; ABE DOWNING.

of nitrate of soda, or of salts of ammonia would largely increase the produce of wheat upon the fallow land, I think therefore that we can come to no other conclusion than that the soil, and not the atmosphere, furnishes the nitrogen which grows the fallow wheat crop: and, further, that it is by no means certain whether alternate fallow and wheat is not a more exhausting system of cultivation than that of growing wheat continuously.

Sources of Plant Nitrogen.

BY SIR J. B. LAWES, BART., LL. D., F. R. S.

EDS. COUNTRY GENTLEMAN—Under the above heading Prof. Atwater has given his views on this interesting and

ing that the plants, especially legumes, obtain nitrogen from the air. Such for instance, are the observations I have already referred to as reported by Messrs. Lawes and Gilbert, and confirmed by Deheran in France, and Schulz-Lupitz in Germany that, after heavy crops of legumes, with their large quantities of nitrogen, had been taken from the soil, the latter contained more nitrogen than it did before the crop grew on it. If the plants took all their nitrogen from the soil, how could the latter have more after it has produced them than it had before?"

What we have established by direct analysis is the fact that after a clover crop has removed three or four times as much nitrogen as a barley crop growing in the same field, the first nine inches of the clover soil will contain the larger amount

of nitrogen of the two, and it will also grow the larger amount of barley in the following year.

These results are obtained in a field with an area of about eight acres divided into four portions, of which one-fourth has grown barley every year for a long time, and the other three parts have grown occasional crops of clover. What we have not yet been able to prove in this experiment is, whether the subsoil has or has not lost nitrogen. The surface soil of the garden plot, of the bean field, and of the field where leguminous plants are continually grown, have lost nitrogen, but not in proportion to the amount of nitrogen removed, that is to say the land which is alternately wheat and fallow has lost more nitrogen than the leguminous plant land, which might be explained by the fact that the leguminous plants take a portion of their food from the subsoil.

On account of the great difference which we find in the character of our subsoils, it is difficult to suppose that analyses, however correct they may be, could be satisfactorily employed to measure the loss of nitrogen. For instance, this year we opened six holes, each nine feet deep, in the field to which I have alluded; on two lucern had been growing for some years, on two white clover, and on the other two, alternately, fallow and wheat. These holes were all within a few yards of each other in the middle of a level field, and to all appearance the surface soils were exactly alike. In order to follow the sampling iron downward it was found necessary to excavate a hole about twelve feet in circumference. In most of the holes the chalk was not reached, but the character of the clay varied exceedingly, and in one part of the same hole the chalk came within about three feet of the surface, while in another part the clay was found nearly down to the bottom. It was noticed that when the lucern roots came in contact with the chalk, they made no attempt to penetrate it, but spread out in a fine network of roots over its surface. I think we may accept it as a fact that leguminous plants do take up a large amount of nitrogen in some form from the subsoil.

Prof. Atwater's suggestion that hostile organisms are in some degree the cause of the failure of clover has not been overlooked by us. It would appear, however, that so long as the plant finds abundance of food—as in the case of the garden clover—it is capable of resisting any such attack, even for so long a period as 32 years. In Great Britain red clover is not repeated on the same soil under eight or twelve years, other leguminous crops being employed in the interval. This would lead us to think that leguminous plants either take different foods from the soil, or that they take the same food at different depths.

Another part of the field under leguminous plants is also, as I mentioned above, under continuous barley, and I have noticed a remarkable difference between the amount of underground life in the two soils. Birds rarely settle on the barley portion, while they are always hunting for food on the other parts of the field. Moles, too, are most troublesome among the leguminous beds, though I rarely, if ever, see their work on the barley land. Common earth-worms are likewise very abundant, and, as far as I can judge, they destroy many of the clover plants—at all events, I have frequently found earth-worms in the crown of plants, the leaves of which have suddenly withered, and I may say that underground life generally appears to be far more active and abundant under the influence of leguminous growth, than under that of the cereal crops.

Although there are difficulties in either case to be got over, whether we attempt to account for the nitrogen of the leguminous having its source in the atmosphere, or in the soil, it still appears to me that there are more difficulties in forming a rational theory on the former supposition, than on

the latter. Theories, however, are of very little use in a question of this kind. What is really required is more facts, and unfortunately these are only accumulated by very slow and laborious processes: (1)

TROTTING STALLION.

ABE DOWNING.

The above engraving is said to be a good likeness of the young trotting stallion Abe Downing, owned by Messrs. J. H. & W. R. Bowman, Waverly, Iowa. He is a bay, bred by James Miller, Paris, Kentucky; got by Miller's Joe Downing, son of Alexander's Edwin Forrest; dam by Harrison, son of Park's Highlander; 2d dam the dam of Dick Jameson (2 26). It will be observed that Abe Downing is nearly a full brother in blood to the famous Dick Jameson, one of the fastest trotters ever bred in Kentucky, both being by the same sire, and the dam of the latter being the second dam of the former; so Abe Downing only misses being standard by a scratch, his sire and his second dam both being standard under the rules of the Breeders' Trotting Stud Book. But Abe Downing has other claims to merit aside from his distinguished ancestry; and if he does lack a scratch of being standard in blood, there is but little doubt of his ability to make himself "solid" under the rules, by his own performances on the turf. Last season, with but little preparation, and on a half-mile track, he won a race, taking the second, third and fourth heats—time, 2:36½, 2:34½, 2:36½, 2:35. We will not undertake to say how fast this young horse can trot when in condition, but will simply state that this record is no measure of his speed from what we have heard of him. He was foaled in 1875, and is now just about old enough to show his mettle. The Messrs. Bowman are recognized as among the most intelligent and enterprising breeders of the Northwest, and are capital judges of stock. In addition to the extensive stable of trotting horses owned by these gentlemen, they are also largely interested in Percheron-Norman horses and Shorthorn cattle. Of the former they have several of the best of Mr. Dunham's various importations, and of the latter it will be difficult to find better ones in the herds of the most noted breeders in the land.

BUTTER IN THE FUTURE.

The following very judicious remarks, altho' from Illinois, U. S., meet our case exactly in Canada. Butter may sell with difficulty in July and August, but excellent butter will pay as well or better the year round than the most sought-for farm produce.
E. A. B.

"Knowing that we are somewhat engaged in the breeding of Jersey cattle and the sale of farm-made Jersey butter, our friends ask, in view of the low price to which butter has fallen, "what are you going to do about it now, with your high priced Jersey cows, and butter selling so low as 15 cts. per pound?" Our answer is that we expect to go right on as usual, except perhaps to be more watchful for the improve-

(1) I find in my New York papers that, in spite of Dr Hoskins' opinion to the contrary, the red-clover plant is beginning to show signs of fatigue. After my long experience of the plant in England, I know what a loss it would be to all farmers if the same unhappy sickness, which at one time rendered the cultivation of red-clover hopeless there, should affect that legumen in this country. I therefore earnestly advise my readers not to sow red-clover more than once in eight years.
A. R. J. F.

ment of our herd, and to make if possible a better quality of butter than ever. We have no fear but that there will continue to be ready sale for all the good butter the farm can produce.

"The revolutions made of late regarding the butter and butterine supplies, now to be had in open market, tend to throw discredit on nearly all of the wholesale butter factories. The corner grocery store may offer a nicely branded article at almost any price, high or low, but the origin is obscure, and the make up is too uncertain for the lover of real butter. He turns away with a distrustful shrug, preferring to buy directly from the farm or local country dairy.

"We look upon the present depression in prices as but temporary. The apparent victory of the butterine makers at the late American Fat Stock and Dairy show need frighten no honest producer of gilt-edge butter. There is in every city or town of much extent a large class of consumers who can neither be deceived nor persuaded into the use of lard and tallow as a substitute for butter. They will have a genuine article or none, and are always ready to pay good prices. Such customers are worth looking for, and they will be as glad to find you as you are to find them.

It may not be practicable for every farmer to have regular days for taking the weekly supply of butter to certain families in the city, but is it not possible for you, reader, to do this? Remember that doing what every body does is not the best way as a rule for making money or getting along happily in the world. Doing the right thing in the right way—usually just what others fail to do—is the surer way to success.

PHIL. THRIPTON."

THE PRESERVATION OF EGGS.

In a letter which appeared in *The Live Stock Journal* on August 7th last, "Henwife" announced that she had sent half a dozen eggs, preserved by three different methods, similar to those she had prepared for the Dairy Show. These *The Live Stock Journal* kept until Tuesday of last week, and the following is the result:—

No. 1. Wrapped in paper, and dipped in melted wax.

This, it will be remembered, is the process which secured second prize at the Birmingham Show of 1863, but which, to "HENWIFE'S" astonishment, was an utter failure in both tests last year. Whether or not the omission of rubbing them with antiseptic salt has made the difference we cannot say. That can only be decided by actual experiment. But the two eggs submitted to us were, whilst not actually rotten, quite unfit for edible or cooking purposes. In this case there was a great discolouration of the shell, and the yolk and white were adorning thereto.

No. 2 Rubbed with a mixture of boiled olive oil and bees-wax

Eggs kept by this method received "very highly commended" at the Dairy Show last week, and this would indicate that the judge considered them good. These in our possession were quite fresh, of good colour, and without the least smell.

No. 3. Rubbed with clarified suet.

These were in every way similar to No. 2, and in both cases evaporation appeared to have been effectually prevented, as the bulk of the contents was quite as great as in a fresh egg. So far, therefore, as this test is concerned, both No. 2 and No. 3 methods may be regarded as effective.

AUTUMN CULTIVATION.

We have been told, within recent years, that the practice of stubble cleaning and autumn tillage originated in mistaken notions as to the reasons for stirring the soil, and as to the sources of plant food. Further, that the practice has got its

death-blow from observations at Rothamsted, proving the great waste of nitric acid during winter in ground which is not covered with plant growth of some kind or another. In short, farmers have been advised to leave their stubbles for fallows untouched until the spring.

It is to be hoped that farmers will be slow to act on such advice, even in a year like the present, when harvest is not only late, but threatens to be unusually prolonged. It is true that fertility is conserved in winter by keeping the soil covered with the vegetation, and that a bare fallow is attended with a considerable loss of nitrates. When we are told, however, that the true way to meet this is to leave the stubble untouched in autumn, and to encourage the free growth of couch grass and other weeds during winter, we take leave to reply that, though this advice may commend itself to the sluggard in autumn, it will bring its own retribution in spring.

By all means let us conserve the nitrogen of our soils as far as possible. It is the most costly thing a farmer has to buy. But a gold sovereign is only worth twenty shillings. And in any case, land under a crop which will yield its own profit is as well protected from the loss of vagrant nitrogen as when growing unprofitable weeds. We must also remember that keeping the soil covered is not everything; for the power of vegetation to utilise the nitric acid in the soil is much diminished if there be a deficiency of available mineral constituents. Since the bare summer-fallow was discontinued, this deficiency, in the case of our poorer soils, is only to be prevented or made good by stubble cleaning and autumn tillage.

Let this important work be done early enough, however, to admit of a catch crop, if not a regular winter crop, being grown. The catch crop of trifolium, winter vetches, or rye, &c., will pay well for growing, and the land will be clean after its removal in spring. It will then require comparatively little labour in spring to prepare the soil for the summer crop; whereas, otherwise, the work is so laborious that it is seldom well done, and as seldom accomplished in time. The right plan is to autumn-clear or cultivate all the stubbles, and to winter-crop as much as possible. "Clean land and no bare fallow" should be the maxim. Land overrun with weeds should at all times be subject to dilapidations.

A GOOD PULVERISING HARROW.

The "Acme" pulverising Harrow, clod crusher and leveller manufactured by Messrs. Nash & Brother, Willington, N. J.

This invention, the production of Mr. Fred'k Nishwitz, the original inventor of the Disc or Wheel Harrow, is the result of a long series of experiments, in which he became convinced that the Disc Harrow is adapted only to superficial pulverisation. Being himself a practical farmer, as well as mechanic and inventor, and feeling the need of a thorough pulveriser in his own farming operations, he conceived the plan of combining a Clod Crusher, Leveler and Harrow in one implement.

His success has been truly marvelous, as is shown by the result, viz.: the production of an implement which weighs much less than other Pulverising Harrows, Sells about One-Third Less, and withal Does the Most Thorough Work of any.

The "ACME" has been subjected to the most thorough practical tests in all sections of the country, thousands of testimonials, coming from forty-seven States and Territories (accompanied always by full post-office address of writers), furnish abundant proof of its wide-spread popularity and, establish beyond doubt the claim that it is adapted to a great variety of soils, and is indeed the best implement of its class yet produced.

A model of the "Acme" is shown in the advertising columns of this paper. S. C.

NON-OFFICIAL PART.

EVERYBODY'S AIR-BRAKE.

"Yes, sah," said Uncle Zach, "I se watched it forty years an' it's as I sez: De fust of May an' Christmas day of de same year allers comes on de same week day."

Further conversation proved Uncle Zach a most incredulous person. Changing to mention Dr. Carver's feat of breaking glass balls with a rifle, he said:

"I heerd 'bout that shootin' and knowed right off it wasn't squar'; dat was a Yankee trick, boss, sho's you born."

"What was the trick?"

"Dar wuz loadstone put into de glass balls, an' likewise onto de bullets; so when the bullets fly outen de gun, it an' de ball jes drawed 'ergedder, which, in course, brokes de glass—dats de trick!"

Later, Uncle Zach observed a rope running along the side of the car.

"Boss, what's dat line fur?"

"To apply the air-brake in case of accident." Then we had further to explain how the force of the brake was obtained, to which Uncle Zach responded:

"Look a here, boss, you sholy don't 'speat me to b'levee dat foolishness? Why, de biggest harricane whatever blowed couldn't stop dis train, runnin' forty mile a hour. An' you think I gwine to b'levee a little pipe full of wind under de kyars can do it? No, sah-ree!"

There are a great many Uncle Zachs who judge everything simply by appearances. The air-brake does not seem to be a very powerful thing, but power and efficiency are not necessarily equivalent to bigness and pretense.

Philip Beers, Esq., who resides at the United States Hotel, New York City, and is engaged in raising subscriptions for the New York World Bartholdi pedestal fund, was once upbraided by a distinguished relative who was a physician, for commending in such enthusiastic terms, a remedy that cured him of Bright's disease eight years ago. He said: "Sir, has the medical profession with all its power and experience of thousands of years, anything that can cure this terrible disorder?" No, no, that is true, there is no mistake about it but that Warner's Safe Cure is really a wonderfully effective preparation. That remedy is an "air-brake" that every man can apply and this fact explains why it has saved so many hundreds of thousands of lives.—Copyrighted. Used by permission of American Rural Home.

FRANK SIDDALLS, the greatest Philadelphia advertiser, is reported to have lately remarked, as a fact worthy of comment, that he had never had a personal application for patronage from the Newspaper Advertising Bureau of Geo. P. Rowell & Co. of New York. The reason for this may be found, not in the fact that Messrs. Rowell & Co. do not want business or are unwilling to drum for it, but that they find a cheaper and more efficacious way of securing patronage is to keep their names before the public by using the advertising columns of the newspapers. Doing this they attract those advertisers who wish their services, and avoid annoying or wasting the time of those who have not yet arrived at that conclusion. The newspaper is the most persistent and at the same time the best mannered of all advertising canvassers.

Buy the Boss Zinc and Leather Ankle Boots. (Others become worthless as soon as wet.) The zinc lined bow keeps the boot in shape and piece in wet weather, and lasts a lifetime. Sold by Harness Makers on 60 days trial. Manufactured by DEXTER CURTIS, Madison, Wis.

FOR SALE

The Standard Bred Hambletonian Stallion Dave White No. 1806, \$500. Pueblo, bay colt foaled 1884, by do \$175. Lachine Bay, bay colt foaled 1885, by do \$125, both have fine trotting action. One pair Shetland ponies, bay mares, 4 and 5 years, gentle, smart drivers. \$100 each. One registered Shorthorn Bull, four years, fine large red, very docile, active, and sure \$90. Twelve young registered Ayrshire Cows, from imported stock, \$50 to \$75 each. Two Jerseys' both in calf to an imported Jersey Bull.

Apply to T. A. DAWES, JR.,
Lachine, P. Q.

Nervous Debilitated Men

You are allowed a free trial of thirty days of the use of Dr. Dye's Celebrated Voltaic Belt with Electric Suspensory Appliances, for the speedy relief and permanent cure of Nervous Debility, loss of Vitality and Manhood, and all kindred troubles. Also, for many other diseases. Complete restoration to health, vigor and manhood guaranteed. No risk is incurred. Illustrated pamphlet, with full information, terms, &c., mailed free by addressing Voltaic Belt Co., Marshall, Mich.

BEET-SUGAR INDUSTRY.

A gentleman who, for the last 15 years, has been technical manager of large beet-sugar factories in Germany, wants a similar position. Being up with the latest contrivances and improvements, he is capable of gaining the best results as to producibility. First-class references can be furnished. A letter addressed to 240 B West Chicago Av., Chicago, Ill. will meet with prompt attention from JULIUS FENNER.

SARGENT'S CELEBRATED LOAD-LIFTER

This labor-saving machine has proved a success for the past three years. The load with the rack can be elevated to any height required. Thousands are in use in various places. This machine has been awarded all first prizes and diplomas. Beware of infringement. The rack can be raised by a man as well as by horse-power. Any party wishing a load-lifter from different parts, who do not know the agent for that district, or any person wishing to buy a "right," will apply to the patentee.

Sargent & Ruddell have combined their respective patents, which will defy competition for the practical use of this celebrated machine. Parties desiring the like would do well to send for circulars before purchasing any rival machines.

WM. SARGENT, Berkeley P. O., Cal.

A PRIZE. Send six cents for postage, and receive free, a costly box of goods which will help all, of either sex, to more money right away than anything else in this world. Fortunes await the workers absolutely sure. Terms mailed free.

TRUE & Co., Augusta, Maine.

The only Practical Swing Stanchion Invented, and the only one that is connected together at the top when open. C. D. BROOKS, PROP'R, Addison, Steuben County, N. Y. Manufactured and for sale by FENNELL & ANTHES, General Agents, Berlin, (Ont.) Canada.

A Liberal Discount to the Trade.

TO BREEDERS AND AGRICULTURAL SOCIETIES.

FOR SALE.

A few choice head of Thorough bred Ayrshires, male and female, from the undersigned's celebrated stock, so much appreciated for its well known milking properties, and which, as such, obtained, twice, the 1st prize at the Ottawa Dominion Exhibition, also the 1st prize for the best herd at Hochelaga County Exhibition for 1884. For particulars apply to JAMES DRUMMOND, Petite Côte, Montréal.