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# THE ILLUSTRATED JOURNAL OF AGRICULTURE

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## Preservation of Dairy produce.

**BORO-GLYCERIDE.** A few weeks ago "G. A. H." touched on this question, which appears to be of great importance to all farmers who either send their milk to London and other large towns, or convert it into butter, cheese, &c. With your permission I will give you the results of experiments which I made in the late spring with boro-glyceride, after this antiseptic had been highly spoken of by a friend who had successfully used it in the preservation of meat, fish, poultry, &c. My first attempt was to preserve butter, of which I had 6 lb weighed off after the bulk had been salted and worked. I then dissolved in water 1 oz. of the boro-glyceride, and thoroughly mixed it with about 3 oz. of butter, which I had ordered to be melted. This mixture of butter and boro was then thoroughly worked into the 6 lb. of butter which was made up in the usual way. A part of this was sent the first week in May, to a friend, the remainder was placed in my dairy, which, from its too close proximity to some of my piggeries and from various other causes, is not considered to be the best possible place for keeping things good. This prepared butter was tried at various times during the summer, when it was found to be as good in flavour as when first made. The same plan was adopted with the butter sent away and with exactly similar results, except that in August the remainder of the prepared butter came to a sad and unexpected end. My friend had a new cook in August, who was not cautioned about the use of this butter; and although an experienced dairy woman, she did not notice any difference in its appearance to fresh butter, the consequence was this experimental butter was eaten without anyone having the slightest idea that it had been made some three or four months. Although this was an unfortunate finish to the experiment, it most conclusively proved that in boro-glyceride the dairy farmer will find a most valuable ally.

I was equally successful in the preservation of cream cheeses, for which this district and part of Cambridgeshire is famous. These cheeses were prepared in much the same way and about the same time as the butter in the previous

times during the months of May and June, and the last was brought on to the table for luncheon in the middle of July, when a Swiss gentleman was at Holywell selecting some pigs for export. He appeared to enjoy this cheese most thoroughly, declaring that it was equal even to that made in his country; when told that it was made the first week in May, he seemed scarcely to credit it. He was very anxious to know how the miracle was performed; the *modus operandi* was explained to him, and he accepted a small quantity of the boro-glyceride with which to experiment on his return to Switzerland. The trials with butter and cheese were so thoroughly successful, that I did not attempt to preserve milk by using boro-glyceride, but I have not the slightest doubt that milk would be more easily and as effectively preserved and kept sweet than would its products, whose value is so materially affected by the slightest change or sourness in its flavour.

The desire to assist my brother farmers must be my excuse (if you deem one necessary) for troubling you with this lengthy epistle—**SANDERS SPENCER, Holywell Manor, St. Ives.**

## The St. Charles, Pa., Creamery.

On visiting the butter and cheese board of trade, at Elgin, Ill., December 11th 1882, I was not a little astonished at the prices at which butter was there bought and sold. There were about 350 tubs put on the board and struck off to the highest bidder, the greater portion of which reached 42c and some 42½. As these figures are considerably above the market price for ordinary butter, I was filled with curiosity to see the place where an article which would command such a price was manufactured. Accordingly, I took the N. W. train for St. Charles, where the creamery is located which is able to accomplish such a result.

The factory of the St. Charles Cooperative Creamery Company is a plain brick structure 2 storeys high, 116 feet in length by 54 feet in width, and is located on the bank of the Fox river, ten miles from Elgin, and within a quarter of a mile of railroad communication.

The building is a new one, and occupies the plan upon which stood a similar factory owned by this company which was destroyed by fire, September 1882. The building at the time of my visit was not completed; workmen being still engaged upon some portions of its interior.

In giving a description of this factory, we will begin with the ground floor. Across one entire end of the building and occupying about one ninth of its length from the ground to its roof, is the ice-house, the dimensions of which we are unable to give, but which we judge were ample for all purposes of the establishment.

Next adjoining the ice-house, and occupying about one tenth of the length of the building on the first floor, is the refrigerator, of a capacity of about 5 car-loads. Adjoining this, a third section of the ground floor is devoted to the reception and cooling of milk, the raising and separating of the cream, and the churning, working, and salting of the

water. In this section also was located the boiler of 35 horse power and the engine 15 H. P.; the boiler being separated from the butter and cheese room by a partition. Another portion of this section contained the apparatus and machinery for the manufacture of cheese. On the second floor was the office, the curing room, and a large room in which boxes were to be made up.

The weigh-can occupies a platform 9 feet from the ground-floor. From this can the milk is drawn into 5 vats standing 4 feet lower than the scales. These vats are each divided into two longitudinal compartments. The 5 vats are each about 16 feet long by 5 feet in width, the compartments being of the same length by 2 feet in width and 20 inches deep. These compartments contain the milk, while the space around them is occupied by ice and water. A few feet from these vats, in the corner of the ice-house, a large tank supplies them with water. There are the vats in which the cream is raised, and from which the milk is drawn into two large circular vats, 5 feet lower, where it is manufactured into cheese.

The cream is not skimmed, but the milk is drawn from under it, and it is left in the bottom, from whence it is conducted into a tempering vat, also 5 feet lower. Immediately below the vats we have just described are 4 pools, each 2 feet deep, about 16 feet long, and 5 feet wide, built in the floor like tannery vats. Each of these pools will contain about 100 cans. In warm weather, these pools are used for raising cream, the milk being drawn into cans made for the purpose, holding, each, about 30 lbs; the cans are placed in the pools and surrounded by water.

The tempering vat is about the size of an ordinary cheese vat, and is supplied with both heating and cooling appliances. If the temperature of the cream is too high, it is reduced, and if too low, it is raised; from 58° F. to 64° F. being the proper points, according to the season.

From this vat the cream is removed to the churn. The churn consists of a oblong box, about 15 feet long and 3 feet square, with bearings, at each end, and is turned at the rate of 45 revolutions per minute. I remarked to the butter maker that I thought this motion too rapid, its tendency being to create heat; he however informed me that this was the motion he required, but he gave no reasons, and I still hold to the opinion I expressed on that occasion. From 30 to 50 minutes, I was, told was the time occupied at a churning.

When churned, the butter was in a granular form of the size of wheat. The butter milk was then drawn, and its place supplied with water, in which the butter was washed. It was then removed from the churn to the power butter-washer, which consists of a table with an incline surface, over which two fluted conical rollers revolve, the one following the other. The butter was placed upon this worker, where it was drained, salted, and worked, and from which it was removed to trays upon which it was allowed to remain until the following morning. It was then reworked, packed in Welsh tubs, and sent to the refrigerator.

#### CHEESE DEPARTMENT.

Having now given a brief and very imperfect description of the butter department of this establishment, we ask the reader's patience while we attempt to follow the milk, from which, as we have seen, the cream has already been removed, through the various operations by which it is converted into cheese.

If the reader will picture in his mind two immense wash-tubs, about 12 feet in diameter by about 20 inches in depth, constructed of staves and hoops, and resting upon blocks of sufficient thickness to raise them to a convenient height, he will have formed a pretty good idea of the appearance of the vats used at this factory.

If he will then go a step further, and conceive of these tubs as lined with tin, a space being left between the tub and its lining of about 2½ inches for the circulation of steam or water, he will have a still better idea of them.

In the centre of each of these vats arises a conical shaped hollow turret, about 12 inches in diameter, and as high as the top of the vat, in the centre of which there is a perpendicular shaft, connected by gearing with a horizontal shaft under the vat. This shaft supplies the motion to a roller, one end of which rests in a wheel, which rolls around upon the edge of the vat. This roller is supplied with 180 spokes or paddles of sufficient length to reach nearly to the bottom of the vat. These paddles are arranged in rows winding about the roller like the thread of a screw. The roller has two motions, one in which its outer end traverses the whole circumference of the vat, and another in which it revolves.

The purpose of this roller is that of agitating the milk in the vat while heating; distributing the rennet, and stirring the curd after it is cut, operations which it performs very perfectly.

After the rennet is sufficiently mixed, and before coagulation begins, this roller is removed, and another put in its place, upon which curd knives are adjusted.

These knives are so arranged on the roller, that with each revolution round the vat a space of about 15 inches is cut perpendicular, until the whole surface is completed. It is then cut by hand in a direction radiating from the centre all round. The third cutting is performed by the roller horizontal, by means of knives adjusted properly for that purpose.

The process of cutting completed, the second roller is removed, and the first restored to its place, which proceeds with the business of stirring.

From the moment when the process of cutting ends and that of stirring begins, this agitator performs the whole operation, including the salting of the curd and preparing the same for the press, in a neat and very satisfactory manner.

The vats are so arranged that one side may be lowered, thus allowing the whey to pass off through a faucet in the bottom; the inclined position of the vat not disturbing in the least the working of the agitator.

The capacity of these vats is 14000 lbs; 12000 or 13000 lbs each being the amount usually worked in them.

They are the invention of Mr T. B. Wire, of Geneva, Ohio; and in my estimation are superior to any self agitating vat in use. Their superiority consists in the very effectual manner in which they stir the curd during the process of heating, airing, and salting.

From the description we have given, any intelligent cheese maker will be able to see that the very large quantity of milk we have named is worked with a comparing small outlay of named labour; no other vat of which we have any knowledge doing the business of stirring the curd unassisted.

It will be seen that all the cheese manufactured at this establishment are skims; the milk being allowed to set about 20 hours and each 100 lbs furnishing the butter department with cream for about 3½ lbs of butter.

In some particulars, the method used in the manufacture of milk of this character into cheese differs from that employed upon whole milk.

First; More rennet should be used. The reason for this being that it is desirable to have cheese of this character go into consumption as soon as possible, and the process of curing is promoted by a liberal use of rennet.

Second; That the cheese may be soft in texture, less heat is required than with whole milk, 82° being the point at which they added the rennet at this factory, scalding being accomplished at from 92° to 94°.

Third; Unlike the whole milk method, no delay is neces-

sary after scalding for the purpose of maturing, the whey being drawn immediately.

Fourth; Less salt is required.

At this factory, 3 lbs to the 1000 lbs of milk was used; but the salt added upon the curd was in a very moist condition, so that I calculated that not more than 2 lbs remained in the curd.

Presses used. The ordinary screw press was in use, of which they had between 40 to 50. On the day of my visit about 12000 lbs of milk was made up, 32 cheeses being produced weighing about 34 lbs each. These cheeses were 15 inches in diameter by about 5 inches in thickness, and resembled Ohio flats.

An examination of the cheese in the curing room convinced me that they were skimmed, but very good, being soft and not too dry, and at the same time firm.

In concluding this article, I would say that the impressions I formed as the result of my visit to this creamery were upon the whole very favourable to its methods and appliances in the manufacture of butter and cheese. Its arrangements, from the point where the milk was taken into the places from whence its products were discharged for market, all being admirably calculated to facility and ease in the performance of every branch of labour therein performed. Its machinery and apparatus, it seems to me, were unusually well calculated to work in harmony with the laws which nature has enacted to govern the processes by which these two very important articles of commerce are brought into being. Its butter sells with the very best on the Elgin market, while its cheese is not inferior to any of that variety manufactured anywhere.

As a proof that this method of working up milk is profitable to those who engage in it, the superintendent informed me that dividends have been declared by this company as high as \$1.80 per 100 lbs milk. Its superintendent, Mr S. S. Pembleton, is a gentleman of whose ability to manage the affairs of the company there can be no doubt: he treated me politely, and spared no pains in giving me a thorough insight into the whole business of the creamery.

J. B. HARRIS.

Antwerp, New-York, Jan. 18th 1883.

HOPS.

I have, I regret to say, been asked for information as to the cultivation of hops, by many people. I say, I regret it, for I am sure that out of every hundred farmers who, tempted by the present abnormal prices, try their hand at this fascinating pursuit, seventy-five will have cause, before four years are over, to regret their temerity. It is a purely speculative crop, and, as such, should be avoided by every one who prefers the haven of safety to the stormy sea of hazard. However, as information is wanted, I will try to give it as fully but as briefly as possible.

The Hop, *Humulus Lupulus*, is in the class and order *Diacia Pentandria* of Linnaeus, some plants having male and some female flowers. The year of its introduction into England is doubtful; an old lease in Kent, date, 1463, has the following covenant: "Evry yere duryng the terme, an acre of wode competent and of the best fewell, exceptes Hope tymbere;" so we may suppose hops to have been well known about the beginning of the 15th century.

It is curious to see how the idea of biting is involved in certain names of plants, and even of living creatures: *lupus* a wolf, hence the pike was called the *water wolf*; and the hop-plant, a little wolf, *lupulus*, bitter; *confer morse!* from *mordeo* to bite, through the French *morceau*; the *bit* of the bridle, &c.

"Hops," says an old writer, "are hot, and in the third degree inciting, aperitive, abstersivo, subastringent, digestive, discussive, diuretic, stomachic, and sudorific: indeed the spirit of the hop is truly cordial." Very good, I hope its qualities are sufficiently numerous to please all parties.

Hops may be grown to perfection on various soils, but deep rich dry soils with porous subsoils are the best for this as for all crops. All heavy lands should be drained 4 feet deep, and at distances from 28 to 40 feet apart, according to the porosity of the subsoil. The roots run down, sometimes, 15 feet into the ground, and no amount of open furrow surface work will save them from rotting in a wet season. For *draining*, v. *Journal of Ag.*, p. 99, vol. 2.

It is worth while taking pains about this crop. I know of land that has stood in plant for more than 120 years—it belonged to Mr Ellis, of Barming, near Maidstone, Kent, Eng., and is, even now, noted for growing large crops of the best quality. The subsoil of this old plantation is the shattery *Kentish Rag*, geologically, the Greensand. Poor Mr Ellis, after hop-growing for forty years, died insolvent about thirty years ago. He was the original of the husband of *David Copperfield's* first love, the "Eldest Miss Larkins." The really superior qualities of hop-soils, like the above named, grow a great weight of the finest sorts, *Goldings* and the *Canterbury*. I do not know of any land in this province fit for their cultivation, unless it be half-way down the slope of the hills near Compton, and other equally favoured districts in the Eastern Townships. The heavy soils of the "French Country" must be satisfied with the coarser varieties: *Jones*, *Grape*, and *Colegate*; and even these will not last long in plant where the drainage is neglected, as it almost invariably is. Large crops may, undoubtedly, be grown on these heavy alluvial soils: I have known as much as 4480 pounds to the acre on some of the Wealden clays in the border between Kent and Sussex. Blight, however, on these low grounds is very destructive. Here, a piece of old grass, deeply, very deeply, ploughed, would be the most desirable hop-yard, as the buried turf would help to feed the plant for some time; but I am anticipating.

*Situation of Hop-yard.*—The site is a very important matter, as shelter from the prevailing winds of the district is a vital point. In Kent, we used to prefer a field sloping to the north, and the idea was, that that aspect has more hours sunshine than a southern exposure. A belt of wood should be left as a protection, but the yard should not be surrounded by wood on any account, as that would hinder the free circulation of air, and tend to encourage mould.

*Preparation of the land for planting.*—It is no use talking of trenching the land two feet deep, here, as we do in Kent and Surrey: we must, perforce, be satisfied with ploughing. Two ploughs, following one another in the same furrow, ought to get a depth of 14 inches in ordinary land: the second plough should be a *subsoiler*, where one is to be had. Our great Kentish "Turn-wrest" plough, with 6 horses, I have seen turn up a furrow of 14 inches in depth. It had two wheels, a gallows, and a steel pointed wooden share, and left an amazing amount of *crumb*. In our flinty soils on the chalk-hills, any other plough would be broken to pieces in ten minutes work. Trenching used to cost about \$35 an acre; here, as men are not used to the job, double the money would not pay for it. If deep work is necessary in the moderate climate of England, how much more so must it be in our hot summers.

The hills should be arranged in the *Quincunx* form, as in that way there will be more paths for the horse-hoe than where the lines run up and down the field, merely. Besides, there will be more hills on an acre in the *Quincunx* system: i. e., at 6½ feet apart, the usual distance, there will be 1194

hills in the one case, and only 1031 in the other. Pins are stuck in the sites of the future plants, to guide the planters.

Young plants are produced in two ways. by cuttings from the prunings of the bines of the former year's growth, after gathering the crop, in which case, 5 should be set in each hill, in case of accidents; or by *bedded sets*, in which case, 3 are sufficient, as they, generally, all take. Bedded sets are the cuttings, as above planted in a nursery-ground a year before they are put out in their future home.

*The sorts of Hops generally grown.*—These are numerous enough, but five of them are sufficient for our purpose:

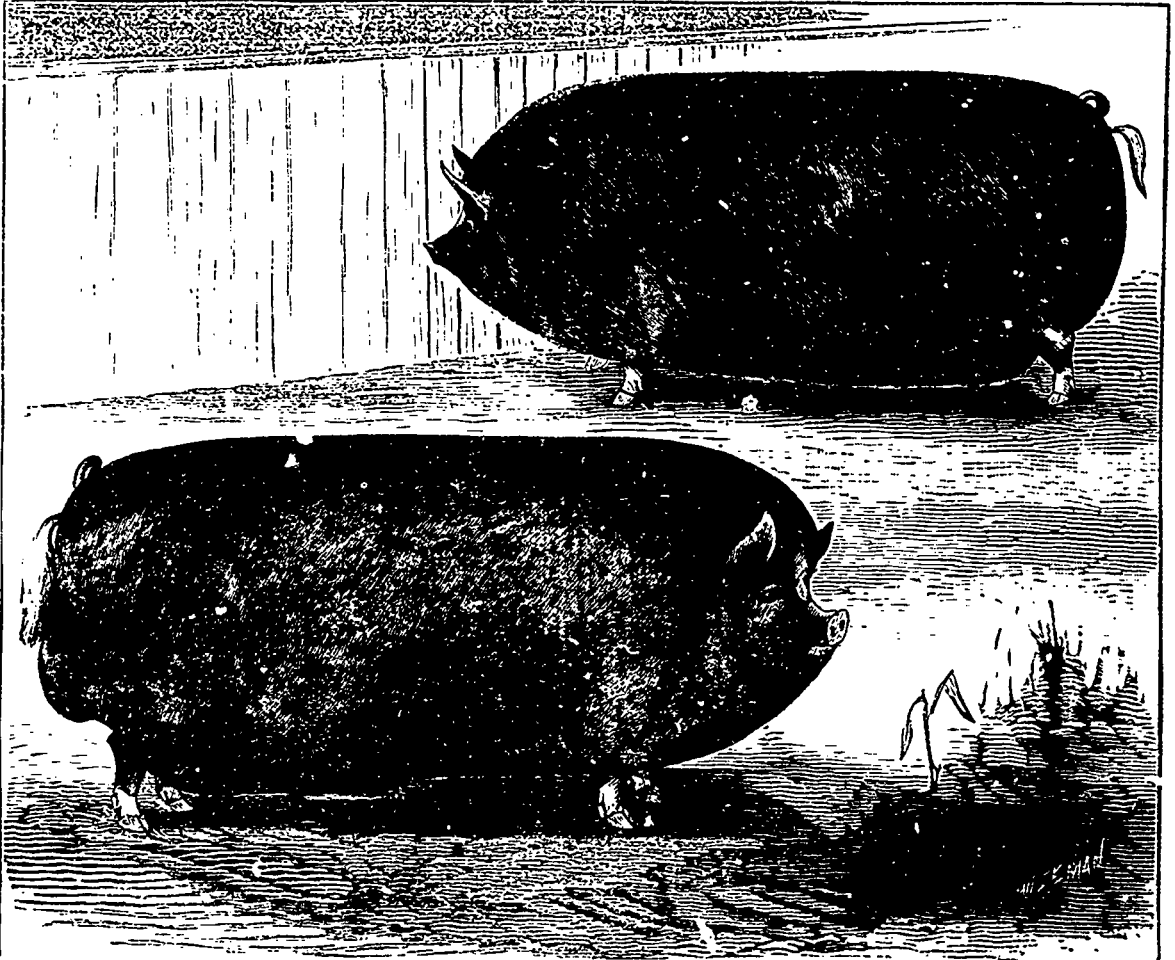
*Golding's*; the finest, richest, and most valuable of all, varying in quality according to the soil in which they are

heads and lateral branches from pole to pole; they are less productive but of better quality than the grape.

*Colegate's* sprang from a wild variety found at Chevening in Kent (such a lovely spot). They are hardy but late; run much to bine, and take 18 feet poles. It is as well to have some of these, as they can be picked after the main crop is done, a useful quality where labour is scarce. They are very bad climbers, and require to be tied continually until the bine reaches the top of the pole.

*Flemish*; a large, coarse kind, only fit for bad porter. I have seen the cones nearly six inches in the greater circumference.

*Seeds* will not produce hops of like character to the pa



BERKSHIRE SWINE.

grown. Poles for this sort should be from 16 to 18 feet in length

*Canterburys*; these are pretty much the same as the *Golding*, but run more to bine, and the poles may be 2 feet longer.

*Grapes*; are more suited to our climate and soil than the above. They grow in clusters, hence the name; not so given to bine, but more productive of hops than the finer kinds; take poles from 12 to 14 feet.

*Jones'*; their chief virtue is that they require shorter poles than any other sorts, any broken poles, 10 or 11 feet long, will do for them, as they are inclined to extend their

rent; so it is useless to attempt sowing. Be satisfied with getting good cuttings from a well managed plantation, and leave seed and bedded sets alone.

As we have seen, hops are *dioicous*, bear *male* and *female* flowers on different plants. Where no males are set out, the cones are, generally, loose and light—the *lupuline*, or yellow resinous powder in which lies the *condition* as brewers call it, is present in very small quantity. One male hill should be allotted to every 144 female hills, i. e. about 8 or 10 per acre. The extra weight of the cones will pay for the trouble. The males should be planted on the windward side, to allow the farina to be distributed more equally.

Where the land is heavy, I can advise with confidence the application of lime. A great expense, I know, in this country, where it costs four times as much as it does at home. But, you must remember, the yard is to stand for years, and will not require a second dressing. Our Kentish tenants, at least 2<sup>d</sup> of whom were hop growers, used to put about 200 bushels per acre on the stronger soils.

Next; the whole field should be manured, and less than one hundred single horse cart loads per acre will not do much. Where the land is heavy, I approve of digging out a hole a yard, or so, square, where the hill is to be, and filling it with a compost of rich earth, blood, bones, and other handy materials. See that the hills are made as fine as a garden before planting.

and then dig, for digging before poling very often, in the hands of careless people, destroys more than one hill.

In England we dig the whole of the yard every year. The men are so handy, that an acre a week is the average stint, costing from 16s to 20s an acre. The *hop-spud*, a 3 tined fork, does wonderful work in these skilful hands. The cast-steel forks, sold here as dug-forks, will do one-third more work than a spade, and do it 3 inches deeper, too: no stones of any size, of course. But here, we cannot dig—we must plough, the horses should be yoked *a-trip*, tandem-fashion, and the furrow should be, at least, 10 inches deep. The greatest care should be taken not to bruise the plants in turning at the headlands, and the hills should be well worked by manual labour. By the bye, I regret to say that too



ABERDEEN OR POLLED ANGUS BULL.

The first year, as no crop can be expected, the middle of the alleys may be sown with turnips, mangles, or other roots; always remembering that the horse-hoe must be going all the summer, and the hills &c., kept perfectly clean, and in good tilth. As the bine begins to run from each set, it should be tied up in a bunch, or to a short stake, to prevent the horse-hoe from injuring it. The implement for working in the alleys, though I call it a horse-hoe, is rather a grubber, much heavier and stronger than the usual one for potatoes &c.

In the autumn of the first year, when the sap is down, and the young bine is brown, it should be cut down, and a little earth thrown on the crown of the hill will preserve the plant from the frost, and shed off any rain that may fall. Level this mound before spring-growth begins; pole early, and work all round with a digging fork at once; the poles need not exceed 7 or 8 feet in length. I say, pole early

many hop-growers in the Eastern Townships leave wide headlands unplanted. Land is plentiful, I know, but one would think that the headlands would grow roots, if not hops

*Dressing.*—I despair of conveying a clear idea of this important operation to my readers. It is done in early spring, by a woman, generally, and a careful woman, too, if such an one can be found. The hill is to be opened with a small hoe (2½ inches), a little below the crown, and the earth cleared away between the sets, which will be found swollen out to four times their original size. These should be cut off between the crown of the hill and the first joint, for it is round the set close to the crown whence the best and "most fruitful bine starts. The earth is then drawn back again, and a mark made to show where the hill is.

ARTHUR R. JENNER FUST.

(To be continued.)

**OUR ENGRAVINGS.**

*Berkshire Swine.*—The property of A. W. Rollins, Manhattan, Kansas; and about as good specimens of the breed as they make them, now a days. The short noses are not so absolutely indispensable as they were.

*Polled Angus Bull.*—I wish a short name could be invented for this breed. I prefer Polled Angus, myself, but no fault can be found with the animal himself. Imported by the Hon. M. H. Cochrane.

*Hereford Heifer.*—Imported by Earl and Stuart, La Fayette, Ind. A real and not a fancy picture. First prize in her class at the Royal, Reading, last summer.

*Young Garenne's Duke.*—Property of Dr J. H. Walker, Worcester, Mass. This lovely Jersey bull calf is the progeny of Young Garenne, for which cow Col. Russell paid \$3,700; for her yearling heifer calf, \$1,825, and for the subject of our engraving, \$1,810—total, for the three, \$7,355! Colour, solid steel gray, with black points. He belongs to the Coomassie family, which, at present, has sold for the highest prices Jerseys have ever fetched, cows having realised \$4,800, and bulls \$5,100, at auction.

**Sheep-feed.**

*My dear Sir,*—I noticed in the June number of the *Illustrated Journal of Agriculture*, a subscriber to the French Journal is anxious to know whether sheep are profitable stock or not.

In reading your answer I notice that a crop must be sown of tares, vetches or rape, to make them profitable. Would you be kind enough to answer through your valuable Journal a few questions which I will ask. 1st How much seed to the acre of tares, vetches, or rape, and which is the best way to sow them? in drills or broadcast? and does it require very rich land and how late will be profitable to sow, and where can the seed be procured. Which kind of fence will be the best and cheapest, such as the sketch of a hurdle in your Journal, or tarred rope, or wire fence, and where can the two last mentioned be obtained?

Yours truly, Subscriber.

In reply to the above, I beg to say that the quality and condition of the land must, to a great extent, regulate the quantity of seed. As a general rule, 6 lbs of rape-seed, 3 bushels of tares (vetches are the same thing), or 2½ bushels of tares and 1 bushel of oats, mixed, will be required for each imperial acre.

The better the land the better the crop, as in other cases, but a fair amount can be grown of these plants with a very slight dressing of bones, sulphate of ammonia, or dung. If the land is in fair condition, no manure is necessary. Messrs Evans, or Messrs Ewing, Montreal, can furnish the seed in abundance.

The tares may be sown on the furrow and harrowed in like any other crop; but I should prefer to well harrow the land first, and then sowing the seed broadcast, let it in with the drag or grubber, giving a couple of strokes with the harrow to cover, and, when the tares are about 3 inches high, passing the roller over to form a smooth surface for the soylth.

*Rape.*—The land should be prepared as for turnips, harrowed and grubbed, and rolled until fine. the seed sown broadcast, slightly buried with a *bush-harrow*, and rolled immediately.

Sow every fortnight from earliest Spring to 1st of September. The first tares should be fed off early enough to be followed by rape, making two enriching crops in one season. Take care not to put sheep on the rape when it is wet. They

should run the hills all the morning, and be folded on the rape &c. at 3 o'clock p. m.

The hurdles, see cut, p. 173, should be advanced every day, and a fair space of new feed given. I think this is the cheapest and most useful style of movable fence yet invented.

**HAMPSHIRE DOWNS.**

I beg to call attention to Mr Eady's advertisement. A man so enterprising deserves all the encouragement that can be given him. I mean to pay Mr Eady a visit, shortly, and my readers shall have a full account of his flock.

A. R. J. F.

**First Steps in Farming—Young Man's Department.**

A wonderful provider is Nature! I suppose few of my readers have seen a young salmon just hatched: those who have will recollect that, attached to its belly, the tiny fish carries a tinier sac, or pouch, filled with sufficient food to last the new denizen of the water for several days. And this is not the only duty performed by the food-reservoir: it serves as an anchor to prevent the rapid stream from sweeping away the little orphan into the sea, before the tender frame is fitted for the impending struggle with the dangerous embraces of its future nurse.

So, too, the embryo chicken feeds on the associated contents of its envelope; the imprisoned butterfly finds store of nourishment in its nymphal state; and the very *oyster spate* is not left unprovided. But, wonderful as all this watchful provision of the great Mother doubtless is, to my mind, the arrangement of the first food of newly born mammals is more wonderful still. If you examine the intestines of a still-born calf, you will find them filled with a peculiar glutinous substance, blackish green in colour, and of a pasty consistence. This, called in scientific language, *meconium*, has been accumulating during the foetal existence of the animal, and must be speedily got rid of on the birth of a living calf. A means of doing this, without danger to the new-born, has been provided: any ordinary observer must remark the extremely rich appearance of the first milk drawn from the cow, and other farm mothers, after parturition. This *colostrum*, or *beistyn*, as it is called in Scotland (we have no name for it in my part of England), is a mild aperient, and differs, materially, from the composition of the subsequent milk as will be seen by the following tables:

**COMPOSITION OF COLOSTRUM.**

	Water	Albuminoids	Fat	Sugar	Ash	Alb. Ratio
Ewe .....	73.2	15.4	2.0	8.0	1.4	1: 0.8
Sow .....	70.1	15.6	9.5	3.8	0.9	1: 1.7
Cow .....	71.7	20.7	3.4	2.5	1.8	1: 0.5

**COMPOSITION OF MILK.**

	Water	Albuminoids	Fat	Sugar	Ash	Alb. Ratio
Ewe .....	83.3	5.5	5.5	5.0	0.9	1: 3.3
Sow .....	84.6	6.3	4.8	3.4	0.9	1: 2.3
Cow .....	87.0	4.0	3.7	4.6	0.7	1: 3.3

You will see at a glance that the beistyn contains an enormous percentage of albuminoids; to what it owes its efficacy as a mild aperient I confess I do not see, but an aperient it certainly is, and I presume no farmers throw it away, as used to be done in my younger days: if they do, they run the risk of losing their calves from constipation. The ash of 100 lbs of cow's milk will supply about 20 lbs of phosphoric acid; .16 lbs of lime; and .17 lbs of potash, all necessary to build up the tissues and bones of the young animal.

But, it will be said, although I want to rear good calves, I really cannot afford to give them new milk. Butter and cheese are high in price, and meat is cheap. are there no means of rearing young stock with skim-milk assisted by other foods? To answer this question I must enter fully

into the treatment of the calf from its birth, promising that no means known at present will make such good calves as the natural milk of the dam, and that many calves reared at the pail are lost from greediness in feeding.

The calf is just born. If you want the cow to be troublesome, blareing after her young one, let her see it, fondle it, and lick it all over. If, on the contrary, you want her to be tranquil, and after drinking her mash, to lie down to rest and recover herself, take the calf away at once, holding it by both fore- and hind-legs, place it in a warm corner, cover it up with plenty of the softest straw (barley-straw for choice), and leave it alone: don't attempt to dry it by rubbing, as that always tends to gum the hair together—the moisture will soon evaporate. There is no hurry to feed the calf, but the cow should be milked as soon as possible, and then left quiet, the milk being kept at its original temperature until the calf has taken it. This is most important, as the slightest internal chill will often kill the tender creature.

If the calf has, as I advise, never been allowed to suck its mother, there will be no difficulty in teaching it to drink. Never mind whether the young one is standing or lying: disturb it as little as possible: take some of the beistyn—temperature not below 90° F.—in a small pail, and supporting the calf's lower jaw with the palm of the left hand, the arm round the neck, open the mouth with thumb of the same hand. Fill, then, the hollow of the right hand with the beistyn, pour it into the mouth, and let one or two fingers remain in the mouth for the calf to suck. Let it take as much as it pleases, and then, after wiping the jaws &c. clean, leave it to repose. After the first two or three feeds, that is, when the animal drinks freely, don't allow it to suck the fingers any more, or else it will refuse to drink without them, which you will find a bore.

A calf should never be fed fewer than three times a day—it will take from 3 pints to 3 quarts a meal or from 4½ quarts to 9 quarts a day, and the milk for the first fortnight at least, should be, I had almost said must be, fresh from the cow.

But you want to make butter as well as to rear calves. Well, if you must, there is only one way, and with care it does not succeed badly. Remember that you have got four things to study in preparing a substitute for the mother's milk: fat, muscle, and bone, and the digestibility of the whole must be as perfect as possible, and thoroughly balanced in the proportions.

The skim-milk, which will be the foundation of our food, is rich enough in phosphate of lime to supply all that is wanted for making bone. Many years ago, I proved this experimentally, by giving a half-bred shorthorn calf as much skim-milk as he would take for the first 6 months of his life. A monstrous beast he grew, and at 18 months, I sent him to Smithfield market, where he fetched, as I expected, sausage-meat price: the lowest in the market. He was all bone, and his hocks and knees were a sight to be seen!

But with the following mixture I have succeeded in making calves, which at 13 weeks old fetched £5 (\$25), a piece in the same market: 2 oz. of linseed-meal and 4 oz. of pease-meal, carefully mixed with boiling water into a thick pudding and stirred up in the usual quantity of skim-milk—this is enough for a calf for one day, and should be given at 96° F. Here we have bone-earth in the skim-milk; fat in the linseed; nitrogen in the pease; carbohydrates in all of them; and the slightly aperient power of the linseed will keep the digestion all right. A food, this, I think I am justified in saying, as near perfection as possible.

You will observe that I state a quantity—6 oz.—but you should not give as much at starting. Bring the calf to it gradually, beginning with 2 oz. a day, and in ten days time

it will take the whole without inconvenience. Beware of ground oats; the husks produce what, I believe, doctors call a *peristaltic* action of the bowels, and frequently cause death.

Mr Ville, a not always trustworthy authority I regret to say, gives the following three experiments in calf-feeding, to show the preponderant action of albuminoid and fatty matter, for every 100 lbs of live-weight the three calves received.

	Casein lbs	Fatty matter lbs	Sugar of milk lbs	Increase lbs
1. Skim-milk.....	4.6	1.2	5.5	13
2. Skim-milk and whey.....	1.6	2.0	7.7	26½
3. Milk fresh from the cow.	5.1	7.5	6.3	48½

The second calf received more carbohydrates than the first, and the third received an excess of fatty matter and albuminoids. All three drank the same quantity of milk; the deductions may be left to your judgment.

By the bye, don't try to give whole luseed, boiled, under any circumstances. From thoroughly well authenticated trials, it is certain that 800 grains out of every 1000 grains of linseed given uncracked, pass through the animal untouched by the digestive powers, and are absolutely wasted. Boiling it for 24 hours will do no good. Take a grain in your mouth; hold it there for a few seconds; and then try to crack it with your teeth. You will need no further experiment to convince you of the necessity of crushing all the linseed you use.

Calves fattening for veal may be tied up, and kept in a dark place. Those intended for rearing should be kept in the light, and have room enough for play. It is a question with me whether a muzzle should be used to prevent the little-ones from sucking each other's ears, scrotum, &c. It is not a healthy habit—as bad almost as crib biting or wind-sucking in a horse—but I am such an advocate for liberty for young stock, that I cannot bear the idea of confining them even at the earliest stage; and a muzzle—as light a one as possible—seems the only preventive; and even that cannot be long employed, as at 5 weeks old the calf should begin to nibble at his future food, and we will now consider what this is to be.

Don't begin to wean before the thirteenth week from birth, and then do it as gradually as possible. By this time the calf will have become accustomed to eat—if you have the good sense to offer them to it—the finest clovery bits of hay; crushed linseed; pease-meal; malt-cummins; some cut swedes (I don't recommend mangles till late in spring); carrots; anything in fact, and the more varied the food the better. It was a wise saying of the late Mr McCombie: "*Never let the animal lose his calf's flesh*;" and I hope all my readers will remember it, and profit by it. It should be written in large letters over every farmer's chimney-piece. Don't be in a hurry to get your calves to grass; rather indulge them with a fortnight longer on the milk; and for the first month or so, let them come into the sheds from the pasture at night. I would not turn my young ones out till the 10th of June, in this province, but the season and the locality must be your guide. And I should be unwilling to dock the linseed (¼ of a pound a day) at first. It is a wonderful, though simple, corrective, and saves more lives than we wot of. The best pasture for calves is the first year's grass, and a part of it should be divided into two, or preferably, into three enclosures for them; so that they may have it fresh and fresh throughout the season. It is a lamentable thing to mark the numberless instances in which the poor things are sent out to a bare burnt up pasture, to pick up a living as they can. How can anything be expected from such treat-



ment but a wretched lot of pot-bellied, hard-skinned, raw-boned brutes, whose very look tells you that it would never pay to fatten them?

The treatment of calves suckled by their dams is simple enough. They may be kept in loose boxes, or tied up, and should be let suck at least three times a day, preferably, four times. The greatest care should be taken to milk the cow dry twice a day if she has more than will satisfy the young one. Neglect of this is the chief reason why so many Herefords, Anguses, and Galloways are such bad milkers. Raising loose with their calves, the production of milk is gradually restricted to the amount required by the suckling, and as this is rendered customary by family descent, the habit becomes engrafted in the breed.

size, those kept on as cows making when moderately fat, from £25 to £30.

ARTHUR R JENNER FUST.

#### LITHOTOMY.

Lithotomy or the removal of a stone from the bladder of a horse was successfully performed, by D. McEashran, Esq., F. R. C. V. S., a few days ago, at the Montreal veterinary College. Stone or Calculus in the bladder is a comparatively common disease in man, but so far has seemed to be much more rarely met with in the horse, the above mentioned case being only the second that has come under the notice of the writer. There can be no doubt, that where there is an abundance of lime salts in the drinking water of horses, calculi



HEREFORD HEIFER.

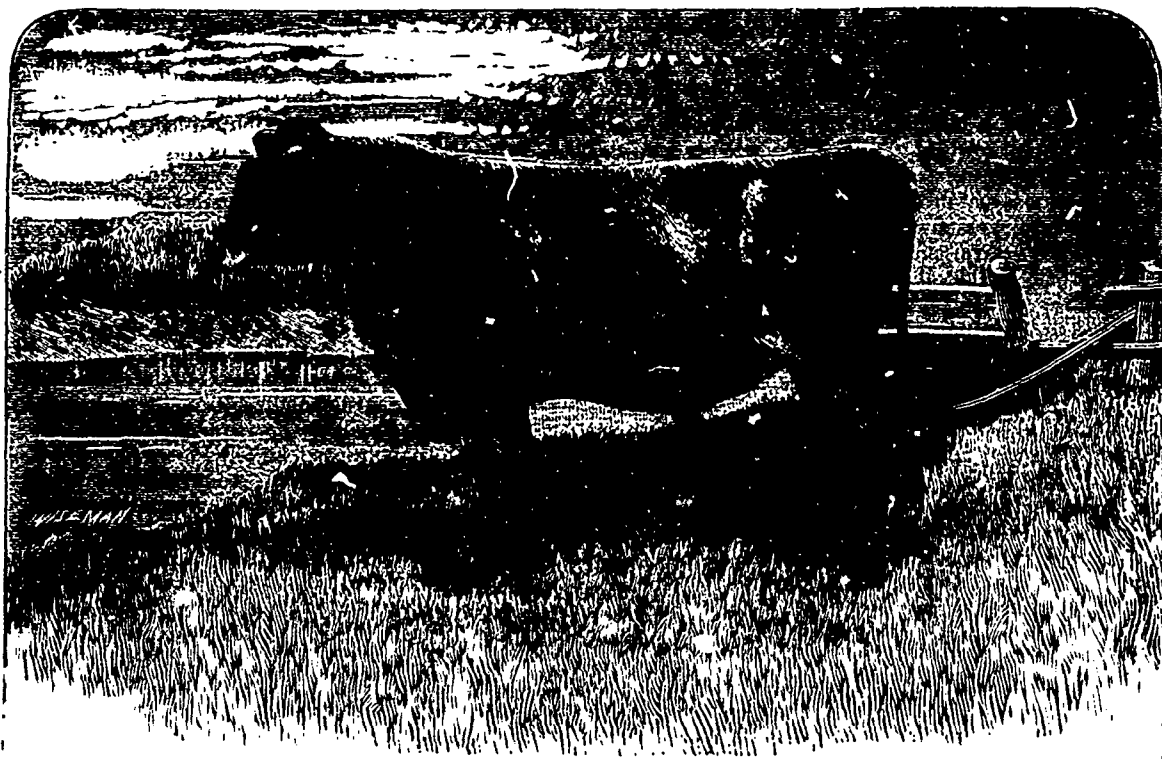
A *Yorkshireman* says: A good fair shorthorn cow, any number of which may be purchased at York market, will, within the twelve months, suckle from five to six calves, and the two year old heifers, two calves. The system is this: To put two calves to a cow at the same time, until about ten weeks old, when they are weaned at once, then two more for the same time, and then one, unless the cow is an extraordinary milker, when a sixth is added. The heifers calve at 24 months old, when each suckles her own offspring, and then another, when the dams are fatted and killed at three years old, making from £24 to £26 each. In the winter the cow is tied up, and the two calves tied also, one on each side of her, and allowed to suck three times a day. The early calving of the heifers does not appear materially to reduce their

must be frequently formed in the bladder or urethra (the canal or outlet from the bladder). As they are formed chiefly from lime salts and lithates that are being removed from the system through the urine, their growth being so gradual that they may exist for a considerable time before their presence is suspected, this is more likely to be the case owing to the kidneys being the only organs of the urinary apparatus that are ever thought to be diseased. To the majority of horse owners it never occurs that the organ which stores the urine until it is expelled from the body is quite as liable to become diseased as those that secrete it. All cases of difficult or peculiar discharge of urine are attributed to sluggishness of the kidneys, and a liberal dosing with diuretics is thought to be the specific called for, this dosing has about the same

effect on some urinary diseases that coal oil would have in putting out a fire.

*The symptoms of urinary calculus.* At first it is noticed that the horse micturates more frequently than usual, only a small quantity of urine being passed at a time, after passing a small quantity, he will stop, take a few steps, keeping the hind legs well apart, then try again, and making a considerable effort, succeeds in getting away a few drops. The difficulty gradually increases. He loses condition, his coat is staring, is hidebound, has a general unthrifty look; may have occasional colicky pains. As the calculus increases in size, if situated at the neck of the bladder or in the urethra, the urine is voided spontaneously, dribbling nearly constantly down the inside of the thighs, which become exoriated, thus adding to the general discomfort of the animal. It is not uncommon to notice a few drops of blood in the urine after the violent expulsive efforts. The horse on which the

of the case it was thought that there was a calculus in the bladder; on making an examination this was found to be the case: Lithotomy was recommended as the only possible cure, at first the owner was disinclined to allow the operation to be performed, but after considering the matter for a few days, finding the horse was nearly useless in his present condition, concluded to allow it to be undertaken, and brought him to the College for the purpose. On Monday 5th Feb. the horse was cast and secured in the usual manner on the off side, the hind leg on the upper side drawn well forward. The rectum was carefully emptied an incision was made into the urethra in the median line, commencing about 2 inches below the lower border of the anus, the catheter having been previously passed to guide the operator in making the incision, through the skin and muscles of the penis. The incision was made in a direct line, through the spongy portion of the urethra, and was made in an oblique manner to avoid cutting



YOUNG GARENNE'S DUKE.

operation referred to was performed, had been purchased by its present owner about the latter part of December last. He noticed nothing unusual about the animal when he bought him, excepting he was rather rough and out of condition, this his former owner claimed was owing to his having been hard worked and not well cared for. The next day the horse was noticed to try and urinate every few minutes, only a few ounces coming away at most; after driving a short distance when he stopped, the urine ran slowly away without any effort on the part of the horse, on several occasions he noticed blood in the urine. Supposing, of course, that the kidneys were at fault, he gave the horse saltpetre for several days; this only made matters worse. Then he thought more soothing treatment would be preferable, gave diluents, linseed tea, but without benefit.

After about six weeks he brought the horse to the College for examination, on seeing the horse and learning the history

the rectum and further injuring the penis. A *sound* was passed into the bladder to determine the exact position of the calculus; this was found to be the prostatic portion of the urethra, which was very considerably dilated, the urine flowing around it on all sides; by a gentle to and fro motion of the sound the calculus was loosened from its position, the left hand was then passed into the rectum and by a gentle pressure the stone was readily moved backward through the urethra towards the opening. Owing to the great size of the calculus, it (the opening) had to be further enlarged, which was done with the probe pointed bistoury, and this done, the calculus was readily drawn out with the hand in the rectum, and by the aid of the sound and fingers of the other hand, in a remarkably short time. The calculus, which is a very large one, measures  $2\frac{3}{4}$  inches by  $\frac{1}{2}$  inch, and weighs  $3\frac{1}{2}$  ounces.

Three sutures were taken in the skin, and the animal was allowed to rise; the hemorrhage was slight, no vessels of

any size having been cut, a little sponging with cold water being all that was required to stop it. Lest some of the blood might flow into the pelvic cavity, the sutures were soon after taken out.

The after treatment has been simple; febrifuges and a cooling diet and frequent sponging being about all that has been required; only one slight chill was noticed, which was promptly arrested with liq. amm. acet. and warm clothing, the temperature was slightly elevated the second day, was 103½ and it is gradually subsiding. This is the rectal temperature and is probably somewhat due to the local inflammation; pulse and appetite normal. Some urine is passed by the opening through which the calculus was removed, but most of it is passed in the natural way. There has been no straining since the first day, which was frequent and violent before the operation.

The catheter has been passed to ascertain if the urethral canal was clear, it was found to be perfectly so, the urine discharged by the natural way daily increases.

## AGRICULTURE.

PARIS, DECEMBER 2.

The persistent rain is making sad havoc with agricultural operations. Autumn sowings are literally made on mud, if made at all. In other cases the soil is so soft, that neither plough nor cart can be utilised. The rain has this peculiarity, that it comes chiefly from the north and east, and that it is alternately warm and glacial. Another important operation retarded, is that of pruning the vines. This has not taken place as usual in the autumn, as the wood at present, continues to be actually green. However, the operation will not be very bad if delayed till spring, many growers being of opinion, that it is the best period for pruning, and tells notably on the augmentation of the grapes. I may here remark, that the yield of wine during the late vintage, is now definitely known. It will be only 440 million gallons; last year it was 308 million gallons more. In years gone by, the mean vintage of France was 1100 million gallons. In the sugar beet regions, the effects of the weather are next to disastrous, the roots can only with great difficulty be lifted, but then it is next to impossible to cart them to the factory. The roots are "forky" this year, retain the clay pertinaciously, and so involve additional expense for cleaning. The density of the juice is a one-tenth less than last year. The roots keep very badly, the temperature being so mild. Some farmers made a joint stock arrangement, and invested in a portable railway to cart off the beet. It is estimated that the total yield of beet sugar, will be the same this year as in 1881; viz. 380,000 tons. The question is being discussed: Ought a farmer to raise his own beet seed, or purchase it? There are sound authorities in favour of both practices, but opinion inclines rather to not self-raising, which exacts much care, but to patronize the best dealer. It should not be forgotten, that there is an advantage in employing seed grown elsewhere.

Ammonia and the nitrates play so important a rôle in vegetation and cultivated soils, that too much importance cannot be given to clearly indicate what is exactly known, and what is uncertain. The Pic du Midi in France, is a meteorological station, 3,164 feet above the level of the sea. Messrs. Muntz and Aubin have analysed the ammonia contained in the air at that altitude, but found no perceptible difference as compared with that contained in the air at the level of the sea, and in the lowlands. Water collected at the same height, from rain, snow, and "fog," contained less ammonia than that contained in the vicinity of London and Paris: in other words, the strata of air nearest the ground,

are richer in ammonia, due to the drops of water sweeping through a longer extent of air. It is to Boussingault reverts the honor of demonstrating the permanency of ammonia in fogs and dew; that permanency has not been proved in the case of rain water. One fact admits of no question—that the quantity of ammonia in the air, is variable. Mr Schloësing emits the opinion, that the Ocean is the great reservoir of ammonia. This is not wholly exact, as certain electric influences can produce ammonia in the atmosphere. Messrs. Muntz and Aubin did not discover any nitrates in the air. Such do not, as a rule, there exist: nitrates are only produced in the atmosphere, following electric discharges, hence, why nitrates are always present in meteoric rain water. The formation and the decomposition of nitrates, by opposite causes, have been demonstrated in the case of drained lands by Barral, and Kuhlmann. A new explanatory fact has been made known, that one class of animalcules makes the nitrification, while another destroys the combination of the elements. The process of nitrification takes place, according to the experiments of Messrs. Dehérain and Maquenne, only in soils rich in organic matter, and exempt from the action of oxygen. These conditions can only be fulfilled in the case of bog-lands or flooded soils. One fact worthy of notice, the decomposition of the nitrates, or reduction to their original elements, is accompanied by the production of protoxide of nitrogen, commonly known as *laughing gas*, and employed as an anæsthetic by dentists in "painless" tooth extraction. But what is the cause of these changes? When a portion of rich soil was heated, or submitted to the fumes of chloroform, it lost its property of decomposing the nitrates; on the other hand, when fresh soil was mixed with that heated &c., the decomposition set in because the animalcules (vibrions) existing in the fresh earth, attacked the organic matter; set free carbonic acid and nitrogen: the latter, seizing the oxygen of the nitrates, disengaged the nitrogen under the form of protoxide. And the animalcules were readily detected, and were identical with the vibrions found by Pasteur in his celebrated researches on fermentation and decomposition.

Attention is being drawn to the error farmers make, by not cultivating sainfoin or *esparcette*; it can advantageously replace clover; it does not exact an essentially calcareous soil; it gives favourable returns on argillaceous and sandy soils. On a soil well prepared, sainfoin can be sown with rye, or any spring cereal, and covered in with a light harrow; 56 lbs of seed per acre is sufficient. The plant lasts from 10 to 15 years in a soil. For milch cows, it should be cut when commencing to flower, for horses, when the seed begins to form. As a hay, it has no equal for sheep during the lambing season, as it augments the secretion of milk.

A writer urges a more careful study of pure water, and of drinks in general, on the economy of animals. The privation of water tells more rapidly on health, than abstinence from food. In every kind of beverage, the part efficacious in assuaging thirst is the water. The quantity of water required by an animal varies with the air's temperature and humidity. A sheep requires least, and a pig most water: horses and cattle come between. In the case of sheep much water thins the blood, they ought never to be deprived of water as many shepherds practise, nor at the same time allowed to fully slake their thirst: the latter observation applies also to horses. The sheep and horse are, of domestic animals, the most sensitive to impure water. For draught animals and sheep water drinks are enervating.

Professor Marker's experiments on meadow lands, in the Bavarian and Swiss Alps, with superphosphates and potash salts, reveal two interesting facts: soils dosed with these fertilizers, not only yielded returns 2½ times greater, but three weeks earlier, than those soils not so treated. It is

however, well-known, that superphosphates advance the maturity of all cultivated plants. But what is not so well known, the salt of potash also hasten maturity, but on one condition, that the soil be rich in lime. Wood ashes, as a consequence of their potash, proved an invaluable fertilizer for meadows, while extirpating those acid weeds peculiar to moist lands.

France has suffered from the excessive destruction of her forests, especially in mountainous districts; hence, it is only natural, that replanting is being largely resorted to. Mr Mucl, inspector of forests, has been conducting experiments with chemical manures, on plantations of pine, oak, ash, and elm. It results, that farm yard manure produced no results commensurate with the quantity applied; nitrogenous fertilizers proved rather a hindrance than a help; whilst mineral manures acted in a marked manner, especially on seedlings. These results are but natural; analysis proves, that nitrogen figures in the composition of wood, only for one per cent, while the mineral salts range from 3 to 7. This may explain why trees grow, and even flourish, on soils too poor for cultivated crops.

The sugar-beetroot Society of the north of France, counsels those who desire to grow their own seed, to select for that purpose, medium sized roots, of a pale rose color, but slightly out of the soil, and having neither too few, nor too many leaves. A spindle shaped root is preferable, but not with a narrow crown, as that indicates a tendency to run to seed. Replant early; cover well; and avoid nitrates, guano and sheep manure.

## POULTRY DEPARTMENT.

### The Grazing of Fowls.

The London *Country Gentleman* gives the following interesting account of the method of poultry keeping practised at the farm at Lamplough Hall, Cumberland:—

The neglect of poultry is a common complaint against large farmers. The small cultivators in France and the same class in England, in those counties where they are found, pay unremitting attention to poultry farming; and millions of pounds sterling find their way into the pockets of foreigners which ought to be kept in the country for the benefit of our own agriculture. Since the award of the prizes to the best cultivated farms in the several classes at Carlisle, I have visited several of the prize-winning occupants. The management of poultry on several of these well conducted farms is commendable, and that on one of them—the largest among them—is exceedingly ingenious and successful. The farm consists of 1,200 acres, almost entirely in grass. The head of poultry is large, numbering several hundred head at the time of my visit, and the success of the method which has been adopted is so entirely satisfactory that the number will be increased. The health of this large number of fowls if maintained by distributing them thinly over the farm. There is only one homestead for the cattle, but there are several sufficient homesteads for the fowls, which are moved from field to field. After harvest, at a time when sparrows and wild birds would elsewhere clear the corn-fields of all scattered corn, the poultry are brought down up the spot. My visit was paid before harvest, when the poultry were grub-hunting and fly-catching in their usual pasturage, the grass fields of the farm. We entered a field for the purpose of looking at some fatting sheep, and at one end, in a sunny corner sheltered by a plantation, the score of poultry attached to that particular site were enjoying themselves, stretched in the sun at the edge of the plantation, or searching the grass for insects and other food. The fowls at Lamplough pick up at least half their living in the fields where they are reared.

I did not at first observe the poultry house. This simple structure is used by the fowls as a nesting place, a roosting place, and a place of refuge and shelter in wet weather. It is about the size of a large dog kennel, six feet long by three feet six inches wide, three feet high to the eaves with a slanting roof of about one-third pitch, a door at one end, an opening for the birds at the other, perches and nests within, ventilating holes at the ends. The roof may be of asphalt nailed on wood, tarred and rough cast with sharps or gravel, as I will presently describe in mentioning another and larger house used on the farm. The hutch fowl houses are set up off the ground to preserve the wood work, and are movable. Twenty hens are kept at each hutch, and when it is desired to change their ground, the hutch, with the fowls within, is placed upon a cart and the whole establishment is removed to the new site, where the fowls—perfectly well understanding the objects and results of the removal—resume their grub hunting with redoubled ardor and success. The hutch is a home from which they never stray. I am describing the management of a gentleman who finds that the poultry reward him for the pains bestowed upon them. It is said that “without pains there are no gains,” and it is equally certain that the pains bestowed upon the poultry do not involve much labor or outlay. They are fed once a day, and the eggs are removed once a week or oftener. The feeding time is early in the morning, when the shepherd, or stock man, on his rounds visiting the more valuable kinds of stock on the farm, passes the several colonies of poultry and scatters some maize for them.

In the field containing the fatting sheep, I found a larger house and corn store, one end of which is partitioned off for the poultry, while the larger apartment—which may be kept under lock and key—contains the cake and corn for the sheep, a bag of maize for the poultry, and a wide basket with a number of very tempting looking new-laid eggs. This corn store and poultry house forms the headquarters and principal depot for all the poultry-hutches in its neighbourhood. It is twelve feet long by seven feet wide inside. One end, four feet deep, is partitioned off for the use of the fowls with boards. This is divided into two stories by a floor three feet six inches from the ground. An inside door in the centre admits the attendant, and the birds go in and out by a hole of suitable size. A window of coarse glass, inserted with a beading, admits light. There are perches for twenty fowls. The nests are formed at one side of this little apartment—the left hand side in looking through the doorway—by a board from the roof and a sill below nailed to the floor. The space below the floor forms a shelter for the birds during inclement weather, and is entered directly from the field by a hole in the end of the building. Possibly, it might be better in those districts where foxes are more common than they are on the coast of Cumberland to dispense with an entrance near the ground. In the case I am describing the fowls enter the lower apartment and pass thence to their perches above at roosting time or to their nests. A lattice for ventilation is fixed above the door already mentioned, and through this door the eggs are readily collected and the floor cleaned.

The largest poultry house which I have now described can be readily placed on a truck for removal to different parts of the farm, though its central position, close to several of the principal feeding pastures, may render its removal a rare occurrence. If the slightest attention is given to the proper cleaning of a house of this description it will not become stenchy, and its twenty or twenty-five hens will range wide for food in all directions. The method of “rough casting” the roof may be strongly recommended. The asphalt, nailed on board, is first tarred with a mixture of about a

gill of naphtha to a gallon of tar, which effectually dries it and prevents the tar from sticking. The tar having been put on hot, it is immediately covered with sharp sand or fine gravel, and the result is a most durable roof, as hard on the surface as stone.

It is almost unnecessary to point out that the advantages of this system of grazing poultry on the land like sheep are health and economy of food. The fowls are fed once a day only; their remaining rations are gleaned by themselves at nature's own board in the fields, which they no doubt strip of many injurious pests, such as wire worms and the destructive daddy long-legs grub, the *tipula*, whose ravages this year so many farmers will have reason to remember. The food given to the fowls is whole maize, which some feeders may find too fattening perhaps, but not when the birds range wide for their own living. Only two conditions are required beyond those already referred to for the success of this system of poultry keeping—a good breed and a good demand for the produce. In the present case there is a good demand for eggs among the mining population at Frizzington. Prices vary from thirteen eggs for a shilling when they are plentiful—as they are in Cumberland during the months of May, June and July—to two pence each at the season when they are scarce. I will not enter minutely into the financial part of the subject. When hens are fed on the smallest possible quantity of the cheapest kind of grain, and when almost nothing is expended on them for the labor of attendance, they can hardly fail to pay well. If the costs are seven shillings a year, or about half what they are when the fowls are confined in poultry yards, and if the hens lay 140 eggs each in the twelve months, selling at an average of one and a quarter pence each, the gain is not less than cent per cent.

The breeds of fowls on the farms are the brown Leghorn, dark Brahma, Houdan and Dominique. There is also a good stock of ducks, including Rouens, India Runners and the incomparable Duclairs, with Toulouse geese and American bronze turkeys. I have never seen any kind of stock better managed than the poultry at Lamplough Hall, and much of the praise is due to the lady of the house.

#### VALUE OF PURE BREEDS.

This journal has long made it a point to recommend pure-bred fowls, because of their great superiority over the old kinds for practical purposes, and to discourage the idea that their chief value is for exhibition purposes, or to ornament the lawns of gentlemen of fancy. People are rapidly coming to the only correct idea in breeding stock of any kind, that to make it profitable, definite results must be sought through intelligent effort and well known causes. The following, from the *Poultry World*, will be found full of proper suggestions.

"The opinion prevails among the more conservative portion of ruralists, that what they choose to call fancy fowls are of little value excepting to look at, and to lavish care upon. And it is clear to a careful observer that this is one of the greatest obstacles to be overcome by the disseminators of pure-bred poultry. And it is clear that on the poultry press, more than anything else, are we to depend for the refutation of this erroneous idea.

"That there have been fowls that were of little value excepting as curiosities, is only too true, but that the great race of pure fowls in general are possessed of few or no economic qualities, is not true. To prove that pure-bred fowls are as much better than common, as the domestic cow is better than the untamed bison, and that common fowls cannot possibly be as valuable, in a practical sense, as pure ones, will be our aim in this article.

"Farmers, and country and village folk, those who keep the bulk of all our fowls, consider eggs the most valuable product of their fowls. And if so, surely the pure breeds are better than the common for this purpose. Where is the flock of common fowls that will lay as many eggs as the Spanish, the Hamburgs, or the Leghorns? It will not do for farmers or others to say their hens lay as many eggs as our flocks of pure-bred fowls do; they must *prove* it by correct records, as we base our opinions of the laying qualities *only* on what they *have done*.

"And fowls for food. Can pure breeds be excelled either in quality or quantity by the flesh of common fowls? Will the average common fowl weigh as much, either alive or dressed, as the Brahmas, the Cochins, Plymouth Rocks, Langshans or Javas? Will any equal in quality of flesh the Houdan or the Dorking? Are any ready for the spit in six weeks from their entrance into this world, as are Leghorns? Will any show a smaller percentage of offal in dressing than the Dominique or the Seabright. As sitters, there are no common hens that equal the Cochins or Brahmas. Even long before

"The snow has left the western hill,  
And buds with new life now are swelling;  
All softly sings the ferny rill,  
And blue bells winter's death are knelling,"

they are ready and willing to be entrusted with the fertile eggs, that in twenty days will be downy balls of beautiful life. And the same soft, fluffy covering that made their entrance upon the stage of life possible amid such inclement weather, will keep them warm and cozy until the bright warm days of May, when they will begin life for themselves.

"If, in productiveness, the pure breeds are better than common fowls, so, too, in health and vigor they are superior. Care, food, and wisdom in selection of breeders have all aided in making the pure bred fowls exceptionally hardy and vigorous. And, if from a sudden change from all this humanity and practised wisdom, they should show signs of disease or a decline of life and strength, it is only the beginning of the weaknesses that is common to farmers' fowls. If a common fowl dies, nothing is thought of it. It is only when a good fowl dies that it is remarked that "them there China chickens aint no ways stout." Does the fancier lose as many fowls as the farmer, even though his fowls are usually kept under adverse circumstances? Common fowls have free range, which is rarely the case with pure ones.

"With good care and attention, common fowls can be, and often are, made to pay a handsome profit. But why does the market poulterer, who cares nothing about the external appearance of fowls, sooner or later discard his common fowls, and keep only some variety of pure ones? It is simply because he has tested the matter, and found that common fowls will *not* pay as large profit as pure ones.

"And why is it *impossible* for common fowls to be as good as pure ones?

"Because they are not specialists. That is, and always has been, the secret of success. He who is devoted to many hobbies, will succeed in none. He may have a kind of limited success, but the grand achievement of his most enthusiastic hopes will not be his. But he who devotes his whole time, energy and thought to *one end*, will succeed, if success be possible. And it is precisely the same with any live-stock breeding, and emphatically so with domestic poultry. Specialty is the idea of the age. Common cattle cannot give us as much good beef as the Shorthorn or Hereford because they were not bred solely for that end. Neither can they give as much butter as the Jersey or the Holsteins, because they have not been bred solely for that purpose for many generations past. Nor is it possible for the common horse to trot as fast as the

high blooded Morgan, who has been bred toward that end until it has become his nature. And fowls are no exception.

"Would it be reasonable, my friend, to expect the common fowl, which has been bred (if bred at all, for usually selection and mating is a matter of chance) for general purposes, to lay as many eggs as the Leghorn, to be as large as the Brahma, as truly a sitter and a mother as the Cochins, as fine flesh as the Houdan, or to mature as soon as the Leghorn or Hamburg? Certainly not.

"If wisdom in selection and mating is of any worth; if good care of both breeding stock and their young will produce any good results; and if good food and water and comfortable housing will improve the good qualities in any form, then pure-bred fowls are the best

"It is no dishonor to common fowls, that those of their race which have been carefully bred should excel them in usefulness. Improvement is an honor to the whole race. The common fowl of to day is a great improvement on the fowls of a century ago, and they were a great improvement on the untamed fowls of India's jungles.

in misery; and habits of industry, carefulness and thought; and the thought that perhaps we are doing something that may benefit our fellow man, form a part, only a part, of the utility of fancy fowls."

**How to Make Hens Lay.**

A correspondent of the *American Cultivator*, having occasion recently to visit a friend in Northern New Hampshire, who has the reputation of making money through the keeping of hens, found his method of operations during the winter season somewhat as follows: "The hen-house was in the basement of a workshop building, with windows facing the south. The size of the rooms where the hens were kept was about fourteen feet by twenty. The fowls were of the Brown Leghorn variety and numbered about sixty birds. Although the room seemed small, considering the number of fowls, yet, by means of good ventilation, it answered its purpose well. As I entered the room the odor of the onion attracted my attention. 'Do you give onions to your hens?' I asked. 'Yes. Onions make a good green food for hens



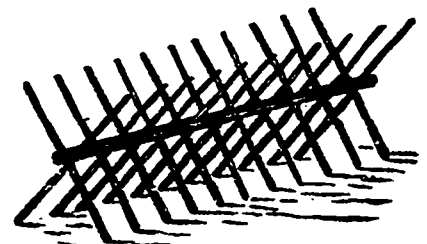
Fig. 1.—Alsike Clover Plant in bloom



Fig. 2.—Alsike Clover Root and Crown, average size, one year old.



Fig. 3.—Red Clover Root and Crown, one year old.



Sheep Hurdle.

"But the benefits of keeping fancy fowls do not stop with their ability to contribute to our income. The poor boy, who toils each day to support his mother and brothers and sisters, breathes in fresh courage and hope, and a love for duty, with every look at his humble flock of fancy fowls. The friendless mother who supports herself and child with her needle and thread, sees home and childhood, and all the bright chain of memory's picture each time she feeds her little flock of hens, or goes to find their gift of nutritious food. Ah, poor man, suffering under misfortune, shame or the curse of caste! The society of your pets, at least,

"Will still the fires within your breast  
While hate and envy forth are driven;  
And all your sadness,  
Will yet be changed to quiet rest,  
And with an unjust world forgiven,  
All will be gladness.

"The love of the beautiful that is cherished by our love of fancy fowls; the sympathy and kindness shown to our pets

during the winter. As I had a quantity on hand, unfit for market, I am feeding them out in this way to good advantage.' 'How do you feed your hens during the winter months?' 'In the morning, I give them a dough made of bran and boiled potatoes. At intervals of two or three days I put cayenne pepper with this mixture. At noon, I feed such scraps as are left at my table, with baked potatoes.

In the evening, I give my fowls about two quarts of whole corn, believing that this grain remains longer in the crop than any other. Twice a week I feed them meat. I buy cheap mutton, chopping up bones and all before feeding. Every day I furnish a supply of pure warm water, also keeping before them at all times a pan of ground oyster shells.' 'Do your hens pay you a good profit?' 'Most certainly. The net profits from my hens more than pay our grocery bills. There is no guess work about this statement, as I keep an exact account, showing the debits and credits in full detail.'

### Alsike Clover for Bee Pasturage

Alsike or Swedish clover (*Trifolium hybridum*), as its name indicates, is a native of Sweden, where it grows wild—being both hardy and productive. It is commonly known by the name of Alsike, that being a parish in Sweden where this clover originated. It was brought into cultivation in Sweden about the beginning of the present century, was introduced into England in 1834, and soon thereafter found its way into the German States and other parts of Europe, and was finally brought into the United States, through the Patent Office, about the year 1853.

Alsike clover is regarded by botanists as a hybrid between our common red and white clovers. The stem and branches are finer and less woody than the common red, and when out and cured for hay, it is perfectly free from fuzz or dust. It does not turn black, but remains the color of well-cured timothy. It has, as the following cut shows, numerous branches and a multitude of blossoms which are rich in honey. The bees have no trouble in finding the honey, as the blossoms are short and the heads no larger than white clover. The blossoms at first are white, but soon change to a beautiful pink, and emit considerable fragrance. The leaves are oval, of a pale green color, and may readily be distinguished at any stage of their growth from the white or red clover by the total absence of a pale white bloom on the upper surface of each leaf, a peculiarity unnoticed by previous writers. It ripens, in the latter part of July, but needs not to be cut till August, if the weather should be unfavorable. The crop of seed is always obtained from this cutting, in which respect it is unlike the common red. It is not advisable to cut this clover more than once each season, but it may be pastured moderately during the fall.

When cut for seed, it may be threshed from the field with a common clover machine; but, if more convenient, it may be stacked and threshed during the fall or winter.

Care should be taken in handling this clover, as the seed shells very easily; but this is looked upon as a point in its favor, as the land thus becomes reseeded every year, and so early, that if the autumn proves to be a wet one, nearly every grain will germinate, and a fine growth of new plants will be secured for the following year. The seed is very fine—being about the size and shape of white clover—a pound containing, it is said, about 600,000 grains, or three times as many as the common red. The seed-pods contain 1, 2, 3 and some times 4 grains, which explains why it is so prolific—a moderate yield being from 150 to 200 lbs. of seed to the acre.

When sowed by itself, 4 lbs. of seed is a great plenty for an acre; but this is not the best plan to pursue, especially with our dry western prairies. It is much the better way to mix Alsike with timothy or the common red, or with both. When thus mixed, they are a help to each other.

The Alsike being a native of a cold climate, does not winterkill, and besides, it acts as a mulch in winter and spring to the common red, and keeps the latter from being destroyed by the heaving-out process. As the red clover shades the roots of the Alsike, which grow close to the surface, it protects the latter from the effects of drouth. The timothy and red clover being both upright growers, lift and keep up the Alsike from the ground, which is very desirable. The stem of the Alsike is too fine to support its many branches in an upright position, and hence is more inclined to lodge than the common red. For the reasons given, the combination of the three named plants is very important, and will prove successful wherever tried.

When mixed sow the usual quantity of timothy and red clover, and not more than 2 lbs. of Alsike seed to the acre—in fact, 1 lb will be ample. If wanted for seed, it might

then be best to use 2 lbs. of Alsike to the acre. Timothy and red clover do no harm, as the crop may be cut so early that the Alsike will be the only plant ripe enough to furnish seed. Timothy seed being about the same size of the Alsike cannot very well be separated from it; but such is not the case with red clover, as a fine sieve will quickly do the work.

Alsike clover, as a fertilizer, must be as good a plant as red clover, if not better, as an examination of figures 2 and 3 will show. Having often dug up specimen roots of both Alsike and the common red clovers for comparison and exhibition, fully as much difference in the size of the crowns and the quantity of roots and rootlets have been found as the cuts indicate. The representations are very accurate, and the reader will do well to examine them closely and note the difference, which seems to be decidedly in favor of the Alsike. Having now grown Alsike on a variety of soils for the past 12 years with good success, I know that what I have set forth in this article are facts and not theories.

But the main object of this article is to call special attention of bee-keepers to Alsike as a honey plant. It is well known to the fraternity that my favorite honey plant is Melilot clover, than which none better has yet been found in the United States. But Melilot will never be cultivated to any extent except by bee-keepers, as no farmer would think of sowing a thing as growing it for hay and pasture. But Alsike clover is a plant that every farmer can and should cultivate, whether he keeps bees or not, as it is superior to the common red, for hay or pasture, for all kinds of stock.

Now, let me indicate to bee-keepers what should be done, and that right speedily. Suppose you have 50 or 100 colonies of bees, more or less, then visit the farmers in close range, and ascertain how many acres they intend to seed down to grass the following spring, and induce enough of them to sow at least as many acres to Alsike, timothy and red clover, as you have colonies. The more land you can thus get seeded down the better. Induce them, if possible, to buy the seed at the cost price, but if you cannot do this, let them have it at half the cost price, but if this fails, then make them a present of as many pounds as they will sow acres. They certainly could not and would not object to this last proposition, as it would be no more work to sow the grass seed mixed with Alsike than if it were left out. A bee-range can be supplied with one of the very best honey plants at a trifling expense. One hundred acres of Alsike, mixed with other grasses, in full bloom during June and July, in the neighborhood of 100 colonies of bees, would insure a large crop of the choicest honey every year, and cause the bee-keeper to swing his hat with joy. Now, if every reader of the BEE JOURNAL will act upon this advice the present winter, hundreds of tons of the finest honey will be added to the crop of 1882, and I am quite sure you will thank me for calling your attention to the project; if so, I shall feel amply repaid.—*American Bee Journal*.

### De Omnibus Rebus.

*The Newell Grinder*.—I have heard from several people who are using this excellent mill. They all speak very highly of its performance. At the Montreal Abattoir, Mr Short says, it is doing splendid work; grinding bones, tannage, &c., to perfection. Mr Charest, of the Deaf and Dumb Institution, praises its meal grinding powers, and Mr Melançon, of St. Jacques L'Achigan, after stating that it grinds from 15 to 20 bushels of grain per hour, without heating the meal, says "It is the best grinding mill I ever saw."

*Great Sale at Kansas City*.—I see by the Breeder's Gazette, that our enterprising countryman Mr Cochran sends a large lot of Angus, Galloways, and Herefords, to the

combined sale at Kansas City on the 25th April. About 200 bulls of the different breeds will be exposed, as our Scotch friends say, on that day.

**Advertisements.**—All intending advertisers will please take notice that cash must, in all cases, accompany orders.

**Polled Angus bulls.**—The Hon. John Pope, I am told, has sold all his Bull-calves, in advance, for \$250 a piece!

Some one is annoyed at my recommending Hampshire-Downs in preference to Scotch Mountain-sheep! As one breed is ready for the butcher from 9 to 15 months, and the other will hardly fatten before 3 years old, if then, the reason for my preference is not far to seek. The Hampshire-Down is used to hard keep, as any one whose has seen them *work* on the Kent and Surrey hills must know; and to speak of those districts as moist, where, on an average, not more than 25 inches of rain fall a year, shows how little people know of the climate of the S. E. of England.

A very awkward sentence in my article on sheep feeding off turnips, last month. How it could have escaped my eye in correcting the proofs I do not understand. Instead of: "The average consumption of a sheep in &c," it should read, "A sheep feeding on turnips in winter, out of doors, will eat about 20 lbs of roots a day, in which there are 18 lbs of water, 14 lbs more than the animal wants for its nutrition."

**Devonshire Butter.**—I find, by experiment, that the heat of the milk at the end of the process for making butter in the Devonshire fashion is about 185° F. I had thought it was nearer 200° F., but I was clearly mistaken.

A. R. J. F.

A farmer asks the "Country Gentleman" if "Ensilage is a fattening food?" Of course it is not; neither are brewers' grains, unless the brewer does not understand his business, but they will help to produce milk, and so will ensilage, and that is its proper place. Butter and meat must come from other sources. The "Dixie Farmer" has no opinion of ensilage. 'Cattle, according to this paper, do not require green food in winter. What a deal the South has to learn! And the worst of it is that the people there seem rather proud of their backwardness.

AN ACRE.

There are 160 square rods in an acre, and there are 30½ square yards in one acre. This gives 4,840 square yards in one acre.

- 5 yards wide by 968 yards long is 1 acre.
- 10 yards wide by 484 yards long is 1 acre.
- 20 yards wide by 242 yards long is 1 acre.
- 40 yards wide by 121 yards long is 1 acre.
- 80 yards wide by 60½ yards long is 1 acre.
- 70 yards wide by 69½ yards long is 1 acre.
- 60 yards wide by 80½ yards long is 1 acre.

Again, allowing nine square feet to the yard, 272½ square feet to the rod, 43,560 square feet to the acre, and we have another table:

- 110 feet by 360 feet, 1 acre.
- 120 feet by 363 feet, 1 acre.
- 220 feet by 198 feet, 1 acre.
- 240 feet by 18½ feet, 1 acre.
- 440 feet by 90 feet, 1 acre.

**IMPORTANT SALE BY AUCTION.**—THOROUGHbred Shorthorn, Hereford, and Ayrshire cattle at Sunnybraes stock farm, Compton, P. Q.  
The undersigned will sell at Sunnybraes, Compton, on Wednesday the 11th April 1883, about (30) thirty heads of thoroughbred registered cows and heifers in calf of the above breeds. Also, by private sale, a very fine lot of yearling Shorthorn, Hereford, and Ayrshire bulls.

J. GORDON GIBB.

For further particulars address the above. Sale to commence at 1 o'clock sharp.



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Probably from the fact that our long experience as Practical Gardeners, made us realize the necessity more strongly than most seed dealers, we very early in our career as seedmen inaugurated the practice of testing all seeds before sowing. From the small tests begun in 1872, this practice has extended and become so systematized that the past season it required the entire use of one of our largest greenhouses for our seed tests during the fall and winter, and afterwards in spring in the open ground we had set out many thousand plants, representing the stock in vegetable seeds alone of over 900 growers. All these tests are carried on under the personal supervision of PETER HENDERSON, and as the author of "Gardening for Profit" has had as long and as varied an experience as most men in operations connected with the soil it will be seen that we are placed in a position to judge, not only as to the germinating properties, but what is of far more importance, the purity of and the kinds of seeds best suited for all gardening purposes. If therefore you can buy seeds as cheaply from us, and we think if you will compare prices you will find that you can—it will certainly be to your interest to do so. Our Catalogue for 1883 of Everything for the Garden is now ready, and will be mailed free on application.

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Will be mailed gratis to all applicants, and to customers without ordering it. It contains five colored plates, 600 engravings, about 200 pages, and full descriptions, prices and directions for planting 1500 varieties of Vegetables and Flower Seeds, Plants, Fruit Trees, etc. Invaluable to all. Send for it. Address, D. M. FERRY & CO., Detroit, Mich.

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**IMPROVED BUTTER COLOR**  
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And, while prepared in oil, is so compounded that it is impossible for it to become rancid!

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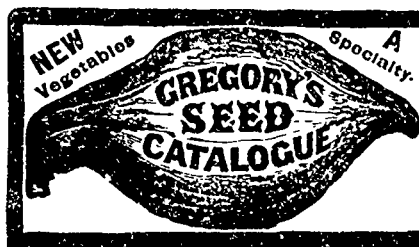
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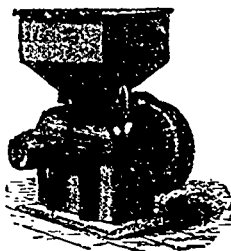


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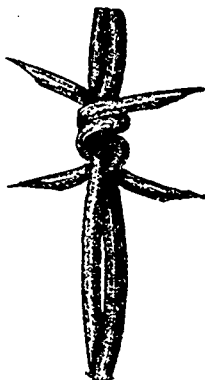
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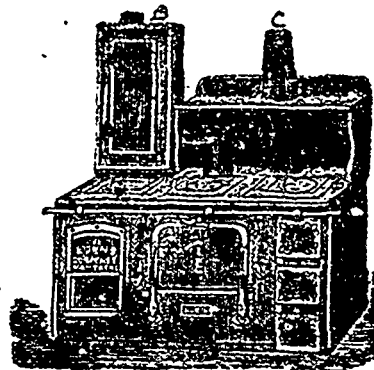
References: Quebec, J. B. Benaul, Esq., M.P.P.  
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