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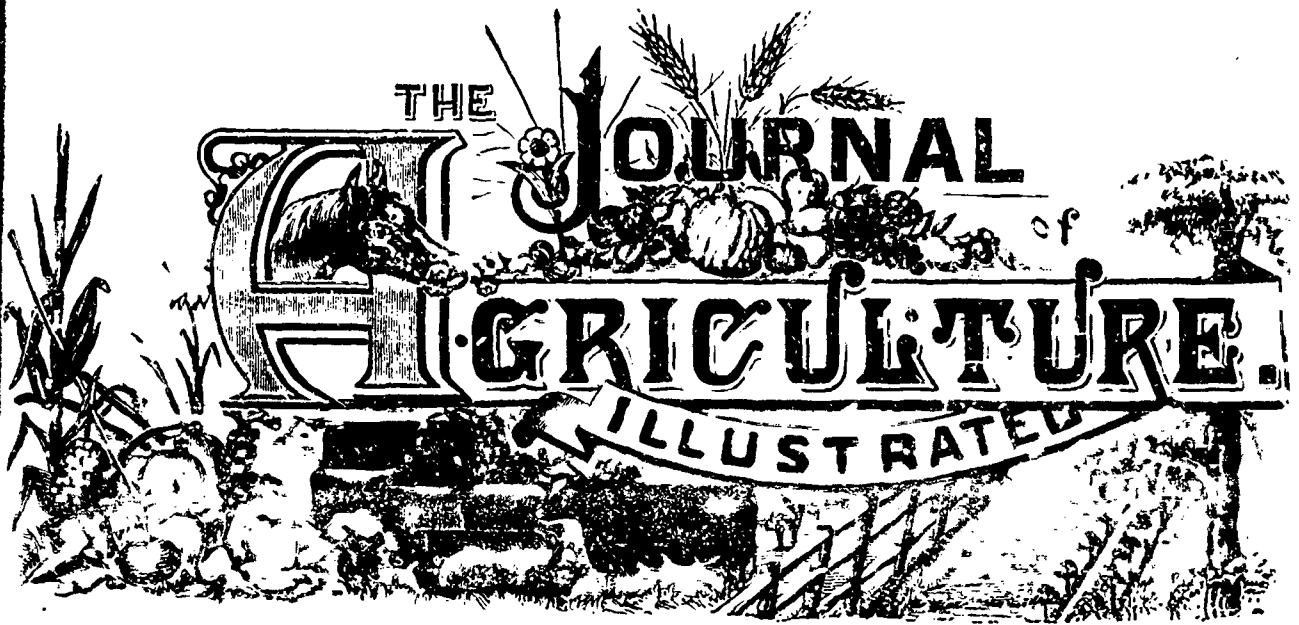
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OFFICIAL PART.

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MUSHROOMS.

Sorel, June 1st, 1887.

If there is a fault of any sort in our way of living in Canada, it is that our dishes generally are wanting in flavour. Boiled pork is a capital thing, but one gets tired even of boiled pork. Even roast beef palls occasionally on the appetite, and then how few people know how to present it hashed on the following day! Lumps of the meat, swimming in a greasy liquid, and flavoured with rank onions, is about the form in which we usually see it; while the addition of a few herbs, and half a dozen mushrooms would make all the difference in the world.

Now, growing mushrooms is not a difficult thing. There are several ways of doing it: putting the spawn immediately below the surface of the dung; putting it upon the top of the dung; and placing it in the mould by which the beds

have been previously covered. In all these methods, the beds must be afterwards earthed or moulded over in a neat, even manner, with finely reduced rich, loamy, dry earth, so as to perfectly cover in the spawn, this being done in the two first methods of planting to a much greater depth than in the last method, where an earthy coat has been previously applied; an inch and a half or two inches in depth of mould being necessary in the former cases, while an inch or less may be sufficient in the last. The spawn is properly divided into pieces and put into the beds in a regular manner, at narrow distances, both as the rows and the spaces between them: six inches each way, will do. There is little difference in these modes of spawning the beds, except that in the two former, and especially in the second, the spawn can be laid in more closely than in the last, by which method of treatment a more forward and more plentiful supply of mushrooms is often produced.

After the earthing has been properly done, the beds are ready for the covering, which should be of straw, and made thick enough to entirely exclude the light. These coverings should be invariably applied as soon as possible after the spawning of the beds; as soon, that is, as their state, in regard to the heat they produce, will permit. The straw should be laid on to a considerable thickness, especially where the beds are not under sheds, but exposed to the weather, in order to afford the spawn a proper degree of power to retain heat and a proper protection against drying winds. The light litter shaken out of the dung with which the beds are made answers for the coverings. It must be lightly and regularly shaken on over the whole bed, to remain constantly, having, in outdoor work, a mat or other sort of cover laid over the straw, as no sort of moisture must, in these cases, come near the spawn.

As little exposure to air and light as possible, after spawning the beds, should be allowed while doing any sort of work about them, as much injury and check are caused by the admission of light and air during the growth of spawn, and, of course, in the crops to be raised from it.

To judge of the successful performance of the operation, look at the mould, and if you see little white threads running here and there and interlacing, it is all right. I do not think it is absolutely necessary, though it is doubtless convenient, to buy mushroom spawn. You can get it for yourselves, if you will take the trouble to hunt for it, at all seasons of the year, but more plentifully in the latter part of summer and in the fall. It may be found in old mushroom-beds, in old horse-dung hot-beds, and, generally, in all compost heaps where horse-dung has formed the chief component part. It is sometimes produced naturally all over the surface of old cucumber and melon beds, both in the dung and in the earth, and when the earth of the bed is of good loam, the spawn found in it is often of superior quality; so much so, that I have known, such old beds, where the frames and glasses remained, and the surface of the beds, under the glasses, was kept dark by straw, produce a full crop of mushrooms in the spring.

The spawn can be found in meadows and pastures in the fall, but only where horses graze, and away from the shade of trees. What mystical association exists between horse-dung and mushrooms? I'm sure I don't know! The mushrooms which grow under the shade of trees are not to be depended on.

A. R. JENNER FUST.

DE OMNIBUS REBUS.

Spaying.—In England we spay, that is extract the ovaries of, all heifers that are not intended for milch-cows, and we find that they fatten all the better for it, as their feeding undergoes no interruption from their periodical fits of amorous phrenzy. In this country, we cannot, as yet, do this, as we have no superfluity of heifer-stock, and, good or bad, every female calf not killed for veal is reared and brought to the pail. But our sow pigs really ought to be spayed: many an uncatable piece of pork owes its villanous flavour and odour to the pig having been slaughtered when in heat.

Some people fancy that the operation is a dangerous one: it is nothing of the sort. I have seen some hundred of sow-pigs spayed, and I never saw one of them injured by the treatment. They are always much quieter and fatten much more rapidly and at an earlier age than open-sows.

Chop—Preparing food for horses is not so new an idea as some people fancy. While we Englishmen were giving our farm-cattle rough hay and whole oats, the Dutch farmers of Pennsylvania were far ahead of us in stable management. As long ago as 1780, the horses of that state used to perform journeys of two and three hundred miles over the hilly roads of that country with prodigious loads of wheat and flour from the interior, returning with dry goods &c from the sea-ports of Charleston, Wheeling, &c. Notwithstanding this enormous labour, Vancouver declares that the horses in question "are seldom seen in a less high condition than the brewers' and other large cart-horses in London."

The manner in which these American horses were fed, so as to support these labours, was, in the stables and on the road, by giving them hay and straw chopped into half-inch lengths and mixed with about half a peck of oat-rye and corn-meal to about three pecks of the chaff. A feeding trough of sufficient size for the whole team to feed out of at the same time was carried in each waggon while on the road. The chaff was put into the trough, and after being well mixed with the

given quantity of meal, was moistened, and again well stirred up, until every shred and particle of the chaff was found to be covered or, so to speak, frosted over by the meal. The avidity with which the horses ate their provender when thus prepared may be easily imagined. This is Mr. Stewart's plan for feeding cattle all over.

That there are great waste and loss of nourishment in the too general practice of giving unbroken grain to horses is extremely evident from the state it is found in after it has passed through their bodies: very little nutriment, if any, has been extracted from it. In its unbroken condition, when not completely masticated by the teeth of the animal, as is frequently the case, the digestive process of the stomach would seem to have but little effect upon it, as it passes out in nearly its natural state, while, when broken or crushed by rollers it is readily acted upon by the gastric juices, and the whole of its nutrient matters is taken up in its long course through the intestines, in consequence of, in its finely comminuted state, its fuller and more extensive application to their surfaces.

All cattle, horses more especially, are better fed and supported when the grain is reduced in its preparation before it is given, than in the usual mode of giving it whole. The supposed defect from want of chewing and mixing with the saliva of the mouth is all nonsense, as no one would think, I should hope, of giving grain to horses without mixing it with a sufficient quantity of hay- and straw-chaff: the chaff and grain will force the laziest beggar of a horse to masticate his food properly.

Shropshires.—At all events, every one interested in this valuable breed of sheep acknowledges that they are derived, by selection or crossing with other breeds, from an original stock which inhabited the Morfe district of Shropshire. I find upon referring to a work on sheep, written about a century ago, that the "Morfe" sheep was horned, black and speckled in colour, bore a fleece of fine short wool, that weighed 1 lb. 12 oz.—washed on the sheep's back, I presume—and that the wethers at the age of 3½ years, at which time they were usually slaughtered, weighed 12 lbs. a quarter. At the above date the Southdown wethers were slaughtered at 2 years old. they weighed 18 lbs. a quarter, and their fleece 2½ lbs.

"The *Shropshire*, or *Morf* breed," continues the writer, "is a sort which has small horns, with speckled dark or black faces and legs, they have the full character of real fine-woolled sheep, have been for centuries bred in Shropshire, Staffordshire, Worcestershire, and the vicinity. Their fleece is nearly all *fine*, and, it is said, superior to the *Ryeland* wool, since the crossing which has been practised in that stock."

How the present Shropshires have been brought to their present state of perfection I do not presume to say; but a glance at a large flock of them at Lord Chesham's gave me the impression that long-wools of some sort or another had something to do with it. Besides every body knows that they were not admitted as a distinct breed to the R. A. S. of England's exhibition till the Gloucester show of 1883. I saw them there in their glory, and having in the previous spring had an opportunity of inspecting several flocks of the breed in their native county, where I was staying in Sir Baldwin Leighton's parish, I honestly confess that I was forcibly struck with the difference between the highly polished exhibition pens, and their rougher brothers of the Shropshire tenant-farmers' flocks.

It seems to me very bad taste of the Shropshire breeders in the States to be always "pitching in" to the Hampshire-downs on account of their large heads. I do not admire that point in the latter, but at all events it is a sign of *virility*, and as long as the Hampshires are the hardiest and the

earliest maturing of our breeds, so long shall I consider them to be the fittest sheep for this climate and country.

Manures.—A strange jump in the price of nitrate of soda has lately taken place in the English market. It is generally worth about £2 a ton less than sulphate of ammonia; but at present whereas the latter is worth £11 a ton, the former fetches £12. This is curious enough, seeing that sulphate of ammonia contains 20½ per cent. of nitrogen, and nitrate of soda only 16 per cent. (1)

Butter.—It is some years, twelve, I think, since I tasted butter, but, on May 4th, Mr. Gylling, a Swedish gentleman, who is cultivating a couple of farms on the Sorel sand, brought me a pat which he besought me to try, and having tried, to give him my sincere opinion about. Well, in appearance nothing could surpass it: the colour was perfect—a light yellow, or rather a deep straw-colour—and the shape, ornament, and exterior texture, all that could be desired. In fact, I never saw a more taking pat of butter in my life, and that is not a little to say. As to the taste, no winter-butter could be better: I ate it with pleasure, almost with greed. There was a slight fault in the interior texture; for upon each face, after being cut, it presented a somewhat marbled appearance—very trifling—which was caused, probably, by the cream of each skimming not being sufficiently mixed with its predecessor and its successor; but, as a general thing, this butter would have brought the top price in any market in this country, and even in London.

The cows which produced this excellent butter were fed as follows:

Straw ad lib.

Red carrots, one pailful a day.

Moulé (oats with a *pea* or *two*) 4 lbs. a day.

Linseed, 1 lb, boiled in plenty of water, a day.

Unfortunately the linseed was not crushed. This butter sells here at 25 cents a pound, and the only trouble is to supply the demand. As for the other that is brought for sale here, I tasted the supposed best, after Mr. Gylling's, and it was impossible to continue eating it.

The weather.—A very extraordinary month of May. Not the tenth part of an inch fell here during the first 23 days, which gave the farmers a chance to get on with their work. A good deal of grain was sown, though, owing to the land being frozen tight on the 7th of last November, all the ploughing had to be done this spring. On the 24th and 25th a few thunder showers fell, which were of much benefit, though I regret to hear a vast quantity of seed perished from the drought in the neighbourhood of Saint-Ours and other places on the Richelieu. The grain does not come up nicely; some of the seed sprouted and made its way through the surface very quickly, while others are not yet up. The root-crop, which is assuming a considerable degree of prominence in this district, is being sown. Senator Guévremont will finish putting in his seven acres of swedes, mangels, and carrots, on Thursday. Potatoes, of which a great acreage has been planted, are above ground in several places; but the land looks foul, and people here will hurry the cultivation.

On Saturday, Pierre Guévremont was rolling a piece of wheat next the road by which the folk come to market, and more than one *habitant* exclaimed as he passed: "What are you doing there, you band of fools?" I wonder what they will say on Thursday, when they see him harrowing in grass-seeds on a piece of wheat three inches high!

(1) Since writing the above, I see that u. of s. has fallen back again a pound a ton.

Horse-breeding.—A Lincolnshire farmer, Mr. Kirkby, who has been passing the winter here, has gone home to bring out four thoroughbred brood-mares and thirty Lincoln ewes, with a couple a rams, to establish a *haras* on the Sorel sand! I took the liberty of telling him before he left that a more hopeless case of lunacy I had never met with. There is not an acre of land in the parish fit to carry any such stock. Canadian cows and Down sheep are the only stock that it can rear, without going to a great expense in artificial food. A great Lincoln sheep would starve here, and where a proper stallion is to be found for the mares within a distance of fifty miles I do not know.

Sparrows.—These abominable pests must be expelled, somehow or other. They have done and are doing an infinity of harm. I see that in England, as long ago as 1780, the Churchwardens of my old parish in Kent announced that they were prepared to pay for sparrows' heads sixpence a dozen the first year, ninepence the second, and a shilling the third year. Is this opposed to the views of some theorists? Let them consider how soon twelve of these birds will destroy a quarter dollar's worth of wheat.

Spurrey.—I have more than once spoken of this plant as adapted to light land incapable of growing any other food for cattle. There are two species of it cultivated, in Holland and in Flanders, for winter food, when there is a prospective scarcity of grass. It enriches the milk of cows, so as to make it afford excellent butter, and gives a fine flavour to the mutton of sheep fed upon it. Lord Walsingham's agent in Norfolk speaks highly of this plant, and reports the yield as equal to that of tares. I wish some one would try it here; there is plenty of almost barren land open to the experiment.

Spinach.—Here, again is a vegetable which, properly grown, is of the most delicious substance and flavour, but which, from being generally lumped in among clods and weeds, without manure, and allowed to grow as it pleases, is despised by almost every one. By the bye, it is one of the droll peculiarities of the English language that "*Spinach* is perfectly anti-phonetic to *Greenwich*"; or, in other words, rhymes with it! Spinach was originally all of the prickly kind, as is evident from the name—derived from *spina*, the same as the French *épine*, a thorn. The *ch* of the last syllable is clearly from the Italian, *spinaccia*, the *cia* being pronounced in that language as if it were written *chia* in English.

The winter crop of spinach should be sown about the first week of September, in rows about a foot apart, and singled to three or four inches in the rows. I do not think well of covering the plants with straw, as is sometimes done, but a few branches of spruce, laid lightly over them, will retain the snow.

The land cannot be too rich for this plant—it is worthless unless quickly grown, particularly the spring kind. In sowing early crops, as well as for those which are to come in regular succession during the summer, it will be necessary to begin and continue the sowings at two or three different times, starting from the moment the land is fit in the spring, choosing the warmest and driest part of the garden for the purpose, and only putting in small quantities at each sowing, as the crops are very liable to run up to seed. In cases where constant successions of spinach are wanted during the summer, it will be requisite to continue the repetition of the sowings every fortnight, as the plants of the sowings run up to seed very rapidly. Now, the moistest parts of the garden should be chosen, the seed sown thinly, and in drills not more than an inch deep. Thin out the plants to prevent crowding, which tends to encourage their going to seed.

Having grown the plant, the next thing is to cook it: wash thoroughly in several waters, and when you think it is quite clean, wash once more; shake off the water, and put the spinach into an agate-ware saucepan—the water that clings to the leaves is sufficient to cook it. When boiled enough, drain it through a cullender, and press the spinach with a spoon until it is as dry as possible, then place lightly porched eggs on it, and serve as quickly as possible. A dust of black pepper and a squeeze of a lemon with a little salt will be all the addition necessary. Spinach-soup is not bad, the leaves being mixed with lettuce (cabbage kind), stewed in a good beef stock, with young onions, herbs, parsley, &c., and pulped through a sieve or *tamis*. I believe I am a *cuisinier manqué*.

Barley—I mentioned in a previous number of this journal that a Sorel farmer cut his barley on the 9th of July last year. That was astonishing enough, but what is still more astonishing is that another *habitant*, M. Didace Guévremont, the Senator's brother, sowed his barley on the 20th of July! As my readers may imagine, it did not do much, but it was harvested on the 28th of October, and I saw them threshing it in April last. A poor sample, of course, weighing about 36 lbs. to the bushel, I should say; but only think what land the *Ile Ronde* must be to grow any grain under such circumstances.

Wisner's sower.—As I feared, the farmers who have bought the machines manufactured at Brantford have used them without any previous harrowing. On Friday last I saw a young man pass the sower, with the seed shut off, twice along the furrows of a late ploughed piece of a grass-land, with the herbage coming well through, and a 'hird time with the seed going. No harrowing was given afterwards, so it is easy to see that the land is unbroken, and there being no *crumb*, the crop will not be half as good as if the seed had been sown by hand and well harrowed in. It is really sad, to see so much money thrown away.

Plum-trees dead—My plum trees, that bore a good crop of large blue plums, of no particular flavour, last autumn, are quite dead! Was it the weight of snow that pulled the branches down that caused their death? Well, they are no great loss anyhow, for, owing to the trees that overshadow them the fruit was no better than turnips; still, I should like to know what killed them.

Flavour of meat.—Here is a problem for men of science! I can tell, by the power of taste, the difference between a 6-tooth down, and a 2-tooth Leicester, but, by the power of analysis, no chemist can! On what does it depend?

Seed-potatoes.—Really, people are beginning to be too economical in the selection of their potatoes for seed. Formerly, we used to divide the crop into three portions: the largest for cooking, the middlings, for seed, and the "chats," for the pigs; but this season I declare solemnly the major part of the seed is of the last mentioned quality and size. Potatoes, treated thus, must deteriorate. Many a bushel has been planted this season the individual tubers of which were no larger than marbles. False economy, believe me, my dear friends; and you will find it out by digging time.

Straw for manure.—There is no better way of making light land lighter, than by applying very strawy dung as manure. Sorel land is of so sandy a nature, that no dung should be used on it that has not been reduced by well managed fermentation to the most compendious form. And yet, I see every day the very rawest of dung put into the drills

for potatoes, and that dung made from cattle littered with the *gros foïn*, commonly called *herbe à lien*, that grows on the islands at the entrance of Lac Saint-Pierre, and is generally used for paper-making. For some reason or other, this hay is very loath to enter into fermentation, and the consequence is that the manure, such as it is, takes a long time to combine with the soil. Dung for light land should be thoroughly rotten; for heavy land it can hardly be too green, provide it be free from the seeds of weeds.

Headlands again.—The greatest difficulty I have with the farmers of this neighbourhood is to make them understand that headlands properly treated should produce as great a crop as the rest of the field. They are taking more pains about them this year, but they are still far behind what I should like to see. Each time the main body of the field is ploughed, the headlands should be split or gathered, harrowed and rolled, the couch and other root-weeds gathered, and, when in roots or corn, be ploughed again immediately the horse hoeing is finished.

Experimental farm.—The Ottawa experimental farm is now in full operation. Mr. Saunders showed me 140 samples of wheat from different parts of the world, each containing 25 lbs. and to be sown on $\frac{1}{2}$ of an acre of land. This part of the undertaking alone will give the superintendent enough to do.

ARTHUR R. JENNER FUST.

Ploughing for Spring Crops.

It will be highly interesting and instructive to obtain now, and at intervals throughout the spring and summer, reports on the best time of ploughing stubbles for spring crops. When autumn cultivation has been editorially commended in our columns of late years, there have always been among our correspondents those who advocated the opposite practice. What we, therefore, particularly ask here is, that those who then expressed themselves opposed to autumn cultivation will now come forward and give us the benefit of their fresh experience in spring ploughing for root crops. We assume, of course, that they have been practising what they preached. In a season like the present, when field work has been far behind, the question could be pretty easily settled; but we must take into account more than the "nice mixed soil, kind for barley." What have clay-land cultivators to say about it? and many others whose fields have been saturated if not submerged for weeks previous to the beginning of April.

There must be a record of the working before we can judge aright of the matter. The advocates of unbroken stubbles during winter, would, therefore, require to prove their case throughout—beginning with the condition as regards cleanness, dryness, &c., of their unbroken stubbles at the date of spring ploughing, and mentioning date of same, daily or weekly rainfall between that date and last harvest, and whether the stubbles were winter grazed or not; next, how the furrows turned up in spring as to tilth, &c.; then the later rainfall, spring workings, condition, and seeding of the land; and, lastly, the progress and result of the crop. We should then be able to discover wherein experiences differ; and to determine whether soil and climate only are at the bottom of it, or the methods of working, or all of them.

We are almost unanimous in the South on the advantages of autumn fallows for the next year's green crops, but in Scotland there is we are told a comparative absence of autumn cultivation for roots, though the stubbles invariably get a winter furrow. The additional humidity and coolness of the northern climate render autumn cultivation, in the sense in which it is understood in the South, a matter

both of less importance and greater difficulty than in England, where the rainfall is much less, and the drying power of the sun in spring is much greater. But though in Scotland the land for roots is chiefly prepared in spring, there is very little spring ploughing practised. *The spring work is now done almost wholly by means of the grubber or cultivator.* After an autumn or winter furrow, the grubber is better for retaining the tilth on the surface, and the moisture of the soil is less evaporated than by spring ploughing.

The latter is a point of great importance for root-culture in dry seasons, especially when the spring tillage is late. Nothing favours drought more than deep ploughing in spring or summer, and to cultivate roots successfully there must be a deep furrow at some stage. Neither deep ploughing nor spring tillage is bad, but the reverse, if rightly done. The deep furrow should be given in autumn; and then in spring and summer the tillage may be shallow, and cannot be too frequent.—*Eng. Ag. Gazette.* (1)

CORRESPONDENCE.

Georgeville, P. Q., 1st June, 1887.

Dear Sir,—I wish to import from England some manufactured manure. I wish to sow it on a piece of land which has not been ploughed for several years and is pretty well run out. My intention is to give it a heavy dressing of fertilizer so as to secure a good crop of oats, and seed it down at the same time, making it first rate grass land. Would you kindly inform me what description of fertilizer I should ask for, and what quantity per acre I should apply. The land is a light loam, in some places sandy. Would the land be in better heart if a second crop oats were taken off it instead of seeding it down with the first crop? It has not been ploughed for so many years that it will require a thorough working to mellow it.

Any information you can give me on the subject will be thankfully received.

Yours truly,

NEWTON BROOKHOUSE.

Answer.—In reply to Mr. Brookhouse's letter, I beg to say that the manure I should recommend for oats is:

Bone-dust	448 lbs.
Or, Superphosphate.....	212 ' (2)
Nitrate of soda.....	200 ' (2)
Or, Sulphate of ammonia..	160 "

The superphosphate to be the plain preparation of phosphate of lime and sulphuric acid.

(1) Gracious goodness! I thought this question was settled 40 years ago in favour of autumn-clearing of stubbles and pre-winter deep ploughing. A R J. F.

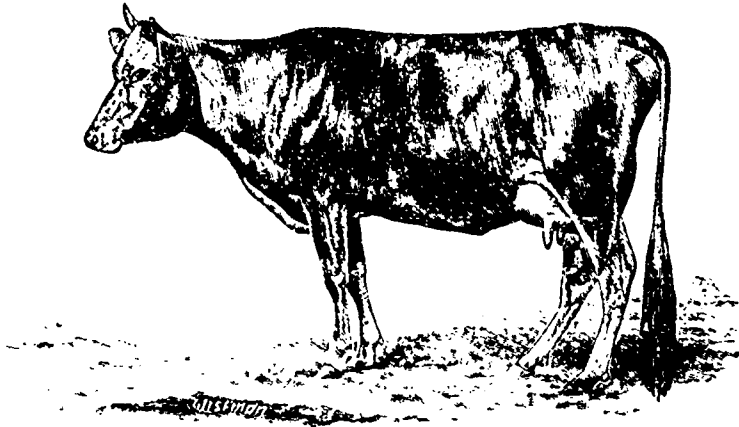
(2) Superphosphate, 26% to 28% guaranteed soluble phosphate per cent, is selling in England for \$8 57 per ton of 2,000 lbs. Here, for 26% of available phosphate, i. e. partly soluble partly reverted, the price is \$26 per same ton!

If the sulphate of ammonia is preferred, it should be sown, with the bone dust or superphosphate, before harrowing in the seed, but the nitrate of soda must be spread after the oats are well up, and a dewy morning is the best time for its application. I fear the nitrate of soda has risen in price lately, and, in consequence, the sulphate will supply the nitrogen at a lower rate.

As for the preparation of the land, if the fall-ploughing is properly done, that is, if the furrows can be laid at an angle of 45°, nothing more will be required until the spring. But if the land is so tough that this is hopeless, I should make a "bastard fallow," by ploughing in August, harrowing and grubbing two or three times, and in October lay it up for the winter with a furrow of 7 x 10 inches. There will then be no need of growing a second crop of oats, but the land may be sown down to grass with the first crop.

If two crops before seeding are determined upon, try, first, pease and then oats. *Black Tartars* are the sort that will best suit your land. Roll after sowing with the heaviest roller you can get.

I should be glad to know the cost of the manure imported from England as laid down on Mr. Brookhouse's farm, including freight, insurance, and duty, which latter, as far as I can gather is six dollars a ton, which, for the superphosphate, will amount to about 75% on the original price.



IMP. GUERNSEY BONNIE LASSIE AT 2 YEARS.

Grapes.—Mr. Nelson, formerly agent for the Beaconsfield vineyard, informs me that the cultivation of grapes, on anything like a large scale, is fast following in the steps of many another "boom." Mr. Gallagher's large yard near Pointe Claire is ploughed up, and the

vines, being unsaleable, were given away to any one who cared to take them. Mr. de Beaujeu's sixteen acres of Champion grapes are still in existence, according to Mr. Nelson, but, owing to neglect of pruning and cultivation, in but a sorry state. The fourteen acre-yard of Italian vines at Longueuil has vanished from the scene, so that the inhabitants of that place will never taste the promised half-pint at five cents! (1)

St. Lambert Jerseys.—Mr. Reburn informs me that he sold, at the New York exhibition of dairy cattle, five heifers of Saint-Lambert blood for \$3,500! I wonder what the Holstein-Frisians, that beat all the cows on the field, fetched! The Guernsey herd was considered, as a whole, the pick of the show, at least so says *The Rural New Yorker*.

Pace of cart-horses.—I do not ask for a rapid pace in horses at plough, because no man can turn a furrow properly if the team exceeds 2½ miles an hour, but my goodness! the cart-horses that work for the corporation of Montreal do go rather too slow! I passed a week in Dorchester Street at the

(1) M. Renaud, the proprietor of the Longueuil vineyard, told me, in 1880, that he intended to set up a *cabaret* on the spot and sell wine by retail at the price mentioned in the text.

beginning of the month, and watched the lazy scoundrels of carters dozing on their loads, and I do not hesitate to say that the pace, as a rule, did not exceed one mile an hour! No wonder the rates of the city are so high that people prefer living in the suburbs.

I have had so much to do, what with giving my last supervision to the Sorel farms and moving to Laohine, that I must defer my promised review of Mr. Lynch's pamphlet of dairying till next month. In the mean time, I recommend every farmer to buy a copy of it, as it is a thoroughly practical, useful work. My address for the future will be Box 109, Post Office, Upper Laohine, P. Q.

ARTHUR R. JENNER FUST.

Frelighsburg, April 14th, 1887.

ARTHUR R. JENNER FUST.

Dear Sir,—Knowing your knowledge of farming, I would be very much obliged for your advice, on reclaiming an old pasture. It is a dry stony pasture and bound out, as we call it, with most weeds, &c. How do you think it would work to sow on early in the spring mixed grasses, and then give it a thorough harrowing with a Scotch iron harrow? The soil is a loose gravel, that is, the portion that needs seeding the most. I think ploughing would be beneficial, but the expense of fencing in a few acres at a time, is very great. What grasses, and in what proportion to an acre would you recommend? An early reply, to my address, would be thankfully received.

I remain your most resp.,
H. C. BLINN. (1)

POLLED CATTLE.

In the original struggle for existence among wild animals, the possession of horns, as offensive and defensive weapons, was undoubtedly an advantage to cattle, and whenever in the case of any animal any advantage occurred in size, shape, texture, or solidity of these weapons, it would be likely to be perpetuated, owing to the superiority it would give its owner in the battle for life in its kindred and other wild animals. But, however useful horns may have been in a wild state, in a state of domestication they are not only useless, but a source of danger, mischief and inconvenience. Prejudice and the endearment of association will, for a considerable time yet, lead many to prefer horns, but the admirers of "no-horns" are steadily and rapidly increasing, and doubtless will soon be, if they are not already, in the majority. One of the greatest hindrances in this direction is the difficulty stockmen experience in dissociating their favorite breeds from horns. What Shorthorn, Hereford, Devon, Ayrshire, or Jersey man can readily imagine his favorite breed without horns? As polls they would naturally appear something different, and would lose the place they hold in his regard, for the true lover of any breed admires not only their acknowledged excellencies, but all their special characteristics—even their defects, as in the case of horns. Wouldn't any of these fine breeds be really more valuable without horns, if with their horns they lost not a whit of their other characteristics?

Hornless cattle are generally milder than others in disposition; are less likely to injure man or beast, and can be shipped closer without injury. Can any stickler for any horned breed mention any advantage in the way of beef or milk production secured to his favorites by the possession of horns?

Polled or hornless cattle have been found in many widely separated places from time immemorial. Those of Great

Britain were known to the Romans in the days of Julius Cæsar. They are all supposed to have been originally horned, and the change is attributed by some either to the natural conformation to the country where the breeds originated or to the effects of selection in breeding, or to a combination of both; while others think it due mainly to "sporting" or unaccountable variation from the ancestral type in some animals, and the perpetuation of this variation by design or circumstances. Certain it is, as we learn from D'Azra, that "in 1770 a hornless bull was produced in Paraguay which has been the progenitor of a race of hornless cattle that have multiplied extensively in that country." If such has been the origin of the Paraguayan polls, why may not the other hornless breeds have originated in the same way? "Muleys" have never been very uncommon among horned cattle.

Of the present recognized breeds of polled cattle the Galloway is probably the oldest. Its original home is in the counties of Wigton, Dumfries, and Kirkcudbright, forming the ancient kingdom or province of Galloway in the south of Scotland. The predominant color is black, though some are tawny, red, brown, or even dun; and others have white faces and are sometimes marked with white on other parts. They have always been noted for their excellent beef qualities, a writer in the sixteenth century speaking of them as "fair ky and oxin of quhilk the flesh is right delicious and tender," and the Galloway rib is a favorite with epicures to-day. They are symmetrical and compact in form; the skin, though thick, is soft and mellow; the hair long and silky; the flesh well and evenly distributed. They are straight and broad across the back, with short legs, long sides, well-sprung ribs and well-rounded hips, and very vigorous and hardy. The cows are poor milkers and soon run dry; but their milk is rich in butter. This shortcoming is greatly due to the custom of allowing the calves to suck their dams as long as they gave milk, and to the fact that it is as butchers' animals they have always been chiefly valued, so that little or no attention has been given to milk production. Lately they have been less numerous in their original home, having been, to a considerable extent, superseded by the Ayrshires, as the farmers have been devoting more attention to the dairy. Formerly great numbers (often 30,000 a year) were driven south to be "finished off" for the London market on the rich pastures of Leicester, Norfolk and other eastern counties, and the shipments are still heavy by rail and steamer.

The Polled Angus or Aberdeen—which the American breeders agreed, less than two years ago, to call Angus-Aberdeen—are in many points like the Galloways, but larger, flatter in the side, thinner in the shoulder, and longer in the leg. Being originally accustomed to a more humid climate (1) and better treated when calves, they have a finer though hardly smoother skin, and a less rough coat of hair. They are also better milkers, though as they have been almost invariably raised for beef, and little care has been given to the development of their milking capabilities, their yield, though rich, is considerably less than that of the Ayrshires and other dairy breeds. They are very hardy, good breeders, mature early, fatten quickly, and can "rustle" for themselves almost as well as the Galloways. The prevailing color is black, though some are a kind of yellow or dun. Great numbers of them used to be driven as Galloways to the south of England, and their meat is considered prime in the London market. Their success as prize-winners at the Paris Exposition of 1878, gave them a great "boom," which the breeders were not slow to make the most of. Some think the Angus-Aberdeen and Galloway were originally identical, and that the

(1) Omitted last month: v. p. 85, June number.

(1) Galloway, a district on the West coast of Scotland, is much damper than Aberdeen, on the East.
A. R. J. F.

differences now noticeable are due to differences for generations in their environments; others are of opinion that each originated in its own section.

The Norfolk Polled Red is generally supposed to have originated from selections made by the Norfolk farmers from the best Galloways grazing on their pastures. Those were bred for milk as well as beef, and hence a greater development of the milking capacity. This origin, however, is denied by many who insist that the race originated in the county. (1) Suffolk has had from time immemorial a breed of red polled cattle, excellent butter makers. It is known that there were frequent crosses of Suffolk bulls on Norfolk cows, and according to Marshall, the result was an "increase in size and improvement in form." No doubt it was in this way the present breed of Norfolk and Suffolk Red Polls was formed. Since 1846 both counties have competed with stock known by this name at dairy and fat stock shows. They are of a rich red color, with the udder of the same shade; but the tip of the tail may be white. They are excellent milkers, fatten readily, make prime beef, and combine in a high degree the two leading objects of beef and milk production.

Some years ago a hornless breed called the Jamestown, was originated in Massachusetts by a cross of a pure-bred Jersey bull on an imported Norfolk and Suffolk Red Polled cow. The sire was from Motley's Flora, imported in 1851 by the Massachusetts Agricultural Society, and the dam was brought over from Ireland in the relief steamer Jamestown on her return after conveying a cargo of provisions to the starving inhabitants during the famine of 1847. The progeny of the cross was the polled bull Jamestown (called after the vessel) which gave his name to his polled progeny. The family was kept up by crosses on Ayrshire and Jersey cows, the hornless calves only being retained, until it grew numerous enough to be perpetuated without admixture of the blood. In 1878 it was recognized as a distinct breed by the Norfolk Agricultural Society (Mass.), and it was described and illustrated in the RURAL of January 22, 1881; but of late we have heard little or nothing about it.

R. G.-N.

LADY FULTON.

The head of this beautiful cow is illustrated on page 106. She is a cross bred animal, being three-fourths Red Poll and one fourth pure Devon, bred and owned by L. F. Ross, Iowa City, Iowa. To our mind she carries the marks of her Devon blood in her face and head. She is a fine cow, one of the best in a noted herd. These cross-bred cattle are said to be, in some respects, superior to thoroughbreds of either breed. The potency of the polled breeds in producing hornless calves is most marked. Mr. Ross states that he produced a herd of "home bred polls" by crossing the Devon and Short-horn on the native polled or "muley" cattle of Illinois. A polled bull produced in this way, though three-eighths Short-horn and one half Devon, got polled calves without exception, and his progeny inherited this characteristic. Much experimental breeding has evidently been attempted in this herd, and with good results.

The imported Guernsey heifer Bonnie Lassie, whose portrait appears herewith, gave, while in flush with her first calf, 33 to 35 lbs. of milk daily, which tested over 25 per cent. cream. From April 27, 1885, to March 16, 1886 (when we last heard from her)—a period of 315 days, she had given *four tons* of milk, and was still yielding 22 lbs. daily. Bonnie Lassie is a member of the Paulsdale Guernsey Herd, property of Mr. W. M. PAUL, Moorestown, N. J.,

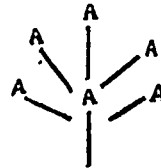
(1) As it certainly did

A. R. J. F.

whose advertisement has lately appeared, and who writes us that he is a warm advocate of the COUNTRY GENTLEMAN and does all he can to induce other Guernsey breeders to do more in the way of keeping the breed before the notice of the readers of its columns.

Irrigating by Springs.

EDS. COUNTRY GENTLEMAN—There are numerous cases in which springs upon elevated land, or near the foot of a hill, can be utilized for the purpose of irrigating crops, especially grass, upon the lower land. Usually these springs form a swamp or morass, and render the ground thus occupied useless. By draining them, and collecting the water by as many branches as may be necessary into a reservoir, the land is brought into a profitable condition, and a permanent meadow made, which would be doubly productive by using the water for irrigation. The first thing to be done in such a case is to locate the reservoir in the most convenient spot for using the water, and to lay drain tiles from it to the wet ground. Here the drains are made to diverge to each of the springy spots, where they may branch again, so as to form effective outlets for the water. The accompanying diagram will show how this



is done: A A are the wettest spots of the swamp, and these may be found by pushing sharp pointed poles into the ground if the flowing water is not visible, or if the whole ground is wet, the heads of the drains may be formed in this way to collect the water. Several of these spots are then connected by drains with a main drain which leads to the reservoir. This is discharged, when filled, in the manner mentioned in a previous article. This storage of the water is preferable to the constant dribbling of it from the

outlet, by which only a small piece of land would be kept always wet, which is not desirable, because much more ground can be covered by a periodical discharge.

Sometimes a wet swamp lies at the foot of a slope. This is the result of the percolation of water down the slope through the subsoil. By cutting off this water by a deep ditch near the foot of the slope, the low ground is drained, and the water gathered into one stream, which may be utilized as above mentioned to irrigate the lower ground. I have succeeded in changing a large swamp into an excellent meadow by this method. The swamp was so wet and miry that the owner had lost several animals in it, a pair of oxen having been mired and submerged in a soft spot while drawing off a load of swamp hay. A ditch 7 feet deep was dug on the higher ground around the swamp, and the water led into a pond made with a low dam. The pond covered about a quarter of an acre, and was used for making ice in winter, and thus paid all the expense of the ditch and itself the first year. The pond was let out into a series of slow, flat channels, which were closed by the hand gates previously described, until the quite level surface was covered slightly, and the ground well watered. When the pond filled up again, the water was distributed over other parts of the field, and thus, in turn, every part was watered. The quantity of water thus collected was surprising; the hillside, of about 13 acres, discharged constantly an amount equivalent to a stream of 1½ square feet, flowing 80 feet per minute, or 120 cubic feet, which is sufficient to cover ten acres four inches deep every ten or twelve days. (1) This may seem to be an excessive quan-

(1) One inch deep of water, or even less, kept flowing in constant motion, is quite enough.

A. R. J. F.

tity, but the meadows of Lombardy, which receive an annual rainfall of 38 inches—or about equal to that of the United States—are supplied, as a rule, with a little more than this amount of water from the irrigating canals, and thus are enriched to produce a daily growth of grass equal to one inch in length, or nearly 16 feet during the whole season.

This instance shows the surprising effects of a maximum useful supply of water for the growth of grass, and the opportunities for its profitable use in the very numerous cases where it is suffered to escape uselessly, or become a damage and a nuisance.

AGRICULTURAL ENGINEER.

Country Gentleman.

HEREFORD CATTLE.

The Hereford is treading close on the heels of the Short-horn. As a beef breed many consider the former on a line

brown color with scarcely any white, as well as others with mottled faces. (1)

In the History of Hereford Cattle just published, the authors, after a full rehearsal and comparison of all attainable information, say that a review of all the circumstances connected with the origin and development of the breed seems to establish the fact that it was founded on a variety of aboriginal cattle of the type from which the Devon and Sussex breeds have been derived. At an early period white Welsh cattle, larger in size, and probably of foreign extraction, were introduced and mixed with the stock of Herefordshire, imparting a tendency to white markings, and enlarging the frames of the native breed. In 1671, Lord Soudamore introduced from Flanders a number of red cattle with white faces, which "strongly accentuated the white face," without rendering it universal. This cross probably also increased the size of the breed. During the 18th century other districts of England were resorted to for stock, as we read of the



HEREFORD CATTLE.

with the latter, or even a little ahead. (1) The earliest notices of the White-faces praise them for their large size, hardiness and excellence as draft animals, as well as for their aptitude to fatten readily, and for the superior quality of their meat, beautifully marbled by a desirable admixture of fat and lean, and for their profitableness as feeders, as it has long been claimed that in proportion to the feed, they lay on more flesh than any other breed. Beyond rare notices of this sort, little is known as to the early history of the race before the opening of the present century.

They are, no doubt, to a great extent, an aboriginal race, bred for ages in the county from which they get their name. It is generally thought that they belong to the same stock as the somewhat smaller cattle of Devon and Suffolk, and like these they were originally a solid red. At these counties are a considerable distance away, however, and other breeds were common in the intervening country, there are some doubts on this point. The present characteristic markings of the breed are of comparatively recent date; for late in the last century and early in the present, there were Hereford cattle of dark red or

introduction of Gloucestershire, Devon and Montgomery blood into the race.

Like nearly all our most valuable modern breeds, the Hereford would therefore appear to have been the result of judicious amalgamation of various good sorts, both home-bred and foreign. Various elements were grafted on the native stock, stimulating the development of better properties.

It was in 1760 that Robert Bakewell, of Dishley, Leicestershire, at the age of 35, succeeded his father as proprietor of the Dishley farm; but he had already obtained some reputation as a breeder, which was soon greatly increased. His example and the results of his labors stimulated not only the Collings and other early Short-horn breeders, but also the breeders of Herefords. Down to the close of last century, cattle in England were bred more for excellence before the plow or the wagon than in the dairy or the shambles; and Bakewell was the first to devote his attention to the production of animals that would mature early, lay on fat readily at the lowest cost for food, and give generous results at the pail; and to accomplish the object he was the first to employ a scientific method of breeding. What the Collings brothers were in the improvement of the Short-horns, the Tomkins,

(1) Herefords fetch a trifling higher price in the London market than Shorthorns. Still, a Shorthorn of neat form, and not too heavy, will bring pretty nearly as much as a Hereford. A. R. J. F.

(1) Or *snoky* faced.

A. R. J. F.

father and son, were in the improvement of the Herefords. The elder Tomkins (Benjamin) is supposed to have begun breeding about 1742, and had a large measure of success, but his son, Benjamin Tomkins, the younger, was by far the more noted breeder. His herd is supposed to have originated in 1766 from stock purchased in the neighborhood of his farm at King's Pyon, Herefordshire, and though he paid little attention to color, and early in his career was not particular about introducing the blood of other Hereford strains,

vivors of Tomkins, and whose names and strains are still honored in Hereford circles, are Galliers, Tully, Skyrmo, Prico, Howor, Jeffries, &c.

The cows Dorothea and Theodora, page 104, winners of the first and second prizes at the Royal show of 1884, are specimens of the breed. As will be seen, the face, throat, chest, belly and part of the legs with the crest of the mane and tip of the tail, are white. Countenance pleasant, and



LADY FULTON.

or even of other breeds, he left at his death, in 1815, what was considered the finest herd of Hereford cattle in existence. After this had been greatly reduced by private sales, 28 head were sold by auction in 1819, and averaged £149 each. At Charles Colling's sale at Ketton, in 1810, the average of 47 Short-horns was £151.8s., and at Robert Colling's sale at Bampton, in 1818, 61 head averaged £128, 17s., 10d., and at his sale in 1820, 46 head averaged £49, 8s., 7d. So that the prices at the first great Hereford and Short-horn sales were hardly in favor of the Short-horns.

Other eminent Hereford breeders, contemporaries or sur-

open, denoting good temper and that quiet disposition essential to economical fattening. Head small in comparison with the rest of the body. Chest deep and full. Shoulder-blades thin, flat and sloping towards the chine, and well covered with mellow flesh. Chine and loin broad. Hips long and moderately broad. Legs straight and small. Rump forming a straight line with the back. Thighs full of flesh to the hock. Flanks deep. Ribs well sprung. The whole carcass covered with rich, mellow flesh. Hide thick, yet mellow, well covered with soft, glossy hair with a tendency to curl. Horns such as are borne by the "middle-horned" class.

OHIO MODES OF ENSILAGE.

HOW TO DRILL, CUT AND OTHER POINTS IN PRACTICE.

EDS. COUNTRY GENTLEMAN.—While I would not for a moment think of calling in question the editorial instructions in regard to filling a silo, found on page 693, I would like to put the "Ohio idea" on record in regard both as to planting and cutting ensilage fodder. Here, in Ohio, the common grain drill is almost exclusively used in planting ensilage corn. To do this, all the force feed holes are filled up, except two, selecting two holes $3\frac{1}{2}$ feet apart. These are open to their full capacity, feeding out not far from 16 quarts per acre. This year there has been a great change in opinion respecting the amount of seed needed per acre, and many will not drill in over 12 quarts per acre next year. The object is to get greater maturity of fodder, and a heavy growth of corn ears.

The season I put in a field of ensilage corn, using less than 12 quarts per acre, and nearly every stalk has a fine ear of corn, that in value approaches one-half that of the fodder. (1) The growing sentiment is that this is the proper way to harvest corn where it is all to be fed on the farm. The fodder is then all saved. There is no husking and cribbling corn, and keeping it away from vermin. The miller is cheated (?) out of his toll, and the labor of going to mill saved. While for stock, there can be no loss in the nutritive qualities of the corn, but a gain, as the grain never becomes hardened, and full of its natural juices, it goes into the system of the animal ready at once to be assimilated with but little of the work of digestion necessary with dry grain.

In drilling in a field, it is a matter of much experience to scatter just about enough by hand in the furrow, but the drill does it accurately and expeditiously, with straight rows, and the drill also does good service in giving the ground one more good working.

The filling of the big silos is going on actively about here, and it is all being cut with sweep rake reapers. I have never seen ensilage corn so large but that it could be readily cut with such a reaper, and delivered in good gavels, and as compared with hand cutting, it reduces the cost of cutting materially. The reapers of Messrs. Wing, Blair, Kent, Brock and others were going yesterday, and they mowed down tons per hour, but no one should attempt to cut but one row at a time, and then there can be no entanglements. No one here now thinks of binding these gavels of fodder to handle. The low waggons are provided with a cleated walking plank, fastened to the rear end of the rack, and a man picks up one of these gavels in his arms, and walks up the plank, and deposits it crosswise of the rack, and they are taken from the wagon in armfuls and laid upon the cutting box, where the machine feeder strings them in between the feed rollers. The stalks are thus only handled once in the field, and once at the cutter, which makes the economy of labor as great as can be devised, although I understand a Canton, O., genius is at work upon a machine which he proposes to attach to the rear of the wagon, where it is expected to pick up and deliver on the load these heavy gavels, and thus reduce the cutting of ensilage practically to machine labor.

Nearly all the ensilage in Ohio is cut into the pits with tread and sweep horse-powers, but I am prepared to believe, since the ensilage corn is allowed to stand a few weeks longer to mature, that a few farmers will cooperate, and time the ensilage cutting somewhat, and own small engines in company, and an engine will thus be used to cut for two or three farmers, and allow all the teams to go into the field on the fodder

wagons. Mr. Emory, Mr. Brock, Henry Camp, and Mr. Wing, are this year using small engines in filling their huge silos, and there is such a never-tired action about them as compared with the teams on the sweeps, or treads, that \$150 for a good engine does not seem a very great price after all to pay for one, where one cuts from 10 to 30 acres of ensilage, as some farmers do in Ohio.

Last week I saw the silo of Mr. Swan of Cent, O., the "boss" milkman of that city, and it seems in some respects the most complete silo I have yet seen. It is built of wood, a building of itself, forming an L to his fine basement barn, 30 by 16 feet, with 14 feet posts. It is built all above ground, of studding 2 by 8 inches, covered with drop siding. It is lined up on the inside with inch boards, and the dead air-space filled in with pounded-down sawdust. The walls on the inside are furrowed up with quarter-inch stuff, and then lathed and plastered, the plaster being made of Akron water-lime cement. Divided into two pits, with a knock-down door, made in sections between the two, and a similar one at the end opening out on a level with the feeding floor of his stable, Mr. Swan seemed to have a silo that must be near perfection in the preservation of ensilage. A Baldwin ensilage cutter, with carrier, deposited the ensilage in either pit, and aside from his own lot, the cost of putting the ensilage in the pits was thought not to exceed 15 cents per ton, while the cost of raising it, he said, was not nearly so much as his field corn.

The Coit Brothers, near here, are now engaged filling their 200-ton silo, with field corn exclusively; and it will be fed almost wholly to steers and fattening cattle. Should the milk business brighten up, they will next year build another silo, holding 400 to 600 tons, and milk 100 cows for the Cleveland milk trade; and Messrs. Wing and Camp will also silo their field corn this year. Besides the new ones created hereabout, Messrs. Blair, Camp, Kent and others have put up additional silos, and the outlook is now that silos have come to stay, and it would not take much of a prophet to hazard the guess that not many years will elapse before many a dairyman will have a special silo to hold a soiling crop, with which, if necessary, he can bridge over such droughts as the one just closed, and not force his dairy to roam pastures brown and bare, seeking green herbage, and finding only ragweed answering to any description of green. (1)

—Western Reserve, O., Sept. 20.

"Dear Sir,—I consider that in laying down land to permanent pasture it is advisable to sow with the perennial seeds a certain quantity of annual and biennial grasses. It is quite true that if the soil is in very high condition at the time of sowing, and an abundance of manure is used during the first year or two, perennial plants may give at once a fairly good pasture, but such is not the ordinary state of land when laid down. Compared with the perennial plants, the annual and biennial plants produce but few roots and their growth is chiefly above ground; by using a portion of these plants you obtain much more herbage during the first two years, and the decay of the roots at the end of the life of these plants furnishes a supply of food to the perennial herbage.

"In reference to your further question whether sainfoin or lucerne should form a portion of the seed sown for a permanent pasture, I think that lucerne should always form a portion of the seed sown. Of all the plants known to me, lucerne is the one which yields in its produce the largest amount of nitrogen where none has been applied in manure,

(1) Sensible enough, but surely this food is not what is usually understood as "corn ensilage." It is worth while to build silos to put matured crops into? Would not they do as well if dried and stacked?

A. R. J. F.

(1) Mr. Saunders, superintendent of the Experimental farms, tells me that, in his extensive inspection of farms in the States, he found a great majority of the silos empty. The impression on his mind evidently was that their day is over.

A. R. J. E.

it also sends its roots deeper into the subsoil than any other plant. There is a field in my neighbourhood which was sown with lucerne twenty years ago; not being kept clean, it almost at once became covered with couch grass and weeds. These plants have not, however, been able to drive out the lucerne, of which there is a considerable quantity still on the land. (1)

Rothamsted.

"Yours sincerely,

"J. B. LAWES."

Plant-Roots—Again.

Our friend, the agricultural editor of the *Brattleboro Phoenix*, is not yet quite satisfied about the blindness of plant-roots, and says:

"The agricultural editor of the *WATCHMAN*, in replying to our discussion of the question 'whether the roots of plants only grope blindly in all directions for nutriment,' strangely neglects to notice our quotation from Professor Asa Gray, who is perhaps as well qualified as any man living to decide a question in vegetable physiology. The question has a scientific interest and it is also one of some practical account; we should therefore like to hear what Dr. Hoskins has to say of the quotation from Professor Gray."

We did not neglect the quotation of our friend Dr. Gray out of any want of respect to so great a botanist, but because we felt that we covered all the ground in what we said of the extract from Professor Johnson, who will be generally acknowledged, we think, by competent judges, as, on this point, the superior authority. The extract from Dr. Gray's *Structural Botany and Vegetable Physiology* given in the *Phoenix* was as follows:

"When we consider that the excitability of sensitive plants is often transmitted, as if by a sort of sympathy, from one part to another; that it is soon exhausted by repeated excitation (as is certainly the case in *Dionæa*, the sensitive plant, etc.), to be renewed only after a period of repose; that all plants require a season of repose; that they consume their products and evolve heat under special circumstances with the same result as in the animal kingdom; that, as if by a kind of instinct, the various organs of the vegetable assume the positions or the directions most favorable to the proper exercise of their functions and the supply of their wants, to this end surmounting intervening obstacles; when we consider in this connection the still more striking cases of spontaneous motion that the lower *Algæ* exhibit, and that all the motions are arrested by narcotics or other poisons, the narcotic and acrid poisons even producing effects upon vegetables respectively analogous to their different effects upon the animal economy—we cannot avoid attributing to plants a vitality and a power of 'making movements tending to a determinate end' not different in nature, perhaps, from the lowest animals. Probably life is essentially the same in the two kingdoms; and to vegetable life faculties are superadded in the lower animals, some of which are here and there not indistinctly foreshadowed in plants."

There is no need to take issue with the final statement of Professor Gray that the nervous system of animals is 'here and there' "foreshadowed" in plants. But shadow is not substance. The expressions made use of in the above extract—"a sort of sympathy," "a kind of instinct," "not different in nature, perhaps," show that Dr. Gray perfectly understands that while, as is undoubtedly true, the lower degrees of life in plants and animals are essentially the same, there is yet a distinct leap—a discrete (creative) and not a continuous degree—between the plant and the animal, as there is

between the animal and man. The entire absence of even the least rudiment of a nervous system in the highest plant separates plant life from animal life by an actual chasm. The apparent simulations of instinct in plants we may believe to be, in a sense, a true foreshadowing what can yet only become reality where the proper organs exist. The Creator undoubtedly had the creation of animal life in view while creating plants, since plants fulfill their chief use in furnishing nutriment to the animal kingdom. All through creation we see these foreshadowings, as in those dendritic crystallizations which often so perfectly simulate the ferns as to make it quite impossible to convince some people that they are not actual fossils. *Dr. Hoskins.*

About Fertilizers—Prompt Answers.

I was so much interested in an article of yours printed last May in regard to increasing the value of manures that I wish to make inquiry in regard to certain points connected with it. 1. Would it be proper to mix the ashes and other ingredients with the manure as it is removed from the stable to the manure cellar daily through the winter? If so, one would need less of other absorbents. 2. Which would you advise to be used, the plain superphosphate or the South Carolina rock ground? 3. Where can each be procured at the best rates?

I think I have taken this in hand early enough so there will be ample time to reply in season for fitting our winter's stock of manure for another spring. We sometimes write hoping to see our article in the next week's issue, and it fails to appear before it is out of season. This would not seem quite so bad if the date of the item were given, but it is still worse when the date is changed, as has sometimes been done in articles I have furnished for publication in a certain paper.

W. I. SIMONDS.

Roxbury, Vt., September 1, 1886.

REPLY BY AGRICULTURAL EDITOR.—1. Yes, it would be quite proper to mix in ashes, plaster, ground bone or mineral phosphates with manure daily, as mentioned—care being taken, in the case of ashes, that it should be perfectly cold and free from fire. 2. This would depend in some degree upon how freely we used manure upon the land. If circumstances required us to make a little manure go a great way, we should perhaps use the plain superphosphate, and the same if there were only to be a short time between making the mixture and applying it to the land. Yet, as a double weight of "floats" can be had for the price of superphosphate, and as a double weight contains four times the quantity of phosphoric acid, it is plainly economy to use the "insoluble" form in equal money's worth, when there is time (say two or three months) for the animal manure to exert its solvent action upon it. In that time the plain superphosphate and the "floats" would reach about the same degree of solubility, the former losing and the latter gaining in that respect. 3. Most dealers in fertilizers, or fertilizer agents, will supply these materials, if ordered so that they can come in the same cars with their stock of superphosphate. Bowker & Co. advertise to supply fertilizer materials directly to farmers and are a reliable firm. *Dr. Hoskins.*

The HAMPSHIRE breed has the glory of carrying off the champion £50 cup for the best pen of sheep in the hall, which goes to Babraham, where Mr. Lambert, succeeding, we presume; Jonas Webb, is cultivating a first-rate breed with success. Mr. Lambert competes here in a very small class, but for the cup he competed with all the Hampshire sheep in the hall. The Hampshire Downs are not shown in large classes.

1. Consequently, I beg to withdraw any observations I have made against sowing lucerne with other clovers or grasses

Mr. Powell Buxton, of Ware, is first in Ewes; Mr. William Woods, of Bishops Waltham, first in Lambs, with a pen weighing 6 cwt. at ten months and one week old. The champion (3) sheep, weighing $7\frac{1}{2}$ cwt. at twenty-two months old, show true Hampshire character, with less than usual of what we shall dare to call the ugly head of the breed—with body standing four-square, breast, and twist, and back equally wide throughout, giving the impression of perfect ripeness, with *no excessive fatness anywhere.* (1)

High Farming in England.

Chadbury Farm is situated in Evesham, Worcestershire, England. It is the property of the Duc d'Aumale, and has been held at an annual rental of 34 shillings per acre by Mr. Charles Randell for the last forty-five years. I visited the place toward the end of May. It lies about two miles from the town, in a charming country. As you look from the terrace you see the Malvern Hills stretching away to the west, while to the southeast loom the Cotswolds with their beautiful slopes. In the other corner, near the farm, stands the town of Evesham, commemorative of the death of Simon de Montfort, (2) while within a stone's throw runs Shakespeare's "Sweet Avon."

The farm consists of 571 acres, 3 roods, and 30 perches, of which 384 acres are arable, 175 acres pasture and orchard, and the remaining 12 acres, homestead. The soil is on the liassic formation, and consists for the most part of a stiff, tenacious clay. The whole of the farm, arable and pasture, has been drained at a depth of three to four feet, about 30 feet apart. The fields are large and well arranged, all hedges and trees having been removed when possible.

Cultivation is done by steam and horses, there being 14 of the latter on the place, "Shires," and some of them are bred annually. Steam is chiefly used for plowing. There is no especial rotation, the tenant having full liberty to grow what he pleases, and sell as he pleases, provided only that when he sells hay or straw he returns an equivalent in value to the land. Mr. Randell's great principle is never to let his land remain idle, but to keep it constantly in crops of some kind. The fallow is cropped with vetches, oats, rape, early and late cabbage and clovers. Large quantities of cow clover (3) are grown, drilled, as are all the clovers. His wheat crop averages from 40 to 50 bushels per acre, and in many years much more. He grows annually a large quantity of mangolds, the variety being the Golden Tankard, seed being grown on the farm. They are planted on the flat, 8 lbs. of seed per acre, in rows 14 inches apart, his object being to get a moderate crop of medium sized roots, rich in sugar. The average annual yield is 45 tons per acre.

The principal attraction is the Shropshire flock, bred by him for many years, and containing a remarkably fine lot of strong, heavily-wooled sheep. There were on the farm at the time of my visit about 1,000, including lambs. The produce from 350 ewes was 525 lambs. In addition to the Shropshires, 50 Dorset ewes are bought annually in April, put to the ram June 1st, and sold with their lambs the following February.

The average clip from the ewes was 7 lbs.; shearling ewes, 9 lbs.; ram tegs, 11 lbs., all washed. The ram tegs would average about 20 lbs per quarter, dead weight. No lambs are castrated, the ram lambs being culled several times and

(1) 280 lbs. for a 22 months old sheep is not bad. These would probably dress in the neighbourhood of 170 lbs. A. R. J. F.

(2) One of our greatest English heroes, in spite of his name A. R. J. F.

(3) *Trifolium medium*, a most valuable clover, but no seedsmen here keeps it. A. R. J. F.

sold to the butcher. (1) The sheep are folded the year round, except from January to April, when the breeding ewes go into the yards. While the lambs are suckling, the ewes receive $\frac{1}{2}$ lb. meal a day, together with a little cut clover and pulped mangolds, besides the folded crops. From weaning to tuppung time, they look out for themselves; and from tuppung time on, get $\frac{1}{2}$ lb. meal per day. The ram and ewe lambs receive the same. Water is always provided. The lambs are dipped every year, and after weaning are kept as much as possible on old seeds and on cabbages, of which a large breadth is grown.

In addition to the sheep, a herd of 50 cows is kept. They are of the Short-Horn breed, unpedigreed, but of a good, strong, useful stamp. A pedigreed bull is bought when necessary, so that the character of the stock improves annually. The cows are let by the year to a dairyman at \$45 each—Mr. Randell finding grass, but nothing else, and having the calves. The heifers are raised; the bull calves sold fat as bullocks, at the age of 24 months.

To work a farm like this successfully, requires an active capital of \$100 per acre, exclusive of the money invested in land and buildings. For instance, the average sum expended in purchased grain and fertilizers annually, is \$7,000—the labor bill being about \$9,000. As an illustration of the high farming pursued, the following account of the cropping, &c., for four years, as taken from the farm books, is instructive:

Size of field, 16 acres. *First year*—Barley, 52 bushels per acre; no manure used; previous crop turnips, fed off with sheep, receiving cake. *Second year*—Mangolds, manured per acre with 40 loads farmyard dung, (2) 6 cwt. artificial fertilizer and 2 cwt. nitrate of soda; yield, 47 tons per acre, one-half being drawn off, remainder consumed on land by sheep. *Third year*—Barley; no manure; yield 64 bushels per acre; straw 5 ft. 6 in. high. After barley was taken off, the land was manured at the rate of 25 loads farm dung per acre, plowed in, and one ton soot per acre spread broadcast. Sixteen thousand cabbage plants per acre were set out Oct. 1st, the seeds having been planted Aug. 28th; rows $22\frac{1}{2}$ inches apart, 12 inches apart in the rows (3) After planting, 4 cwt. per acre of Peruvian guano was scattered along the rows by hand. In spring, 4 cwt. of fish guano and $1\frac{1}{2}$ cwt. of nitrate of soda were distributed along the rows. The crop was sold standing, by auction, for \$162 per acre.

To conclude, this farm is an admirable specimen of what industry and intelligence, united to business capacity, can produce in agriculture as in all else.

JAMES LAWRENCE.

Groton, Mass.



An Improvement in Siloes.

In the most common construction of siloes, they are made of moderate width, not usually exceeding 16 feet, and of any required length, often 60 or 80. If more space is required, separate siloes are built. The greater the depth given to them the more is their capacity for an equal amount of covering, and the heavier the pressure of the ensilage above. The only difficulty in the way of much depth, is the labor required for withdrawing their contents when the bottom is lower than the stable floors.

The common practice, in feeding out the ensilage, is to cut down a vertical stratum with a hayknife, and when this is

(1) I don't like this plan. Uncastrated lambs are always what the London butchers call "foxy," i. e. red colour in the meat. A. R. J. F.

(2) Equal probably, to about 30 tons. A. R. J. F.

(3) I have always had great difficulty in getting my pupils to set their cabbages near enough together. A. R. J. F.

fed out, to cut down another, and so on in succession. This requires considerable labor in cutting, and the successively cut faces are exposed for a time to the air, and often injured by this exposure. To avoid this difficulty, some owners build several, which are emptied one at a time from the top in successive horizontal layers, which gives a fresh surface at every feeding, and the ensilage is not long exposed to the air. The objections to this course are the greater expense in the construction of so many walls, and the inconvenience of reclosing the cutting machinery for every silo when filling. To avoid these difficulties and to apply all their advantages to long silos already built, the arrangement is adopted represented in the engraving, which shows the silo with the front side and cover removed to exhibit the interior with the partitions. These partitions divide it into several compartments, one or two of which may be filled at a time; and by a slight removal of the cutting machinery, all of them in succession. The chief advantage of this arrangement is in feeding out. The outer compartment is taken first, and a sufficient layer for one ration taken from the whole surface at the top. The upper portion may be thrown over the wall or partition; the lower passed through the door, which may be made of any desired height for convenience, or, a single slice may be cut down to the door, with a hay

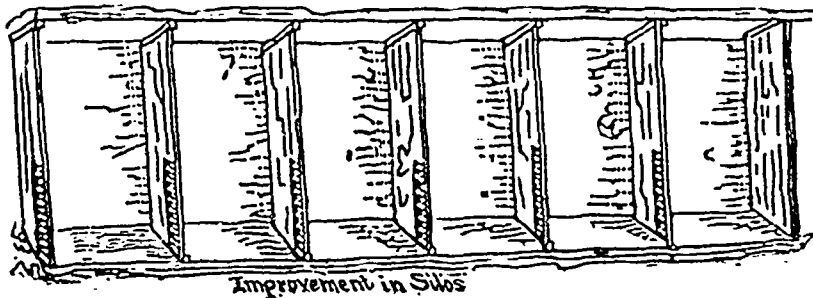
and if in addition to this oiling they could have a coating of gas tar, they would last a long time.

Country Gentleman.

Ground Coprolites.

Mr. F. C. Cooke, of Fritcham Abbey, Lynn, states, in his communication in the *AGRICULTURAL GAZETTE* of May 24th, the grounds on which he considers that he was justified in misapprehending the conclusions drawn from the Aberdeenshire and Sussex experiments. I take advantage of the opportunity thus offered to indicate clearly what we have endeavoured to establish. Mr. Cooke quotes from my Aberdeenshire report of 1875, "that phosphates of lime decidedly increase the turnip crop, but that farmers need not trouble themselves to know whether the phosphates are of mineral or animal origin..... Hence, the most economical phosphatic manure for turnips is probably insoluble phosphate of lime from any source, ground down to an impalpable powder. Soluble phosphate is not superior in effect to insoluble phosphate if the latter be in finely disintegrated form."

I should not hesitate to depart from the ground thus taken eleven years ago if subsequent experiments had shown it to be necessary. On the contrary, however, there appears no room



knife, for an opening.

The partitions are made of plank, double in thickness for strength, nailed together in contact, crossing each other. In a small silo, a single thickness of 2-inch plank may answer. A square timber is first laid across the bottom and secured at the ends. Another timber is placed at the top directly over it. Smaller timbers may be placed vertically at each side, connecting the two, for additional strength, but these are not absolutely necessary. These upper and lower timbers secure the plank partitions. Additional timbers might be placed between, were it not that they would obstruct the free settling of the ensilage.

In filling the successive spaces, if the pressure of the ensilage against the partitions causes them to bend outwards slightly, it will do no harm; but if they do not possess sufficient stiffness to resist the pressure, one or two pieces of scantling may be placed slanting, as braces against them, the lower end resting against the cross-timber which forms the foot of the next partition, and the upper end against the middle of the partition to be stiffened. These are removed when the next compartment is to be filled.

Each partition has a door of convenient height; or nearly the same thickness, braced with cross bars, and each one is opened in succession for the passage of the hand-cart or barrow for emptying the contents, all being on the same level as the adjacent cattle stalls. It is not necessary that the partitions be air-tight, as they are in actual use only a few days while the filling process is going on. If well soaked with crude petroleum, they would be quite durable against decay;

for doubt, in my mind, that all properly conducted experiments have abundantly confirmed that the position is sound and reliable.

No doubt, the term "impalpable powder" is not so definite as could be desired. The definition of ability to pass through a sieve of a certain gauge might have been adopted, but it could hardly have been used by farmers in practice, and further on it is shown that that distinction also is unsatisfactory. By "impalpable powder" we wished to distinguish easily between the desired fine dusty mass and the coarse ($\frac{1}{8}$, $\frac{1}{4}$, or even $\frac{1}{2}$ in.) particles in which raw bones are sold and the gritty particles of badly-ground mineral phosphates.

The above quotations, however, were the conclusions as originally worded, and it may be well to say that five years later on (see report for 1881, p. 9) it was found desirable to slightly alter the phraseology in order chiefly to exclude crystalline apatite. (1) The following were the

FINAL CONCLUSIONS.

I. "Non crystalline phosphate of lime, ground to a floury state, applied to soil deficient in phosphate, greatly increases the turnip crop, and also, though to a less extent, the cereal and grass crops, but always with equal effect, whether it be derived from animal or mineral matter."

(1) There! At last we have the confession of the prince of humbugs that apatite, unless dissolved in sulphuric acid, is useless! The very thing I have been fighting for during the last seven years.

A. R. J. F.

II. "Soluble phosphate is not superior in effect to insoluble phosphate if the latter be in finely disaggregated form, *e. g.*, disaggregation effected by precipitation from solution, or by grinding bones after being steamed at high pressure....."

III. "Refers to action of nitrogen."

IV. "Fine division (or perfect disintegration) of phosphates assists the braird nearly as much, and with more healthy results, than applications of nitrogenous manures.

"The most economical phosphatic manure is probably non-crystalline, floury, insoluble phosphate of lime; the cheapest form being mixed with an equal quantity of the form in which the highest degree of disaggregation is reached.

"At present these two forms are respectively ground mineral phosphate (coprolite) and steamed bone flour."

Mr. Cooke's misapprehension, and the misapprehension of many others, perhaps arises from limiting the term insoluble phosphate of lime to ground coprolite, thus excluding those other forms of insoluble phosphate of lime in which a finer state of division is obtained, such as in steamed bone flour.

In framing the above conclusions, every word was carefully weighed, and we had these two forms of insoluble phosphate, viz., ground coprolite and steamed bone flour, clearly in our view, and their respective results on crops before us. In applying these conclusions, the question which the agriculturist must put to himself is—What form of insoluble phosphate is most "finely disintegrated" or in the finest state of division? Looking at ground coprolite, it might be supposed that perfection in grinding, or division, is obtained, but that is to judge it merely by using the comparatively coarse tests of the senses of touch and sight; the state of division of ground coprolite falls far short of that in the mass of particles of phosphate of lime as deposited in the tissue of bone, where we have the ultimate molecules probably isolated, molecules or particles indiscernible even by the microscope, and embedded and glued up in this animal tissue. Let this gluey matter be separated, *as is done by steaming*, then we have probably a mass of the ultimate ultramicroscopic molecules loosely aggregated together, and thus in the finest state of division possible.

Thus much as to the *efficacy* of the different forms of phosphate of lime which after seven years of experimenting we venture to put in the following ratio:—

Phosphate of iron	0
Phosphate of alumina (redonda).. ..	3
Raw bone, coarsely ground.....	10
Coprolite, finely ground.....	10
Dissolved phosphate.....	12
Precipitated phosphate.....	13
Steamed bone flour.....	14

But, further, we recognise the *rate of action* to be—

Coprolite	Too slow, but steady.
Dissolved phosphate.....	Too rapid for healthy growth.
Precipitated phosphate }	Each moderately quick and steady.
Steamed bone flour..... }	

These differences we had to take into account, inasmuch as a good but not too rash a start often determines the weight of the crop.

Further, in recommending the most economical phosphate, we had to consider the commercial costs of the materials, and, considering that ground coprolites provided phosphate at by far the least cost, and might be depended on for steady but not immediate action, we considered that sound advice was given in saying, "Thus we are led to commend a mixture of the two extremes (insoluble bone and insoluble mineral) as the largest and cheapest producers..... Till the soil is in good 'heart,' the farmer should choose mainly the

highest producer (steamed bone flour), but (1) he gradually brings it into this condition (good heart) by the cheapest form (ground coprolites), and should endeavour to become independent of starting, by maintaining the high degree of fertility in the least expensive way."

Mr. Cooke italicises the last three words, and adds "obviously by ground mineral phosphates." In this he errs. No doubt if the land were once in such good heart that the plant would require no aid in the earlier part of its growth, coprolite might, in favourable seasons, be found to do alone all that is required; but probably only a small proportion of the agricultural area of England is in the garden-like state, and the possibility of this being sometimes attained will not justify the inference that for general cultivation the most advantageous form of phosphate can be dispensed with. (2)

Three subordinate points are also referred to by Mr. Cooke, which may be referred to in passing. We found that dissolved phosphates had a tendency to produce disease in turnips, a circumstance supposed to be due to an injurious effect of the sulphuric acid in dissolved manures, so weakening the plant as to render it an easier prey to its natural fungoid enemies. Mr. Cooke indicates that the Norfolk Society hope to obtain some proof of this. I may mention that three to five years elapsed before this result was clearly shown in our own experiments, and may warn him against expecting distinct indications in a shorter period.

The second point is that Mr. Cooke seems surprised at the outlay of 44s. 6d. per acre, along with 14 tons farmyard manure per acre, to the turnip crop. I may mention that in Aberdeenshire excellent crops of turnips are grown, due not a little to a suitable climate for that plant; also that farmers are very far from being extravagant in the application of artificial manure or very credulous as to its value, but yet no good farmer thinks of applying to his turnip land less than 40s., and often goes the length of 60s. per acre for artificial manure, along with 12 to 16 tons farmyard manure.

The third point is that Mr. Cooke mentions that he has tried steamed bone flour, and was not greatly satisfied with the result. Is Mr. Cooke sure that he used steamed bone flour? It is altogether different from raw crushed bones sold under the name of bone dust, bone powder, and, it may be also, bone flour. Buyers should ascertain that it really is steamed, and as finely ground as blown roadside dust. Raw bone is tough, and will hardly pound; steamed bone is freer; any particle subjected to pressure is easily reduced to a floury powder.

But the main point is the exact position that from the outset we have ascribed to coprolite. If, as Mr. Cooke mentions, the Norfolk Society has decided to use coprolite alone, I trust it will be on land very poor in phosphate, and alongside a patch unmanured, in order to show what coprolite can do. If, however, the land is poor also in nitrogen and potash, other two patches should be treated with these substances, the one with and the other without coprolite. I also trust that Mr. Cooke or some other gentleman will feel it to be their duty to explain that we do not recommend, and never have recommended, this form of phosphate for use in practice alone, but (3) recommend it only mixed with an equal weight of

(1) The words "steamed bone-flour," are an afterthought of Mr. Jamieson. A. R. J. F.

(2) All afterthoughts, when Mr. Jamieson found his original position untenable. A. R. J. F.

(3) But he, and his agents in this country, Mr. Wingfield Bonyon notably, *did* recommend the use of finely ground phosphate, in the form of apatite especially, as being the best manure for all sorts of roots; Mr. W. Bonyon showing, at Lachine, a plot of grass very much in advance of its neighbours, which he declared had been manured with nothing but ground apatite. Of course, the statement was untrue. A. R. J. F.

steamed bone flour, and that we uphold coprolite chiefly as a material that happily puts a check upon the undue raising of the price of other forms of phosphate. It seems, indeed, to have actually had this effect, and steamed bone flour can now be purchased at so low a rate, and so near the rate of the coprolite, as to enable the farmer to use steamed bone flour alone. Care should also be taken that the coprolite used may not be to great extent composed of useless phosphate of iron, which will be known by its having a brownish or reddish colour. It should be of a light grey colour, if Cambridge coprolite be used. These were the two forms that we employed, and they occur largely in nature. I trust the Norfolk society will see that these or some such form is used, in order that they may not unknowingly condemn coprolite by using faulty forms of it. *Among these faulty forms, must certainly be included crystalline apatite, also red and brown or yellowish coprolite, and possibly also the gritty Belgium phosphate.* Of the latter, however, I am not quite sure, as I have not experimented with it.

I have been at pains to enter fully into this matter in view of the proposed experiments by other societies, but I hope I shall be excused from entering upon further correspondence on the subject meantime.

THOS. JAMIESON. (1)

Dairy Breeds in England.

The British Dairy Farmers' Association have just issued the second part of the second volume of their Journal, containing among other papers a full report of the milking competition at the London Dairy Show in October, 1886, now published for the first time.

On that occasion two prizes were offered for pure-bred Short-horns, two for Short-horns not eligible for the Herd Book, two for Jerseys and Guernseys, two for other pure or cross breeds, and a champion cup for the best of all the breeds. Sixty-three entries of cows and heifers were made, and tables in the report give their breed, name, age, time since calving, yield of milk in twenty-four hours, percentage of cream analysis, and points allotted to each animal. From these the Irish Farmer's Gazette quotes the first and second prize-winners in each class. One point is allowed for each pound of milk, two points for each percentage unit of solids, three points for each unit of fat, and one point for each ten after the first twenty days that have elapsed since parturition. It is not convenient to copy the table at length, but we give below the aggregate points accorded to the several prize-winners :

Pure Short-Horn—1.....	Total points.	80.53
do 2.....	do	79.78
Dairy Short Horn—1.....	do	98.30
do 2.....	do	98.10
Jersey or Guernsey - 1.....	do	92.31
do 2.....	do	88.03
Other cows—1 (Ayrshire).....	do	97.72
do 2 (Ayr. & S. H. cross).....	do	85.03

Our contemporary adds the following remarks. One of the most valuable results of this annual competition is the opportunity it affords of comparing the milking powers of the dairy breeds under similar conditions.

(1) Better late than never. A complete, though a most dishonest recantation of a poisonous heresy.

A. R. J. F.

The following table gives a summary of averages, extending over seven years, 1879 to 1886, inclusive :

	Lbs. Milk.	Analysis.
Of 55 Short-Horns...	42.89	12.69 solids... 3.62 fat.
42 Jerseys	27 34	13.70 do ... 4.17
23 Guernseys.....	27 43	13.87 do ... 4.52
9 Cross-bred.....	43 53	12.71 do ... 3.57

The free milk-yielding character of the dairy Short-Horn is rendered very apparent by these tables. The circumstances surrounding public exhibitions are not favorable to the production of large quantities of milk; cows are too sensitive to external influences to settle quietly, and the food obtainable at such places is not always the most suitable for deep milking; yet it is seen that 55 animals of this type, 78 days after calving, are credited with the good average of 42.89 lbs. (about 17 quarts) milk daily of the high quality of 12.69 per cent. of solids, of which 3.62 is fat. Certainly, no other breed in the country possesses such a record, and it goes far to prove this race to be the most profitable for the dairy farmer. (1)

In the Channel Islands cattle, the relative position of Jerseys and Guernseys has been changed since 1883. At that period the Jerseys were leading in weight of produce by nearly 4 lbs. daily, and this superiority was fully maintained in 1884. In 1885 a large proportion of Jersey heifers in competition reduced the average of the race considerably, while some well selected cows of the Guernsey tribes raised theirs, until, for the first time in the tables, the Guernseys are slightly in front in quantity and quality. Whether this superiority is to be permanent remains to be proved. Doubtless, much time and attention have lately been devoted to developing the excellences of the "lemon and white;" and the patrons of the "self-colored" tribes must look to their laurels if they intend their favorites to keep the place of vantage they have hitherto undoubtedly possessed. (2)

Country Gentleman.

GLoucestershire Chamber of Agriculture.

EXPERIMENTS IN WINTER DAIRYING. (3)

The CHAIRMAN, prior to reading his paper, said he had received a telegram from Dr. Bond, explaining that his absence from the meeting was enforced, as he had had to go to Cornwall. The chairman then read his paper as follows:—
 "When I took the presidency of this Chamber in January last I expressed the hope that during the year other subjects than those connected with the politics of agriculture would be discussed here; and perhaps it is, therefore, right that I should take the lead in introducing an extra subject, the one I propose to introduce to you to-day being an experiment in winter dairying. Well, I say "we" because I am in partnership with my sister, without whose assistance I should certainly not have attempted my present system of dairying, began on

(1) I have no doubt about it, where the land is fit to carry them. In fact, a very short sojourn in different parts of England would convince the most obstinate that the dairy-farms of that count, are almost entirely tenanted by the "dairy-short-horn." A. R. J. F.

(2) I have great faith in a cross between Shorthorns and Guernsey, where the land is of moderate quality, or where extra food is given on pasture. A. R. J. F.

(3) An article well worth studying. The author is a near neighbour of ours in Gloucestershire, and perfectly trustworthy. A. R. J. F.

the 6th of April last year with 29 cows, gradually increasing the herd till by the end of the year we had 54, keeping the proportions of two-thirds shorthorns to one third of Channel Island; the average number in herd during the year was 47. Of the three great modes of dairying, milk selling, cheese-making, and butter making, we chose the latter for various reasons. Now, having decided to make butter, we had choice of three ways of getting the cream: shallow pans, the separator, and the deep setting or Corley system. We rejected the first as taking up too much room and not being likely to give the best results. We were rather afraid of the separator, the opinion expressed at the Conference here in one or two of the discussions being that it was not suited for private dairies, we accordingly started with the deep setting system. Now the one great essential of that system is a large and constant supply of cold water, and we hoped by the works we had carried out during the winter that we should obtain the necessary supply: but our confidence was misplaced, for in the second week in June the water in our deep well ran out. We determined at once to put up a separator, but unluckily there had been a great run on Laval separators and there was not a single one in stock in England, and we were told we must wait till one could be ordered from Sweden. Every day's delay being of importance, we applied to Mr. Lister, of Dursley, who fitted us up with an engine and the old separator from the Berkeley Dairy Company, but it was not till the month of August that it was ready to start. During those eight weeks in the height of summer we carried on business under great difficulties, and lost a large percentage of our cream. From the time the separator was got into thorough working our difficulties ceased, and though there were some misgivings on the part of some members of the establishment as to the effects on the quality of the butter, I think all will agree now that it not only makes more but better butter than any other system; as to the increase it was most marked, and in round numbers you may see that the separator gives an extra pound of butter per cow per week. The milk given by each cow is weighed at every milking. This is a practice I cannot too strongly recommend. It makes all the difference between working in the light and in the dark, for besides telling you the value of each cow as a milker, it is as good as having a veterinary surgeon to examine your herd twice a-day. The mode of procedure is as follows. — The big milk buckets are placed near the exit of the milking shed, over them is placed a Salter's balance, each milker has a small bucket of a given weight; after milking each cow he weighs his bucket of milk on the balance before emptying the contents into one of the big buckets, the weight is noted down on a sheet of paper, on which every cow's name is entered. When two of the big buckets are full, they are carried on the yokes to the dairy, where they are deposited on a weighing machine in the verandah outside, the men carrying the milk from the cowsheds never entering the dairy. (1) The dairyman having weighed the milk, strains it and pours it into the receptacle, from whence it runs into the separator, it is immediately separated. After the evening milking the head cowman brings his paper with the individual yield of the cows to the dairy, the dairy maid copies on to the back of it from her slate the total amount of milk which has been brought to the dairy, the amount of milk and skim-milk sold and given for feeding, and the number of pounds of butter made; this paper, together with the money received at the dairy door and the cream tests, are sent in every night. A sample of the milk of the whole herd is set up in the cream gauge every day, and the

individual milk of about five cows, so that we test the quality of the bulk every day, and that of each cow about twice a month, once a-week we test a sample of the bulk in the *lactometer*, to ascertain the amount of butter fat in the milk; we also test the milk of any new cow. Every Monday night we make up our dairy accounts, reckoning the amount of butter and cream sold as cash and the amount fed as receipts, not cash. We value our skim milk fed to calves and pigs at 2d. a gallon. We then take the total amount of milk brought to the dairy during the week, and after deducting the amount of whole milk used divide it by the pounds of butter made. We thus see each week how many pounds of milk it takes to make a pound of butter. The next thing is to ascertain how much we are making per gallon, that is a very simple sum, which I need not explain. During the year ending the 3rd April last we made 12,584 lbs. of butter, an average of 262 lbs. per cow, which was sold at an average price of 16½d., £18 0s. 3d. by butter alone, then there is the skim milk and the calf. During eighteen weeks from October to February the pounds of milk which it took to make a pound of butter only averaged 19½, a gallon being 10½ lbs. In six of those weeks it took under 19 lbs., and in the week ending December 11th only just over 18 lbs. During that week we had in milk 31 Short-horns and 11 Channel Island. (1) Each cow had 25 lbs. of chaff, half hay and half straw, which was slightly steamed, 4 lbs. of meal, barley, wheat, and beans, all ground up together, and 2 lbs. of decorticated cotton cake, (2) the dry cows had no cake, the Shorthorns were turned out for a few hours every day, and during January were given the outside of a stack of silage to pick over, no roots were given. Cost per cow per week, reckoning the hay at £3 and straw at £2 a ton, meal at 3s. a bushel of 42 lbs., it comes to — chaff, 3s. 10d., meal, 2s., cake, 9d., labour, 1s. 10d.; total, 8s. 5d. The labour includes coal for two engines and all dairy expenses, this item we hope to reduce next year. The receipts per week for butter and cream were, in cash, £17 8s., and milk fed on the farm we valued at £3 12s., making a total of £21, or a fraction under 9s. a head. The profit is not large, but you must remember that very few of the cows were in full profit, most of them had been many months in milk, and twenty of them were heifers with their first calves, who cannot be expected to milk through the winter like older cows. Again, in collecting a herd so rapidly, you cannot expect your purchases to turn out equally well; many of ours were chance cows picked up in Gloucester market, and that they were not all successes at the pail you will see, when I tell you that our largest yield was 959 gallons and our lowest only 174. We hope by breeding largely and by careful selection to greatly increase the yield. If I might presume to give advice I would recommend all those who go in for butter making to keep a few Jersey cows in their herds, it solves many of the mysteries of making first-class butter. Our experience is that Jerseys do better in this vale than Guernseys, the latter give very rich milk, one of ours giving sometimes 50 per cent. of cream in the cream gauge, but they are very delicate and require much greater care. In conclusion, our farm is 327 acres, 128 acres arable, 10 permanent pasture, the rest old pasture, (3) the soil is somewhat stiff, with a subsoil of gravel, sand, and clay.

Curtis Hayward; Col.

(1) Guernseys and Jerseys.

A. R. J. F.

(2) Cotton cake is almost universally given to cows in England, but not in large quantities.

A. R. J. F.

(3) I don't see the difference between "permanent" and "old" pasture. The former probably means pasture recently laid down.

A. R. J. F.

(1) A wise precaution, as any one who thinks for a moment will perceive.