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Fallow Crops.

Commonly called *root-crops*, are now so generally cultivated here, that it is unnecessary to expatiate on their utility. Every one knows how desirable a possession, at the beginning of winter, a root house full of mangolds, swede &c is; and although many a one is deterred from growing them by the trouble incurred in singling the crop, yet it is clear to any attentive observer that the extent of land under this culture is increasing every year.

Upon the whole I do not think that it is advisable to sow carrots or parsnips as a regular part of the fallow shift. They are expensive to hoe, troublesome to thin, and do not, as a rule, yield largely. Neither do I think that their feeding qualities are so very superior to a good, sound swede, whether for butter or meat producing, as to warrant the extra labour they demand. I believe that potatoes, mangolds, sugar beets, and swedes, are sufficient for our purpose, and, with care, forethought and industry, there is not a farm in this Province on which these crops cannot be grown successfully.

And first of potatoes. What is a crop of this tuber? Ask the gardener, and he will tell you, a square rod ought to give four bushels! Ask the farmer, and he will say that 80 to 100 bushels per acre is a fair yield! Is there any reason for this discrepancy, a discrepancy so monstrous (640 to 100) that it could not exist for twelve months in any other trade? I think there are several reasons, and I will try and point out some of them.

In the first place it is generally acknowledged that, since we have become addicted to the modern plan of growing all the root crops on our farms on drills, we have allowed too much space between the plants. It is no uncommon thing to see potatoes set at 3 feet between the drills, and 20 inches between the plants in the drill, whereas in gardens the usual distance is 20 inches to 24 inches, by 10 inches. This alone would show that one or the other plan must be wrong. I admit that, if the land is, as it ought not to be, very foul, a considerable distance should be preserved between the sets, but only such a distance as shall admit of the easy passage of the horse-hoe, in one direction, and of the hand-hoe in the other, i. e. 24 inches and 9 inches, for it should be borne in mind that a large growth of tubers is seldom the product of a luxuriant growth of haulm, and the nearness of the plants checks the growth of the latter, just as a thickly sown crop of pease never runs to bine, as a thinly sown one almost always does in a damp season. (1)

Again, the gardener seldom manures directly previous to the setting of the potato. On the contrary, the heavy dressing of dung given to cabbages or cauliflowers is expected to furnish the succeeding crop of potatoes with all the food it requires; and it does so with all the more ease because, owing to the frequent stirring the land has received, the manure has become thoroughly mixed with the soil, its disintegration is perfected, and the roots find their provender ready for absorption.

The gardener, again, has dug his ground over at least ten inches deep, while the farmer is satisfied with six inches. Shallow cultivation and raw dung can hardly compete with deep cultivation and well mixed dung and soil; for, be it remembered, in many cases the manure is perfectly visible to the naked eye when we open the drills in the potato harvest.

I think, from all accounts, that it is clear that comparative immunity from disease is the reward of the early planting of this crop. I have taken great pains, at different times, to collect opinions on this subject, and I find that the latest crop is almost invariably the greatest sufferer. It would therefore seem to be an axiom that land should be prepared for potatoes as far as possible in the autumn. There is no reason on earth why, on our heavier soils, the cleaning should not be completed and the drills drawn out before the beginning of winter. In this case, the first work in spring would be harrowing down the drills with the drill harrow; they should then be reshaped with the double mould board plough, the dung spread, the potatoes set, and the drills split. It would be better to run the risk of the plants being cut down by a late frost than to lose a week in planting: the land being in good heart there is no fear of the recovery of the potatoes. How often does a heavy rain delay the setting till the end of May or the beginning of June, causing the yield to be small and the quality inferior, to say nothing of the almost positive certainty of losing half the crop by disease?

On lighter soils the ordinary way of planting will be probably always followed: cross-ploughing the autumn furrow, drilling up the land with the double mould board plough, spreading the dung, planting the sets on the dung, and splitting the drills to cover all up. The manure should not be exposed to the action of the sun and air longer than is absolutely necessary. Not that any valuable quality will escape from it, but because, when thus dried, it will not mix so well with the soil. It is worth while to see the perfect manner in which this is understood and acted upon in Scotland. They beat us Englishmen into fits here, if in nothing else. Of course in Canada, where the number of horses kept on each farm is small, we cannot follow out the system to perfection, but after having done, say 3 hours work with the dung-cart, we might plant and split the drills we have just got ready; and, although time must necessarily be lost in yoking and unyoking the good effects of the proceeding would, most assuredly, repay us in the end.

There is a deal of good argument expended every spring as to whether the whole potato, or the cut set gives the

(1) Our experience shows conclusively that many varieties of potatoes would be too close in drills only 24 inches apart. As a rule, gardeners sow early varieties exclusively, it is well known that these run less to bine and, therefore can be planted closer every way. However, the practice recommended here of manuring one year in advance, or at least in the previous fall, with rotten manure ploughed under, would check the tendency to over production of bine and increase greatly the yield of sound potatoes. E. A. B.

better crop. Individually I have a liking for a smallish uncut potato-one just large enough to cook; but I can assign no reason, except early habit, for my preference. It seems however certain that, if cut, the sets should be prepared some days in advance, and spread out thinly to dry. (1)

If, however, it should happen that potatoes have to be planted on an already manured soil, it would be a good plan to set them in every third furrow made by a common plough. This would place them, if the man "holds small," at from 24 inches to 27 inches apart, and afford plenty of room for the horse-hoe to work. This system is often followed when land is too rough for drilling; the dung is spread over the whole piece, and the plough is followed by boys or women who poke the manure into the furrow with small forks, and an untidy job it makes; but what would you have? There is the land, the dung, and the sets, so the potatoes must be planted, and this is the only way in which it can be managed! (2)

A few days after the potatoes are in, depending upon the season, the harrow should be passed over the field to lighten the soil, destroy what weeds have sprouted, and allow the young shoots to come up easily in their regular rows. The chain-harrows make beautiful work on drills, but the ordinary harrows should of course be used when the ground is flat. The horse-hoe follows, as soon as the plants are visible, accompanied by the hand-hoe, and, last of all, the earth is laid lightly, and in moderation, on the top of the drill by the double mould-plough. This last named implement has been wonderfully improved of late years; by cutting away the lower parts of the mould-boards it has been adapted to draw drills infinitely better than used to be done by a bout of the common plough, which used to make the drills uneven, so that the potato plants always came up through the side of the drill.

Too much earthing up is worse that none at all. The earth is given to keep the tubers from the light which would make them look green and taste bitter.

As our enemy the potato beetle has almost disappeared from many districts (3), and as early planting is seen to secure this valuable esculent in a great measure from disease, it may be expected that a largely increased area will be planted next year It is no exaggeration to say that where one bushel is grown now two ought to be produced, and it is not a difficult thing to do; the mere lessening of the distance between the sets would go a long way towards it: the quality of the crop this year is really so very superior (particularly of the Early Rose) that we ought to be encouraged by the ready sale it has met with in England to compel our willing soil to yield a fair return and, instead of sitting down satisfied with 80 or 100 bushels, to insist upon receiving at least 200. For consider for one moment that, at 27 inches by 12 inches between the plants, there are 19,360 bunches of tubers to the acre, and allowing each bunch to weigh 1 lb. there will be 322 bushels of 60 lbs. each, so that, supposing no gaps to occur, and really one does not see many as a general rule, our bunches of potatoes, instead of weighing one pound, can hardly weigh five oz.

The sorts of potatoes cultivated in the Province are so fine, and, generally so well selected, that it would be superfluous to offer any advice on the subject. Suffice it to say that the Early Rose should be the main dependence, as it is a large cropper, stands any amount of dung, ripens very early, keeps well, and is of superb quality. For early garden culture nothing has ever come up to the "Ashleaf Kidney," which, in Canada, is fit to eat, *if not earthed up*, by the 21st. of June. It should be stirred as little as possible, as breaking the rootlets causes the plant to put forth new ones, and delays the formation of the tubers. The land can hardly be too rich for this sort, as it hardly ever rots. The Chilis last out well but, except on real potato soils, the flavour is harsh, and, as a general rule, the white sorts, as usually found in our markets, are not true to their sorts, and are, therefore, not trustworthy.

The next crop that claims our attention, and which almost jostles the potato in its demand for early sowing, is the Mangold Wurzel. It is generally supposed to be a hybrid between the red garden beet and the white sugar-beet. The bulk of this crop in England and Ireland is sometimes enormous. Instances are known of 80 roots weighing a ton, and individual roots have been grown of 36 lbs. each. An ordinary crop in the south of England is 30 tons to the acre, where 15 tons of Swedes would be rare, to say nothing of the quality being very inferior.

There are four principal sorts; long and globe red, long and globe yellow. On heavy land there is no doubt that the long red yields best, but the quality of the yellows is superior.

I strongly recommend soaking the seed. I have tried it during fifteen seasons, and have never found the "braird" injured by it. Place the necessary quantity (4 lbs to 6 lbs per acre) in a bag and, plunging it in river or rain water, let it steep for 30 hours, take it out and hang it up until it is thoroughly drained, then place it in a warm situation and when it has "chipped," i. e. when tiny white points appear at the points of the seed. mix it with a small proportion of dry sand. Having previously rolled the drills down flat with a light roller, let a shallow rut be made along the top with the corner of a hoe, and drop the seed at once, covering it over about one inch deep, and then pass the roller over the drills again to confine the moisture.

It is of the greatest importance to the future yield of this crop that the drills should be deeply hoed when the plants are sufficiently advanced. The hoe should leave them as flat as possible, the space between the drills becoming the higher of the two. If the plants lie down on their backs, the grower need not fear that they will die, the dew and coolness of the following night will restore them, and all the stem that is left bare of earth will become converted into bulb.

The sowing of carrot and parsnip seed may be conducted in the same way, only sow seed enough, and use seed not more than one year old, 6 lbs of the former, and 8 lbs of the latter, are not too much.

The distance between the plants of mangold, to yield the greatest crop, should be ten inches. Keep the horse hoe going once a week, until the leaves prevent its passage; then a moderate use of the hand-hoe will cheaply finish the cultivation.

There are always a few plants that run to seed in every crop. Beware of using the seed of these for another year, as they most surely propagate their peculiarity.

(1) For over 20 years we have carefully comparing the planting of potatoes cut to one *sound* eye, with sets of two eyes or more. The larger the number of eyes, the greater the number of potatoes, but the smaller the crops and less uniform This stands to reason. Each sound eye forms a complete plant by itself, which requires space to grow and develop its seed. The placing of from two to twenty eyes or plants in a bunch must evidently crowdd the young plants, causing death to many, and injury to all. E. A. B.

Again, a sound eye or a very small potatoe as proved with us fully as good as the eye taken from the largest, and a great deal more conomical. This question requires still more looking into and especially numerous practical tests. E. A. B.

(2) When the manure can be ploughed under in the fall, the planting could then be done with less trouble and better results under the third furrow, as recommended. E. A. B.

(3) Unfortunately, we must not trust to the beetle's disappearance yet. It will be but to be ready for them with plenty of land plaster in which 1 lb. of Paris green has been thoroughly mixed to every 50 lbs of plaster The Messrs Lyman, Clare & Co, are, we believe, preparring this mixture for the coming spring. E. A. B.

Woollen rags or refuse, and any nitrogenous manure, will, added to a fair amount of dung, greatly assist mangolds; whilst mineral superphosphate is quite wasted upon them. Black earth produces larger crops of this root than any other soil, and the hotter the season the larger the yield, and the better the quality. Insects do not affect it much, though a few roots are sometimes cut off by the wire-worm about an inch below the surface; if this worm is numerous, it is well to know that a certain cure exists in rape-cake, or cotton-seed cake; not in powder, but broken in to small pieces about the size of a small haricot bean. The greedy brutes fix on the lumps and literally gorge themselves to death.

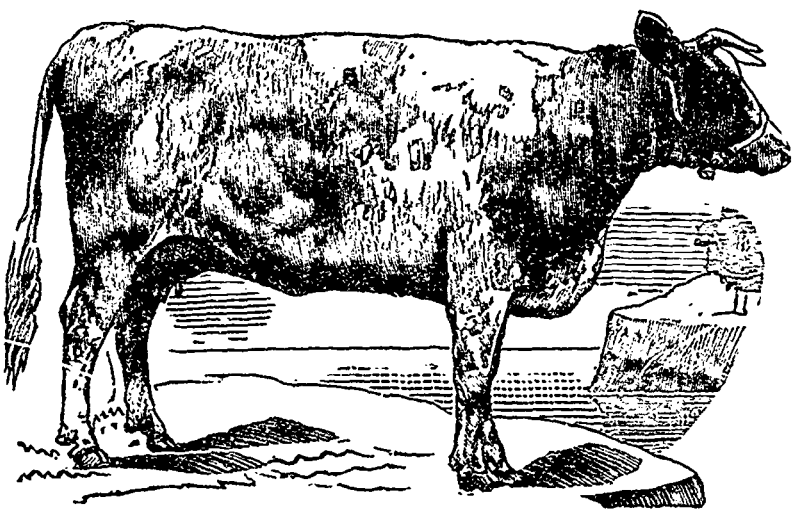
About 4 cwt per acre is sufficient and the cake will not be thrown away as it is a most efficient manure, and will greatly aid the grain crop which follows the mangolds.

Don't pull the leaves for your cows unless dire necessity compels you, as the practice is certain to diminish the crop. In harvesting *wrench* off the tops, and draw the roots out carefully, as they are easily wounded, and bleed to death at the least provocation. ARTHUR R. JENNER FUST.

The Show of Dairy Cows Implements &c. at Islington, attracted a great deal of attention in England and on the Continent. The first prize for milch cows was won by a Holstein with 25½ quarts of milk in the 24 hours (1). She was run however very close by a Shorthorn, of herd-book quality, and by another who had a slight taint in her blood. The milk of the first and second is to be tested by Dr. Voelcker to see if quality and quantity are alike superior in the Holstein.

The show of cheese was very good. Mr. Nuttall's Stiltons were easy winners, to the astonishment of the Leicester men who have been accustomed to have it all their own way: but the most surprising thing seems to have been the 9 lots of American cheese. The judges exhausted the language in their epithets of praise! Now I must confess to have always

(1) Why, 25½ quarts for a Short-horn or for a Holstein is not much, considering their weight. We had, for years, in our stables, small canadien cows, weighing fully one half, and perhaps only one third as much as an ordinary Short-horn, which gave their 25, 26, and 27 quarts of milk, avery day, for excepts together, after calving E.A. B



Shorthorn cow "Vesper."

entertained the opinion that nothing but *old* grass would produce good cheese. This is no longer tenable seeing that old permanent pasture hardly exists on this side of our continent of any cheese-making quality; at least, if it does, I never heard of it or saw it. What then will the English landlords and tenant farmers say to the agreements whereby the latter is bound to pay the former £50 if he plough up an acre of *pasture*, and, in Glo'stershire at least, £10, if he mow it? All these nonsensical ideas seem to be perplexing people at once on the other side of the Atlantic, but good must come of it in the long run.

The plan of separating the cream from the milk immediately by the mechanical contrivance of which we gave an engraving in our September Number, does not seem to answer, as the butter produced, as compared with that obtained from the old plan of setting the milk in shallow vessels, was as 16 to 17½ (1).

The recent marvellous rise in the price of all dairy produce in England does not seem to have helped the farmers there very much, as I hear, from a very near relation, that all the stocks were sold before the improvement in demand took place. American butter does not seem to be in great favour at present, but people seem to think that the export from this continent will increase in quantity and improve in quality, and will probably prove more profitable to the Americans than cheese. Considerable fear exists, apparently, in Europe, of the competition of butter from hence in the English market; as it is supposed that, if the *creamery* plan turns out such an improvement as the *factory* plan, the second qualities of butter from Holland &c. if not the first, will be difficult to sell.

The Queen showed samples in all three of the classes of fresh butter, and won a prize in all of them two 2nds and a 3rd. In these classes, two 1st prizes went to Dorsetshire, and one 2nd to Devonshire. A. R. J. F.

(1) Further experiments are evidently needed before an exact conclusion can be arrived at.

Feeding Cattle.

The principles on which cattle-feeding should be conducted, to extract the greatest possible results both as regards meat and manure from the materials used, have been very little understood until lately.

The practice has been, too frequently, to give turnips or

mangolds, hay or straw, cake or linseed, corn or oats, just as the one or the other came handiest.

Thanks, however, to the labours of our friends the analytical chemists of Europe there will be, for the future, no excuse for such empirical work, as the process of fattening is now thoroughly worked out, and the value and office of the different constituents of the food, generally given, thoroughly understood.

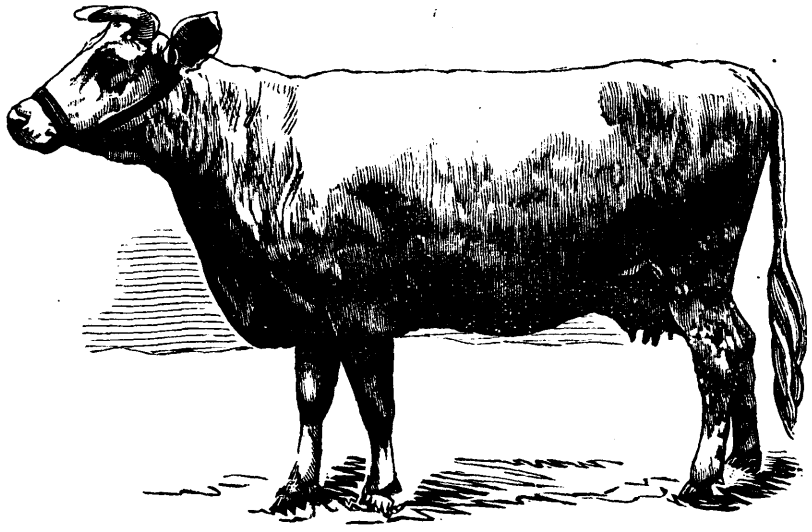
It is clear that the successful feeding of animals must depend upon two things; first, what food is administered to them, and, secondly, in what state that food is when they receive it. To judge wisely upon these two points, we must study the chemical composition of the materials, the functions of the digestive organs, and the way in which those organs are affected by the various states in which they find the substances on which they are required to act.

It is evident to any thoughtful mind that a full grown animal cannot require the same sort of food as an immature one. Its bones and teeth are already formed, its skin and hair want little support, and there remain only the muscle, the fat, and the fuel to be provided for. I mean, of course, by fuel that part of the food necessary to supply the ingredients which the respiratory organs convert into the heat of the animal body. During its youth the growing beast demands a sufficient quantity of proper materials to be furnished it to build up its bones, &c.; but fat is hardly a requisite, though, of course, heat is.

Now, modern agricultural chemists have divided the constituents of food in a different and a simpler manner to that of their predecessors, inasmuch as the separation of the flesh-forming from the fat-forming and heat-giving matters is much more easily understood, by the man of average reading than the *protein compounds*, &c. of the past.

The flesh-forming ingredients have only one function to perform—the laying on of muscle or lean meat; but the fat-formers have a double duty—after having furnished warmth to the body they expend the remainder of their wealth in laying on fat.

Let us see how the process of digestion is carried on in the animal economy. First, *the mouth* receives the food and,



Dairy Cow "Maiden."

with the aid of the teeth, masticates it— the act of mastication evolving the saliva; *the stomach* macerates the food by means of the saliva and the gastric juice; *the intestines* still further, by the help of the *bile* from the liver and the *chyme* from the *pancreas* (sweetbreads), work up the whole into a porridge like mass which is taken up by the *absorbents* into the blood, and circulated through the body; while the useless remainder is sent on by the rectum and ejected in the form of dung.

Now, by various experiments, made on a large scale but most carefully conducted, it has been shown that the proper proportion of fat and heat-givers to flesh-formers should be, in a perfect food mixture, as 3½ to 1.

Experiment No. 1.—An ox, live weight 1400 lbs., taken up from grass— food, 8 lbs. crushed linseed cake — 13 lbs. cut clover hay, and 47 lbs. of turnips. Increase of weight, 20 lbs a week, or nearly 3 lbs. a day; equal to 400 lbs. during an average fatting time of 20 weeks—a pretty fair and profitable business.

The ingredients of this mixture are as follows:

Oil cake, 8 lbs. = 128 oz.

Flesh-formers	22.14 0/0
Heat givers	51.00 "
Ash (mineral)	7.25 "

Clover-hay, 13 lbs. = 208 oz.

Flesh-formers	12.0 0/0
Heat-givers	55.7 "
Ash	8.0 "

Turnips, 47 lbs. = 752 oz.

Flesh-formers	1.2 0/0
Heat-givers	6.2 "
Ash	1.5 "

The sum of these ingredients is as follows:

	Flesh-formers.	Heat-givers.	Ash.
Oil cake,	28.3	65.00	9.27
Clover-hay,	25.0	119.00	16.64
Turnips,	9.0	46.62	11.28
	62.3	230.62	37.19

These last figures are arrived at by a sum in simple proportion: e. g. as oil-cake holds 22.14 0/0 of flesh formers,

			oz.	oz.	
then	100	: 22.14 ::	128	: 28.3	Flesh formers.
	100	: 51.00 ::	128	: 65.0	Heat-givers.
	100	: 7.25 ::	128	: 92.7	Ash.

Thus it seems that oil-cake gives a large proportion of flesh-formers (28.3) and little more than double heat-givers (65);

so that cake alone is not sufficient to afford all the heat-givers and flesh-formers necessary to a fatting bullock, since the proportion should be as 3½ to 1. The clover-hay gives nearly as much flesh formers (25) as the oil-cake (28) while it affords at least 4½ times of the heat-givers, showing that clover hay could keep the ox going, but not put much fat on him. The turnips show a low amount of flesh-formers (9) and five times as much heat-givers (46.62), while the ash from the clover-hay is by far the largest of the lot (16.64), nearly double that in the oil-cake, and more than that in the turnips.

So we must be thoroughly satisfied that, with this moderate amount of food, bullocks of fair quality will put on flesh, fat, &c., at the rate of 20 lbs. per week.

Now in what form should this food be given to fulfil our desire to allow the digestion to do its work with the greatest ease to itself? Let Messrs. Lawes and Gilbert answer the question.

They took, at Woburn (1), 6 Herefords and 5 Devons for one experiment, and 7 Herefords and 5 Devons for another experiment. The first lot were fed, after being carefully weighed, on crushed oil cake, cut clover-hay, and swedes. The second had, like the first, clover-hay and swedes, but, instead of oil-cake, a *cooked* mixture of two parts of barley meal, two parts linseed meal, and one part bean meal. The result was that the lot which had cooked food did much better than the other lot; a result very much to be expected by any one who remembers, as I do, the elaborate papers of Messrs. Warnes, Thompson, & Marshall, some 30 years ago, on the superiority of cooked linseed and bean meals, to any form of oil-cake.

It will be evident at a glance that the prepared food must save the animal action, and therefore save some amount of animal heat, which must tend to economize the heat-givers. The preparation is simple enough—boil the linseed (crushed, or if not you may expect to lose quite one half) in plenty of water, and mix, on any floor, with the other meal and cut straw or hay.

In continuance of the Woburn experiments 98 oxen, 348 sheep, and 80 hogs were fattened on a great variety of food. Not only was the increase of the body ascertained, but the increase of the carcass, of all the offals, in the lean and fat state, and, in fact under all possible condition. Some of the results are as follows:

Fattening oxen, well fed on cake, corn, roots, and hay or straw, will consume 12 lbs. or 13 lbs. of the dry substance of such a mixture per 100 lbs. live weight per week, and should give 1 lb. of increase for the 12 lbs. to 13 lbs. of dry substance so consumed, even allowing the dry substance to contain as much as 5 heat-givers to 1 flesh-former.

Sheep will consume 15 lbs. of dry substance to every 100 lbs of live weight per week, and yield 1 part increase for 9 parts of dry substance consumed.

Pigs fed liberally on food consisting chiefly of grain, will eat 26 lbs. to 30 lbs. per 100 lbs. live weight per week, and should yield 1 lb. of increase to 4 lbs. or 5 lbs. of dry substance consumed. With as much as 5 or 6 parts of heat-givers to 1 of flesh-formers the animals will become very fat. If the proportion is less than 5 to 1 the carcass will be more fleshy and less fat.

In proportion to their weight oxen have much larger stomachs than sheep, and sheep larger than pigs. Moderately fat oxen should yield 58 to 60 0/0 of carcass to live weight, and *fat* oxen 65 to 70 0/0.

Fairly-fat sheep should give 58 0/0, and *fat* sheep 64 0/0 of carcass to live weight. Porkers from 80 to 82 0/0, and *fat* pigs considerably more.

In lean animals water in carcass 54 to 62 0/0 — in *fat* animals 40 to 50 0/0. Bone to carcass on a *fat* ox 11.3 0/0, *fat* sheep 8.9 0/0, *fat* pig 4.0 0/0. In the pig alone the head is included.

(1) On the farm of the very public-spirited Duke of Bedford.

I subjoin a table of the weights of different organs of the various animals experimented upon.

Offals.	Mean of 16 heifers.	Mean of 249 sheep.	Mean of 80 pigs.
	lb oz.	lb oz.	lb oz.
Stomach,	35.14	3.12	2.10
Contents of stomach,	92.13	7.10	
Caul fat,	23. 3	7. 2	1. 2
Small intestines,	17.12	2. 8	4. 8
Large "	11. 7	2.15	8. 6
Intestines fat,	21. 5	2. 2	2. 6
Heart, &c.,	5.11	0.10	0.10
" fat,	3. 4	0. 8	.....
Lungs, &c.,	9. 4	1. 8	1. 9
Blood,	45.13	6. 2	7.10
Liver,	14.13	2. 5	3. 5
Gall,	1.00	0. 2	0. 2
Sweetbread,	1. 1	0. 3	0. 7
Heartbread,	0.11	.....	.....
Throatbread,	0. 6	.....	.....
Melt,	1.14	0. 4	0. 5
Bladder,	0. 9	0. 1	0. 3
Brains,	0.12	.....	.....
Tongue and head,	30.11	4. 8	1. 0
Hide, skin & wool.,	84.10	18. 0	.....
Feet,	20. 1	.....	0. 3
Tail,	1. 2	.....	.....
Skirts,	5. 2	0. 3	.....
&c.,	3.15	0. 3	1. 0
Total,	430.14	61.12	35. 5
Carcass,	680.12	91.13	176. 5
Loss,	20. 7	0. 1	1. 2
Live weight after fasting.	1141.1	153.10	212.12

ARTHUR R. JENNER FUST.

A Model Percheron Norman Horse.

We copy from the London *Agricultural Gazette* the following exact description of a good *Percheron*. It is a great pity that those imported into our Province a few years ago should have been selected with so little care, as the result has been prejudicial to the crossing of our French-canadian mare with the horse which suits them best. In the Western states, where a better selection was made from France, the best of results have been obtained, and the Percheron breed there is becoming very popular amongst the farmers.

Head clean, bony, and small for the size of the animal; ears short, mobile, erect and finely pointed; eyes bright, clear, large and prominent; forehead broad; nostrils large, open, and red within; jaws rather wide; chin fine; lips thin; teeth sound and even. Neck a trifle short, yet harmoniously rounding to the body; throttle clean; crest rigid, rather high, and gracefully curved; mane abundant, with silky hair. Breast broad and deep, with great muscular development, shoulders smooth, and sufficiently sloping for the collar to set snug to them; withers high; back short and strongly coupled; body well ribbed up, round, full, and straight on the belly, which is much longer than the back; rump broad, long, and moderately sloping to the tail, which is attached high; hips round and smooth at top, and flat on the sides; quarters wide, well let down, and swelling with powerful muscles. Dock strong, tail long, heavy, and gracefully hanging out from the croup when the animal is in full motion. Legs flat and wide, standing square and firm, and well under the

body, with hard, clean bones and extra large, strong joints, cords, and tendons; short from the knees and hocks down; pasterns upright, fetlocks thin; hoofs full size, solid, open, tough, and well set up at the heels. Height 15 to 16½ hands, weight 1,300 to 1,700 lbs. Colour various, as with other horses. but a clear dapple grey is preferred, as the best of the original breed were thus marked. Aetion bold, square, free, and easy, neither fore-reaching nor interfering; the walk four to five miles an hour, the trot six te eight, on a dry and moderately level road, but capable of being pushed much faster on the latter gait when required. Temper kind, disposition docile, but energetic and vigorous; hardy, enduring, and long-lived; precocious, able to be put to light work at eighteen to twenty-four months old; possessing, when fullgrown, immense power for his size, never baulking or refusing to draw at a dead pull; stylish, elegant, and attractive in appearance; easy, elastic, and graceful in motion. No tendency to disease of any sort, and especially free from those of the legs and feet, such as spavin, splint, curb, ringbone, grease, and founder. An easy keeper and quick feeder.—*Agricultural Gazette*

VETERINARY DEPARTMENT.

Under the direction of D. McEachran, F. R. C. V. S., Principal of the Montreal Veterinary College, and Inspector of Stock for the Canadian Government.

The fattening of Cattle.

In compliance with a request that we should give a few articles on the interesting and important subject of cattle feeding we commence in this number with a description of the digestive organs of the Ruminants, and the process of digestion in them as differing from other animals: this we consider necessary before entering on the subject of feeding.

Observe an ox in the pasture field or in the byre; notice the enormous quantity of food he hurriedly gathers up, and passes with but little mastication into the stomach; observe that when he has filled the large receptacle to repletion he seeks a retired spot, and leisurely proceeds to chew the cud—in other words he, by a process known as rumination, returns the food into the mouth, and there submits it to a thorough mastication and incorporation with saliva, before its final deglutition.

The digestive organs are admirably arranged for the thorough digestion of the food, and, as we shall afterwards show, under favourable circumstances the whole nutriment of the food is extracted, and readily utilized by the body for the manufacture of flesh, fat or milk; and under a wise Providence, man, by a study of animal physiology, has in a great measure succeeded in being able to direct the ntilization of the food to the production of beef or milk at will, by systematic breeding and a correct knowledge of the science of feeding, for a science it has come to be.

The Gastric apparatus of the ox is remarkable for its enormous development, and its division into a true digestive stomach, and three preparatory compartments.

"These cavities represent a considerable mass that fills the greater part of the abdominal cavity, and the medium capacity of which is not less than fifty five gallons: one of them, the rumen or paunch, into which the œsophagus (gullet) is inserted, constitutes nine tenths of the entire mass" (*Chauveau*).

The rumen or paunch, is a very large reservoir occupying about three fourths of the abdominal cavity: it is lined by a rough membrane studded by numerous papillæ, and divided by strong muscular bands into compartments: into its upper end opens the gullet; by this opening the food enters, and just below, and opposite this opening, is the opening into the second compartment.

The second compartment is called the *Honey comb:* this is the smallest of the four; its interior is lined by a membrane raised into ridges forming polyhedral cells, from which it receives the name of *honey comb.* This sac communicates with the first, and opens into a groove, which is a continuation of the gullet, and by means of this groove communicates with the third compartment.

The third sac, called *Many-plies* (Feuillets), from the very peculiar laminated arrangement of its interior it being filled with the unequally developed leaves of its lining membrane all of which are covered by papillæ. These leaves are attached by their convex border to the walls of the sac, and their concave border is free: they are of different lengths, and between these leaves there is always a quantity of finely divided food sometimes soft or semifluid, at others dry and flakey.

The fourth sac, "la caillette," is the true digestive stomach, and corresponds both in its structure and functions to the single stomach of the omnivora and carnivora. It is in this stomach the first real process of digestion takes place by the chemical action of the gastric juices.

The intestinal canal consists of a long cylindrical tube divided, by difference of calibre and disposition, into large and small intestines, averaging about 49 yards in length, folded and festooned in the cavity of the belly by means of a thin transparent membrane—the peritoneum.

The interior of the intestines is covered by numerous villosities and glandular orifices or follicules. The whole arranged so that, while the nutriment of the food has been prepared by digestion for absorption which takes place in the intestines, the indigestible matters and effete products are mixed with fluids poured on to the surface of the bowels, rendered soft, and the outward passage facilitated.

THE PROCESS OF RUMINATION.—The food being gathered by the lips and tongue, is roughly masticated and swallowed, passing in this bulky form into the Paunch (Panse), while according to *Owen*, "water that may be drunk, finds its way mainly, as in the Camel, into the cells of the second cavity."

The food is subjected to a rotatory or churning motion in the paunch successively in this course to be moistened by the fluid of the reticulum.

When rumination commences, the coarse food in the paunch is brought within the grasp of the muscular walls of the œsophagean groove or canal (Canal Œsophagien), where it is moulded into a bolus and, by an antiperistaltic action of the œsophagus. it is carried upwards, and by a motion, partly voluntary and partly involuntary, it is thrown into the mouth where it undergoes a longer and more thorough mastication and a more complete incorporation with saliva, and is again swallowed. By contraction of the muscular walls of the groove the opening into the paunch and honey comb closes and the soft food is carried direct into the third or *manyplies*, the fluid portions passing direct into the fourth stomach.

The food after having been compressed between the leaves of the manyplies, triturated, comminuted, and diluted by fluids, is passed on to the fourth or true digestive stomach, where it is subjected to the action of the gastric juices, and the essential process of digestion commences. The food is here converted into a pultaceous mass called chyme and is passed into the first portion of the bowel (the Duodenum) where it is further acted upon by the secretions from the pancreas and liver and the chyme is converted into a milky fluid called chyle and is not prepared to be absorbed by the villi (Follicules) of the intestines, and by the lacteals carried through the lymphatic glands, and thence to the blood, to enrich it with nutrition, and by it to be carried to each tissue in the body, to repair waste, and build up the tissue.

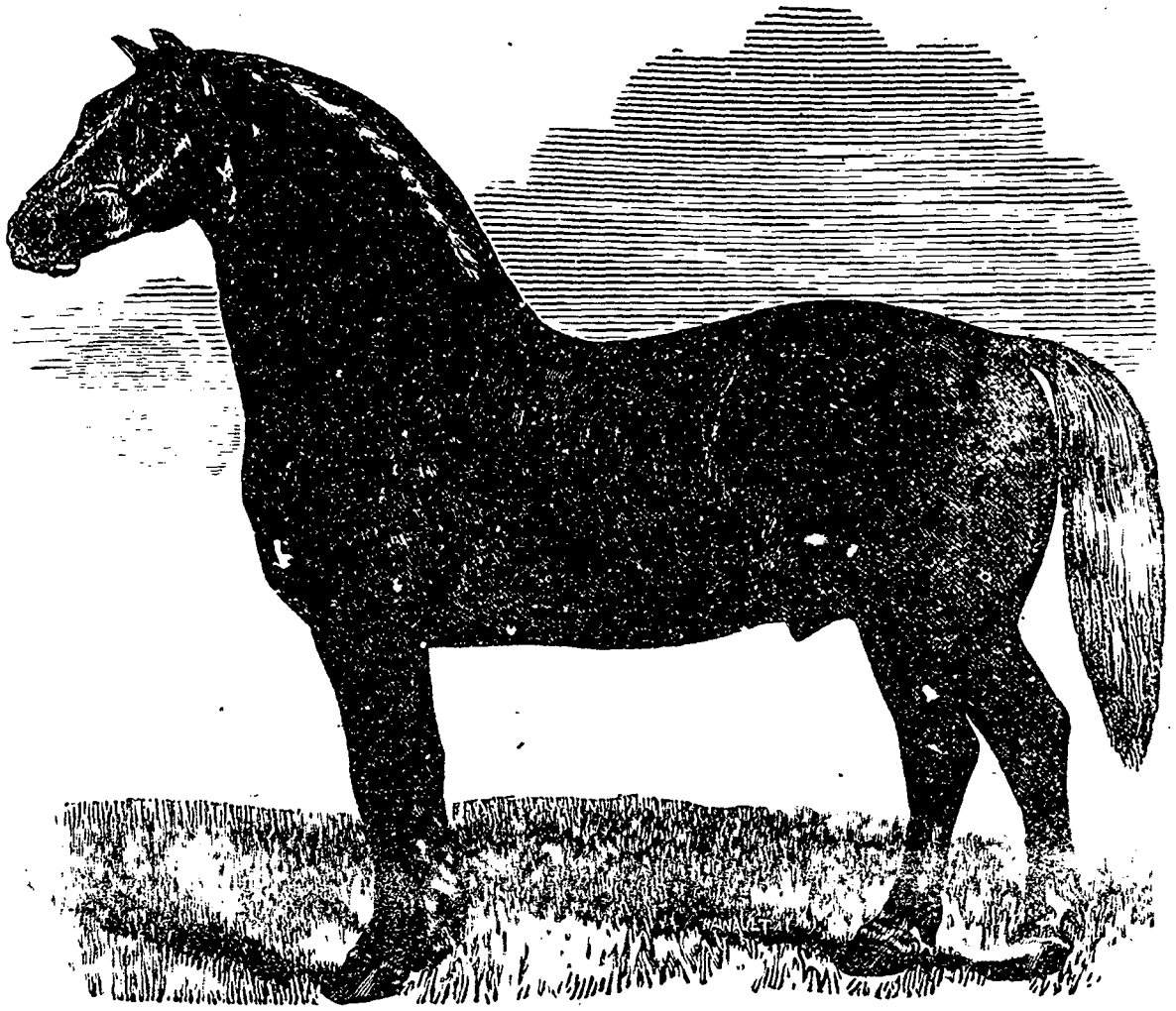
While the nutriment is thus circulated through the system, the waste products and effete matters are carried out of the system by the peristaltic action of the bowels.

The process of digestion in the bovine species is much more complicated, and, at the same time, more thorough than in monogastric animals such as the horse.

In fact the more conversant we become with the anatomy and physiology of the ox, the more perfect we see the wonderful arrangement, and perfection of adaptation of means to an end, in the digestive system of the ox tribe for the conversion of food into beef to be, viewed in the abstract: the huge, coarse, bony frame, the large feeding capacity and perfection of the digestive apparatus, the quiet phlegmatic temperament, their sedentary and inactive lives, all point to Nature's having intended the bovine species as food for man.

In preceding numbers of the Journal we noticed the peculiarities of the different breeds of cattle, some of which are natural while others are the result of judicious selection and care in breeding. We will here merely notice that, as the result of years of study and practice, breeders have produced certain families of cattle which in a most extraordinary degree have developed the fattening tendency. The improved breeds not only produce more flesh in proportion to the food consumed, but they arrive at maturity much sooner, attain a greater size, and altogether are more profitable to both the breeder and the feeder.

The breeds in which these qualities have been most



THE PERCHERON.

cultivated are the "Short horns," the "Herefords," and the "Polled Angus;" and the purer bred they are the better feeders they prove to be.

As few farmers can afford to stock their farm altogether with pure bred stock, grades will be found in many cases to retain the fattening qualities of the pure-bred progenitor.

Of all breeds the short horn is the best to use for crossing with: no bull will stamp his characteristics on crosses like the short-horn; hence, for producing grades for feeding the short-horn cross should always be preferred. They grow faster, larger, and produce more weight per pound for food consumed than any other cross.

American Short-horn breeders Convention.

The cattle interests of Canada and the United-States are so much dependent on one another, especially as concerns the breeding and improvement of stock, that whatever is done by our neighbours is watched with interest by our breeders on this side of line. The meeting of this association recently held at Chicago, was one of more than ordinary interest on account of the important questions there discussed. We are pleased to see that on that meeting Canada, and particularly this Province, was well represented. The Hon. David Christie, the late speaker in the Dominion Senate, occupied the chair, and among those present were Hon. M. H. Cochrane, of

Compton; J. M. Browning, esq., ex-President, Dr. G. Leclerc, Secretary, and Mr. D. McEachran, consulting Veterinary Surgeon, of the Council of Agriculture.

We notice with pleasure that Hon. M. Cochrane has been elected a Vice-President, and J. M. Browning, esq., a Director, of the Association.

The principal business of the discussions was, "what steps should be taken to get Congress to rid the United-States of Pleuro-pneumonia," which was suggested by the able address of the President which we reproduce in full. A lively discussion ensued among the members present, during which Mr. McEachran was several times called for to give information and explanations with regard to the disease, its history in America. its ravages, and other particulars which materially helped the meeting in arriving at conclusions, as to what action was necessary in the premises.

A letter was also read from Professor Lair, and a short address by Dr. N. H. Paaren of Chicago on the subject. The result of the full consideration of the question was the appointment of a Committee of five to press the matter before Congress, consisting of Hon. T. C. Jones, Ohio, Hon. Emory Cobb, Illinois, Mr. Claude Mathews, Indiana, Hon. T. J. Megibben, Kentucky, and Hon. L. Coffin of Iowa; to whom, upon motion, the Hon. David Christie was added. It was also resolved that the State Agricultural Societies be requested to memorialize the legislatures of the States to petition Congress on the subject of sanitary regulations concerning live stock.

The members representing the Western States complaimed of the injustice of the States being included in the prohibitory order simply because lung plague existed in the few Atlantic States, while they, one and all, positively asserted that no contagious disease existed west of the Alleghany Range of Mountains.

THE PRESIDENT'S ADDRESS.

Gentlemen,

As vou are aware, at the last meeting of the Association it was resolved that the next meeting should be held at Nashville, Tennessee, but owing to the prevalence of that terrible scourge, yellow fever, and in consequence of the urgent remonstrances of many members of the Association, the meeting was postponed. The same difficulty occurred this year; in these circumstances, it was deemed proper to consult the Directors of the Association as to what should be done. The responses were unanimous in naming Chicago as the place of meeting, and certainly, since a wise discretion rendered a change of place necessary, there could be no more fitting place than this great city, easy of access from all parts of the continent, a great cattle mart, the first in the world, and also the leading city in one of the great cattle States of America, a State not surpassed for fertility and for Short-horn Cattle.

When we last met the storm of adversity had compassed the length and breadth of the land, and it extended to every branch of business and to each industrial pursuit. The breeders of Short-horn Cattle felt the full force of the blast. Prices receded to a degree unprecedented in Short-horn history. In England, last year, the average of the 64 sales was £57 5s. 9d.; 56 of these comprised 99 per cent. of the whole, and averaged £37 0s. 7d. One thousand and thirty-one animals averaged less than £30. One animal, Baroness Oxford 5th, brought 2,660 guineas, or more than the individual proceeds of 51 of the 64 sales recorded. So said the *Mark Lane Express*. Our American averages were not much better. Now the storm has passed, and already we have seen the harbinger of prosperous times. A recent Short-horn sale in Chicago has given a better average than we have had in America for two years past, and better than the average in England last year. The lesson taught by adversity should not be lost.

> "Sweet are the uses of adversity,
> Which, like the toad, ugly and venemous,
> Wears yet a precious jewel in her head."

Men of the present generation are not likelv again to he tempted to over speculation, or to give excessive prices. Another important lesson is not to place unreasoning reliance on mere pedigree, whether of this or that family or tribe, without giving due weight to personal qualities. Pedigree is very important, because it gives a reasonable degree of assurance of the transmission of valuable qualities from parents to progeny; but how can an animal be expected to transmit qualities not possessed by it, but which, according to tradition, may have been the characteristic of some one or more remote ancestors. The old adage, that "like produces like," commonly holds true; the principle of pedigree is based on it, and rest assured, gentlemen, that the day has come when the presentation of a "long pedigree" will not cover the want of distinguished personal qualities. Both together, but neither singly, will satisfy future purchasers. The demand for good animals, of good pedigree, will increase year by year. The demand for a superior quality of beef for export to the British market will compel breeders and feeders to use only good and well-bred animals; because it will neither pay to breed nor to export inferior cattle. With all due deference to the opinions and statements of our Hereford friends, there is no race of cattle which, for early maturity and aptitude to produce, with profit, really first.class beef, can compare with the Short-horn. It is one of the promising features in the future of America agriculture, that a line of demarcation is being drawn between the busines of breeding and of feeding cattle for beef. The lands in the East, and as far west as the Missouri, are too high-priced to enable farmers to raise beef-cattle with profit. On lands worth from $50 to $100 per acre beef-cattle cannot be raised with profit. In ordinary circumstances a steer cannot be ready for market until he is three years old, during which period we will cost more than he will bring in market. In Great Britain this is well understood. English and Scotch farmers purchase, at the great fairs, cattle bred in Wales and the Highlands of Scotland, were they can be raised cheaply, and then feed them.(1) They know well that all the profit of stail-feeding does not consist in the extra quantity and qualityof beef but in the large quanty of valuable mauure produced, and in the cultivation of the soil for root crops, which, in due time, result in large returns of grain per acre in succeeding crops. The farmers of Illinois, Indiana, and Ohio, who feed cattle, act on the principle that is more profitable to purchase than to raise stock for that purpose. They know that they cannot compete with breeders living on the cheap lands of Kansas, Nebraska, and Colorado, and therefore, they repair to the great cattle marts of Kansas City, St. Louis, and Chicago; at which, any day in October and November, they can purchase all the stock they need for feeding purposes. A few years ago it was difficult to get as many well-bred steers as were needed, therefore recourse to the lean and ill-favoied Texan was a necessity, the descendants of the old Andalusian cattle—a race unprofitable to feed, and somatimes bringing with them, as in 1868, "Texan Fever," a scourge which desolated large districts of country. Fortunately, during the past ten years, a better race of cattle has taken their place. From the extensve dissemination of Short-horns among the Western herds, the supply of good cattle is yearly becoming more abundant, and promises soon to keep pace with the demand. This is a most encouraging fact to the breeders of Short-horns. Many of the Western herds require the service of 60 to 100 bulls, which of course must be rep'aced by the purchase of others every third year.

If you will permit me to trespass a little on your time, I wish to quote from a report by Prof. Brown, of the Ontario Agricultural College, at Guelph, the narrativé of an experiment made at the college, last year, in teeding Short-horn steers. Prof. Brown says: "During the past winter, our school made two experiments in fattening of steers: 1st. With four steers of our own breeding, *four-fifths* prime fat, and nine-tenths-bred Short-horns. 2dly. With six steers bought in, half fed, and two-thirds-bred Short-horns. All the animals were entered on the 8th of December, and withdrawn on the 6th of March, being 67 days—say three months—

(1) Many lean beasts come from Ireland—good Short-horns: the Castle Hill at Norwich is, on Saturdays in October, covered with them, many *Galloways* are sent South, at 2 years old and moving down through Yorkshire to Lincolnshire and Norfolk, are slaughtered in London at 4 years old. It should be observed that, as the great majority of English farmers cultivate their land on the 4 course shift, the clover standing only one year, breeding is, to them, an impossibility. Still, all I hear from England leads me to believe that it will not be so long. Many men are preparing to lay down part of their farms to grass, intending to breed their own bullocks as they already breed their own sheep. A. R. J. F.

average age of all 35 months and 15 days, at latter date. The food consisted of, daily, 90 lbs. of pulped Swede turnips, 12 lbs. of cut straw, of sorts, and 12 lbs. of crushed Indian corn, given in two forms—turnips and straw put in a heap in alternate layers, so as to slightly ferment, and corn mixed with them when served; and others pulped turnips direct from the machine. The four steers averaged, on entry, 1512 lbs., and 1764 when finished—thus gaining 252 lbs. in 87 days—being 2 8-10 lbs. per day, or 16 per cent. on their weight. The six steers, on entry, averaged 1260 lbs., and 1492 lbs. when withdrawn—thus gaining 232 lbs. in 87 days—being 2 7 10 lbs. per day, or 18½ per cent. on their weight."

So we can make the following balance-sheet, according to current market prices, attendance, and manure, to meet each other for safe figuring

1st. example:

Cost of straw, $5 per ton	$2.61
Cost of corn, 50c per 56 lbs	8.70
Value of animal when entered—1512 lbs., at 5½c	22.16
	$93.47
1764lbs. sold for 6 cents	105.24
Balance to credit	$11.77

2d example:

Cost of food as above	$11.31
Value of animal when entered—1260 lbs., at 3¾c	47.25
	$58 58
1482 lbs. sold for 5¼ cents	78.33
Balance to credit	$19.77

[Or a difference in favor of the half-fed steers of $8 per head.]

There is material here for some very nice discussion and comparisons. Let me approximate the conclusions. That well-bred steers, nearly prime fat gain 3½ per cent. more on the same food than others that are not so well bred, and that were also 6 per cent. less in weight when put in competition; that, in proportion to weight, the half-fed steers gave 68 per cent. more profit than the others; that, according to weight, the half-fed steers gave 2½ per cent. more increase than others almost prime; that, in proportion to weight, the half-fed steeers ate 18 per cent. more food than the others; that, as an investment, without reference to manure, the matured animals returned fully 9 per cent., and the half-fed ones 40 per cent., on the original cost—being a difference of 31 per cent. in favor of the leaner animals. No doubt there are circumstances for and against each of these conclusions, which it may be well to notice. The previons treatment of our own ored cattle was likely more favorable. The change of place and food was agaiust the others. Their inferiority of breeding might be against them. Note how much fat, heat, and flesh substances of food was required to produce a certain quantity of beef. One animal, in 87 days, ate, flesh, fat, and heat producers:

Turnips,	*Straw*,	*Corn*,	*Total.*
574 lbs.	441 lbs.	831 lbs.	1846 lbs.

In the case of the animals, therefore, the 1846 lbs. of fat, heat, and flesh forming substances in the three sorts of food seem to have been required to make 236 lbs. of probably the same things in the animal's frame. This we find was one of flesh to seven of fat. There is, then, under proper management, proper food, and with the proper animal, a large profit in growing beef.

It may be remarked, in reference to the foregoing statement, that the profit would have been much larger, had all the steers in question been bred where they could have been produced, at the proper age, at less cost.

I have alluded to the large increase in the trade in beef with Great Britain. From small beginnings, it has grown to large proportions. In 1876, the total domestic exports from the United-States were:

Live Cattle	$1,110,703
Salt Beef	3,186,304
Sheep	171,101
	$4,468,108

These figures include the total exports to all countries, from the United-States.

In 1877, the exports of live cattle, sheep, fresh beef, and salt beef to Great Britain, were:

Live Cattle	$ 546,829
Salt Beef	1,200,000
Sheep	22,678
Fresh Beef	4,552,525
Fresh Mutton	36,480
An aggregate of	$6,358,410

to Great Britain alone, as against $4,552,523 to all foreign countries during the previous year; being an increase in the items named of $1,989,382.

In 1878, the United-States domestic exports to Great Britain were:

Live Cattle	$2,408,843
Sheep	109,777
Swine	69,395
Hams and Bacon	38,241,651
Beef Salted	2,118,992
Beef Fresh	4,906,152
Mutton Fresh	8,272
Lard	10,175,475
Meats Preserved	4,284,512
	$62,305,969

Thus, the aggregate exports in meats and cattle, sheep and pigs. to Great Britain alone, in 1878, amounted to nearly as much as the total exports to all foreign countries in 1877, while the total exports in those classes to all foreign countries were to the value of $104,272,552; showing an increase from the previous year of $46,983,794, or more than double the export trade in 1876, which amounted to $49,592,834. I could not obtain the statistics of the trade for the present year, but it has been stated that the exports of live stock this year have reached the value of $11,487,754. It is clear, therefore, that the demand keeps place with the supply, so that Short-horn breeders have good cause to believe that their trade will be prosperous. The exports of live stock for food from Canada, are also very encouraging. In 1878, in cattle, sheep, and swine, they amounted to $1,937,365, and in 1879, to $3,342,006—an increase of $1,404,741.

Amid these indications of prosperity, we must not conceal from ourselves the fact that great danger threatens the whole trade in live stock. It is beyond doubt that contagious pleuro-pneumonia exists among the cattle of several States of the Union. At this date, it is unnecessary to inquire into the truth of the statements as to the existence of the disease among the cattle composing the cargo of the Ontario, and which led to the scheduling of American cattle. There is grave reason to doubt the correctness of the conclusions arrived at by the veterinary examiners of the Privy Council. We have high authority for stating this. Professor Williams has, in very plain terms, denied that they were correct; and it will not do to impugn the professional status of Professor Williams, in order to get rid of his statements. He is well known to be one of the first veterinary pathologists of the day; and the best proof of this is, that on the 27th of May last, at a special meeting of the council of the Royal College of Veterinary Surgeons of Great Britain, he was elected President of that body, by a vote of more than two to one over his competitor, who had been one of the examiners, on behalf of the Privy Council, of the cattle brought by the Ontario, and who had given a different opinion from that of Professor Williams. But as has been stated, we know that contagious pleuro-pneumonia does exist among cattle in some Eastern States, and the imperative duty of every American breeder and professional man is to urge, with determination which cannot be misunderstood, that the Government of the United States shall take such action as shall effectually "stamp out" this dire scourge, and prevent its re-introduction among the cattle of America. Had the Government heeded the warnings given when we were threatened with an invasion of rinderpest, much of the difficulty would have been avoided, and a proper system of quarantine and veterinary inspection would have been instituted. This Association, at its last meeting, at Lexington, two years ago, sent a memorial to the Government on this subject, to which little attention was paid. Last spring, when the existence of the disease was ascertained, the officers of the association sent a memorial to the Government, urging the appointment of an international veterinary commission for the purpose of ascertaining where the disease existed, and for

advising measures for its suppression, and, until that should be accomplished, for preventing its spread. The result was, that nothing was done, no commission was appointed, and Congress was allowed to adjourn without an appropriation being made for the purpose of getting rid of this terrible disease. Shall the interests of the agricultural portion of this country be unheeded, and shall no adequate measures be taken to protect them?

There is no public question at this moment of greater importance to the people of this country than the extirpation of contagious pleuro-pneumonia. The legislature of the State of New-York, at their last session, made an appropriation of $35,000 towards this object; a rigid system of quarantine has been instituted, and by the able and efficient officers appointed by the State Government much has been done. But no more State legislation and expenditure will do the work. There must be Congressional legislation and a large appropriation by Congress, or all other merely local efforts will fail. The Order of the Treasury Department, issued on the 19th of July, 1879, falls far short of what is necessary. To the quarantine of ninety days there is the exception: "Where State or municipal laws provide for the quarantine of such cattle; and in such cases collectors will permit them to quarantine them in such manner as the State or municipal authorities require." The "Order" or law should be made to apply to every State in the Union alike. The matter is national in its character, and the laws or orders relating to it should be national in their character, otherwise there can be no certainty as to the suppression or exclusion of the disease. We have a signal illustration of this in the case of an importation of cattle which arrived in New-York during the week before last. I quote from the *Country Gentleman* of October 23d: "We observe by the papers that the contemplated importation of Channel Islands cattle, by Mr. P. H. Fowler, Watford, Eng., was landed at New-York last week by the steamship Cornwall, *and from thence they were transferred by rail to the Messrs. Herkness & Co.'s Bazaar, Philadelphia.* Although in a healthy condition, they will be subjected to rigorous quarantine regulations, and until released will be in charge of Thomas I. Edge, Secretary of the Board of Agriculture and State Commissioner, and Dr. Bridge, Veterinary Inspector. The stock comprises 38 Jersey cows and calves, and two Guernsey bulls.

Now, mark what follows: "Since the foregoing was in type, Messrs. Herkness & Co., of Philadelphia, sent the announcement of the sale of these cattle, which appears on our first page. *It will take place* on Thursday morning, November 6th." The advertisement referred to states that the cattle were "*direct from the Channel Islands, via Bristol, Eng., to New-York, per steamer Cornwall, and thence by rail to Philadelphia.*" Could there be a stronger illustration of the utter inefficiency of the "Treasury Order" to prevent the importation and spread of the disease? From anything known to anyone, these cattle may all be diseased, The period for the incubation of the disease may not have expired, and althongh apparently healthy, they may have contracted it, and thus be the means of carrying contagious pleuro-pneumonia into the very heart of the country; for, be it observed, they came from an infected county, and in passing from New-York to Philadelphia they were carried through a country where disease exists. It is pleasing to observe that at a meeting of the United-States Veterinary Medical Association, held in New-York, on the 16th of September, 1879, a committee was appointed to take action in the matter, and, "to draw up a set of resolutions to be presented to Congress in relation to the investigation and prévention of contagious diseases of domestic animals." I beg to recommend the appointment of a similar committee by this Association.

I have pleasure in stating my belief that the Government of Canada will co-operate hartily with the Government of the United-States in the adoption of measures calculated to prevent the importation of the disease.

PURCHASE OF DEVON CATTLE FOR THE PROVINCE OF QUEBEC.—We are very much pleased to learn that Mr. Ivan Wotherspoon has decided to introduce the breeding of Devons into this Province. He has purchased for his farm at St. Ann's the following valuable animals from Mr. George Radd, of Guelph, Ontario:

"Tecumseh," a magnificent Bull, eighteen months old—which was awarded first prize in his class at the Dominion Exhibition at Ottawa.

"Meadow Flower," three years old, also winner of first prize at Ottawa.

"Flora Nelson" winner of the 2d prize at Ottawa.

All of them were shown in the herd which took the premium at the same exhibition.

The cows are both in calf to imported bulls of pure Devon blood.

That the Devons are a valuable breed is well known, and that they will do well in this Province we have no doubt. They are hardy, mature early, make excellent beef, and are unequalled for working cattle.—For the butcher they furnish superior cuts. By attention to milking strains they are capable of being developed into good milkers. We wish Mr. Wotherspoon success with his new venture.

Feeding Horses.

In our last we made a few suggestions on this important subject, and now we present a very commonsense article on the same subject taken from the pages of the English *Live-Stock Journal.*

Every good groom knows that sound oats and beans, in due proportion and at least a year old, are the very best food for a galloping horse—the only food on which it is possible to get the very best condition out of a race-horse or a hunter. It has also recently become known that horses do slow work and become fat—indeed, too fat—on maize (Indian corn), which is frequently one-third cheaper than the best oats. In the East, horses are fed on barley, and it is a popular idea with English officers who have lived in Persia and Syria, that the change of food from barley to oats often, when imported, produces blindness in Arab horses.

Now, although no men understand better, or so well, how to get blood horses into galloping condition as English grooms, they do not, and few of their masters do, know the reason why oats and beans are the best food for putting muscular flesh on a horse. The agricultural chemist steps in here, makes the matter very plain, and shows that if you want pace, Indian corn, although nominally cheaper, is not cheap at all. According to Dr. Voelcker's and other chemists' analyses, we find in round numbers, in oats, beans, barley, and maize, the following constituents:

	Oats	Beans.	Barley.	Maize.
Water	14.3	14.5	14.3	14.4
Nitrogenous or muscle-producing compounds	12.0	25.5	9.5	10.5
Starch and other non-nitrogenous heat and fat-producing compounds	54.4	43.0	64.1	61.0
Oil, as ready-made fat	8.0	2.0	2 5	7.0
Indigestible woody fibre	10.0	11.5	7 0	5 0
Mineral matter (ash)	3.0	3 0	2 6	2.1
Total	100 0	100.0	100 0	100.0

It was a common saying in Leicestershire, before deep draining, clean-cut fences, and increased sheep-feeding had improved agriculture at the expense of fox hunting, after one of those five-and-forty minute runs at best pace, that are now so rare, "it found out the horse that eat old beans and best oats." In fact, they made experiments they did not understand, which it was left for the modern chemist to explain.

When we feed a bullock, a sheep, or a pig for sale, after it has passed the store stage, we want to make it fat as quickly, and as cheaply as possible; but with a horse for work the object is, give him muscle—in common language, hard flesh. There are times when it is profitable to make a horse fat, as, for instance, when he is going up for sale after a severe hunting season. For this purpose, an addition of about a pound and a half of oil-cake to his ordinary food has a good effect. It is especially useful when a horse that has been closely clipped or singed is in low condition. It helps on the change to the new coat by making him fat. A

horse in low condition changes his coat very slowly. Now oil-cake is composed of:

Moisture	12 00
Oil	11.50
Nitrogenous compounds	29 70
Mucilage and digestible fibre	27 80
Woody fibre	12.00
Mineral matter (ash)	7.00
Total	100.00

When from any cause there is difficulty in getting a supply of the best oats, an excellent mixture may be made of crushed maize and beans in the proportion of two-thirds of maize and one of beans, which exactly affords the proportions of flesh-forming and fat-forming food.

Bran is a very valuable food in a stable for reducing the inflammatory effect of oats and beans. Made into mashes, it has a cooling and laxative effect; but used in excess, especially in a dry state, it is apt to form stony secretions in the bowels of the horse Stones produced from the excessive use of bran have been taken out of horses after death, weighing many pounds When sawn through, they appeared to be composed of a hard, crystalline mass, deposited in regular rings, resembling in appearance the concentric yearly rings of wood; they proved to be composed of phosphate of magnesia and ammonia. Millers' horses are particularly subjected to this malady. The best way to guard against it is to add half a pint, to a pint of linseed, boiled until quite soft, to the mash of each horse.

POULTRY DEPARTMENT.

Under the direction of Dr. Andres, Beaver Hall, Montreal.

PARTRIDGE COCHINS.

DISQUALIFICATIONS

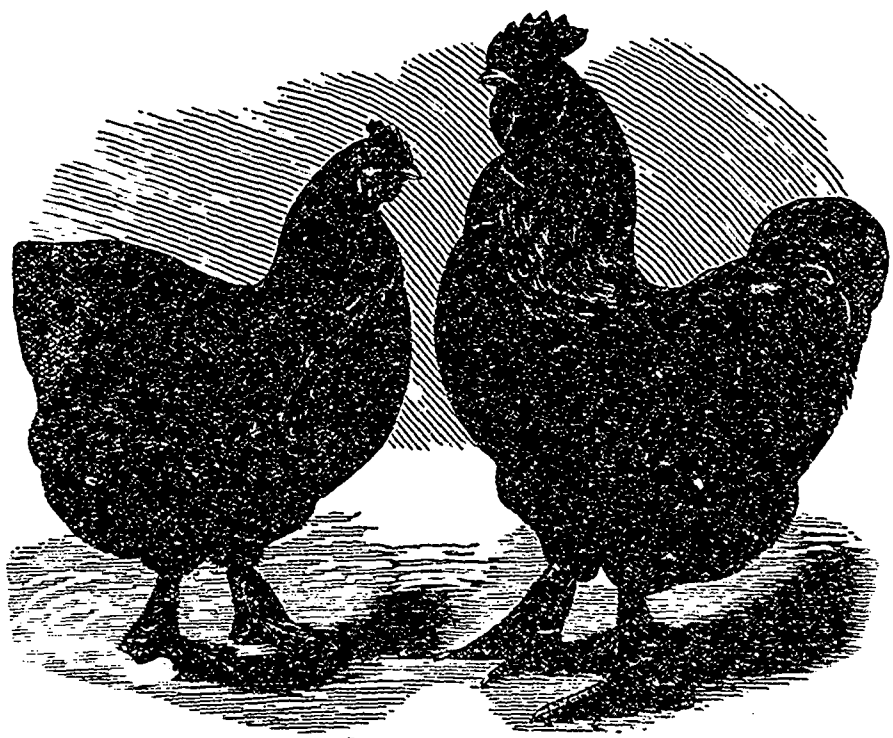
Birds not matching in the show pen: cocks with mottled breasts: hens with pale buff, or clay colored breasts, or without pencilling; twisted combs, or combs falling to either side; primary feathers twisted in the wings; crooked backs; wry tails; vulture hocks; absence of leg feathering; white in the tail of cockerels; cocks not weighing nine pounds; hens not weighing seven and a half pounds; pullets not weighing six pounds.

THE COCK.

Head: Bright red, rather short and small for the size of the bird: Eyes bright, clear and mild in expression: Beak, curved, stout, at the base; rather short, and yellow or horn color.

Comb: Rich, brilliant red, single, firm, rather small, perfectly straight, and upright, with well defined serrations, and free from side-sprigs.

Wattles and Ear-lobes: Wattles of medium length, fine in texture, and well rounded: Ear-lobes, large, pendant, and fine in texture.



PARTRIDGE COCHINS.

Neck: Short, and well curved; hackle, full, abundant, and flowing well over the shoulders; in color, rich red, or orange-red; with a distinct black stripe down the middle of each feather.

Back: Broad, with a gentle rise from the middle thereof to the tail, with saddle feathers very abundant, rich red, or orange-red in color, with a black stripe down the middle of each feather.

Breast and Body: Breast, deep, broad and full, and in color, rich, deep black; Body, broad, deep and round, and the under plumage deep black.

Wings: Small, the primaries well folded under the secondaries, so as to be entirely concealed when the wings are closed, the primaries have a bay edging on the outside web and dark on the inside web, the secondaries a rich bay on the outside web, black on the inside web, with a greenish black end to each feather; wing-covers, greenish-black, forming a wide bar across the wings.

Tail: Broad, short, soft and full; the covers, being numerous, and carried more horizontally than upright; the color should be glossy black, without any white at the base of the feathers; such development however, though highly

objectionable, is not a disqualification: the greater tail covers are bronzy-black, the lesser covers black, or black edged with red.

Fluff: Very abundant and soft; covering the posterior portions of the fowl standing out about the thighs, and in color, black.

Legs: Thighs, very large and strong, and plentifully covered with perfectly soft feathers, which on the lower part should curve inward around the hock, so as nearly to hide the joint: Shanks yellow, or dusky-yellow, short, stout, wide apart and heavily feathered down the outsides with black feathers: Toes, straight, strong and well spread, the outer and middle toes being well feathered.

Carriage: Upright and stately.

HEN.

Head: Small and neat in shape, and, in color, rich brown. Eyes, mild clear and bright: Beak yellow, or horn-color, stout and nicely curved.

Comb: Single, small, fine, low in front, erect perfectly straight, with small and well defined serrations, free from side sprigs, and, in color, brilliant red.

Wattles and Ear-lobes: Wattles, small neatly rounded, and fine in texture. Ear-lobes, well developed, fine in texture, and in color brilliant red.

Neck: Short, carried forward, the lower part full and broad, the hackle reaching well over the shoulders, and in color, a rich reddish gold, with a broad black stripe down the middle of the feathers.

Back: Broad, flat and short, with the cushion rising from the middle thereof, and partly covering the tail.

Breast and Body: Breast, broad and full, and carried rather low, the plumage a rich brown and distinctly and handsomely pencilled with darker brown, the pencilling being well developed over the breast, and reaching well up towards the throat: Body, broad and deep behind, the general plumage of which is brown, and distinctly pencilled with a deeper brown.

Wings: Small, the primaries well folded under the secondaries, so as to be concealed when the wings are closed, the wingbows nearly covered by the breast feathers, and the points well concealed in the fluff: primaries, a very dark brown or blackish brown, secondaries, the inner web a blackish brown, and the outer-web a blackish-brown pencilled with a lighter brown, the color and pencilling of the wing covers quite similar to the same characteristics of the breast.

Tail: Short, small, carried horizontally, and almost hidden in the cushion; the main tail-feathers black.

Fluff: Very abundant and soft, standing out about the thighs giving the bird a very deep and broad appearance behind, and in color, brown.

Legs; Thighs: large, abounding with soft flufy feathers, curving inward around the hock, so as nearly to hide the joint. Shanks, yellow, or dusky yellow, short, stout, wide apart, and well feathered down the outsides, the feathers being of the same color as those of the body, and distinctly pencilled. Toes, straight, strong and well spread, the outer and middle toes being well feathered.

Carriage: low, with a contented, matronly appearance.

POINTS IN PARTRIDGE COCHINS.

Symmetry	10
Size and weight	12
Condition	7
Head	4
Comb	7
Wattles and Ear-lobes	3
Neck	10
Back	10
Breast and Body	10
Wings	7
Tail	8
Fluff	5
Legs	7
	100

Comparisons, in size and weight, 2 points to the pound.

American Standard.

Poultry for the table.

La Basse-cour, a French journal especially devoted to the interests of the Poultry Yard, gives the following directions for insuring white plump and tender poultry for the table, as obtained from a celebrated cook in the south of France. "To get good weight and a delicate color, only meal from grain one year old should be used when fattening for market, and the water used in the mixing of food should have salt added to it in the proportion of ten grammes to the litre (three-eights of an ounce avoirdupois to a quart of meal); also, a small quantity of coarse gravel should be added to the paste thus made, so as to assist the birds' digestive functions. Special care should be taken not to give them any food for at least twelve hours before they are to be killed, so that the intestines may be empty at the time of death, and the acid fermentation of their contents, which would otherwise ensue, and which facilitates decomposition, may be avoided. Nor should we be in too great ahurry to pluck them: if feathers are pulled out while the blood is still fluid the vesicle at the root of each of them becomes engorged and the skin gets spotted. A fowl killed while digestion is going on will hardly keep for a week. By attention to the above directions they may be preserved for a fortnight, in mild wet weather, and for three weeks or more when it is dry and cold.

A few pieces of charcoal put inside will assist in preservation. To boil a pullet thus prepared: it should be put into cold gravy soup, made ready before hand, and cooked by a slow fire. Directly it is taken from the pot it should be powdered over with salt in coarse grains: and if eaten when hot, it is a dish for the severest epicure.

Seasonable Hints.

To keep your fowls free from disease give them good, clean, sound grain, and green food, changing their diet often, and plenty of clean water. While moulting add to the water Tincture of Muriate of Iron (Tinctura Ferri Chloridi) in proportion of one drachm or teasponful of the tincture to one half gallon of water. It is an excellent tonic. See to it that they have plenty of light, and that your fowlhouse be kept clean and dry. A good washing of the roost and nest boxes with kerosene in the morning about once in two weeks will keep them free from vermin. Use powdered charcoal twice a week: a large tablesponful to every ten birds, in their soft food which should be given warm, the first thing in the morning during cold weather: ventilate well, without subjecting your birds to a draught.

Caution.

It is becoming an acknowledged fact that most domestic poultry diseases arise from negligence of care in keeping the young stock free from filth. We call attention to one little error many make with young chickens, not only when being brooded by their mother, but even after she has left them and before they have learned to roost. With a coop without bottom which is moved daily this is easily avoided, but after the hen leaves the chicks, they usually follow her to the hen house, and, not being able to get on to the perch alongside, crouch down in some corner, and during night emit their

excrement in large quantities, and if this is not cleared away daily and the ground dusted on that spot with dry soil or ashes, the consequence is a certain growth of vermin and impure vapor, caused by the regular warmth of the chicks' bodies upon the ground, which in a few days will become perfectly fetid from ammonia, &c., causing roup, gapes, canker and skin diseases, as well as causing the chickens to lose their feathers, &c.

Italian bees.—A Montreal correspondent, who succeeds well with the common bee, writes that he has tried the Italian bees without success. He thinks the climate is too cold for them.—This is not the experience of gentlemen in the District of Quebec. As the Italian bees are reputed to be fully as profitable again as the common bee, this question of climate is certainly worth elucidating now fully. We therefore request our readers to give us the benefit of their experience in this matter.

What fruit will do.—The fruit that ruined Adam saves men, as may be seen as follows: record is made in the proceedings of the Lucas county, Ohio, Horticultural Society, of the cure of a confirmed case of dyspepsia by restricting the diet to a small quantity of bread and butter, accompanied, by berries — straw, rasp, and black — and peaches in their respective seasons. A friend informs us that a black-eyed lady, a relative of his, invariably had a spring visitation of bilious fever whenever the winter apple supply ran short in consequence of limited yield. After this coincidence was observed, apples in abundance were invariably provided (and, even at high prices they prove less costly than the doctor's services), and since then, several years now, there has been no more trying periodical sickness in that family. — *The Minnesota Farmer.*

Clover, red top and light meadow hay, put up in stacks of five tons, will measure 700 cubic feet to the ton. Timothy 500 cubic feet, and timothy and clover mixed 600 cubic feet to the ton. *Exchange* (1).

(1) A cubic yard of hay, in the counties round London, Eng., weighs from 200 lb down to 132 lb according to the part of the stack from which it is taken. Stacks contain from 25 tons to 80 tons; the grass is cut in flower, the hay is put together rather green, so that the *sweating* would, on a fine morning, make a stranger think the whole on fire. Clover, there, cuts out in almost solid blocks, with a sticky surface like a gigantic *plug* of tobacco. When the stacks are trimmed and finished, the strongest man could not pull a handful out. A. R. J. F.

Chicago Fat Stock Show.

Liberal Premiums Offered—The Advantages of such an Exhibition.

The show just held at Chicago has again been a great success. The entries were very numerous and the show well attended.—Why should not the city of Montreal manage to make the fat cattle department of its coming provincial show a grand success as well as Chicago? The quantity of stock shipped from this port through the season is very great, and a good annual show of fat cattle could not but be beneficial.

The following article from the *State Journal*, Oct. 23, although written before the fair, gives a good idea of what is aimed at by such shows:

The JOURNAL has frequently called attention to the importance of a show of this character, where the pedigree and color, or the reputation of the breeder, has no influence with the committees, which are composed of practical butchers whose judgment is influenced only by the superior quality and the distribution of meat in the most valuable portions of the carcass. Short-horns, Herefords, Devons, "other pure breeds not named," and Grades and Crosses, each have a separate lot and receive premiums as follows:

Best steer 4 years old or over	$25 00
Second best	15 00
Best steer 3 and under 4 years	25 00
Second best	15 00
Best steer 2 and under 3 years	25 00
Second best	15 00
Best steer 1 and under 2 years	25 00
Second best	15 00
Best cow 3 years old or over	25 00
Second best	15 00

All the various breeds and their crosses are then brought into competition with each other, and compete for the sweepstakes prizes, which are as follows:

SWEEPSTAKES—OPEN TO ALL.

Best steer 4 years old or over	$50 00
Best steer 3 and under 4 years	50 00
Best steer 2 and under 3 years	50 00
Best steer 1 and under 2 years	50 00

The final test as to the best animal in the show is decided in the following ring for

GRAND SWEEPSTAKES—OPEN TO ALL.

Best Steer or Cow in the show $100 00

It will be seen that the foregoing classification of premiums makes a most thorough and practical test of the comparative merits of the several pure breeds of cattle, as well as their grades and crosses.

First the best beef animals of each breed, according to age, are selected and awarded premiums. Then all the breeds of same ages are brought into competition, and finally all the best animals, without regard to age or breed, are brought into the same ring for grand sweepstakes, and the best animal in the show is selected.

The report for the last Show shows that in the sweepstakes ring, prizes were awarded as follows:

Steer 4 years old or over — Short-horn.
Steer 3 and under 4 years — Grade Short-horn.
Steer 2 and under 3 years — Grade Short-horn.
Steer 1 and under 2 years — Short-horn.
Cow of any age or breed — Hereford.
In Grand Sweepstakes Ring the honor was given to a Grade Short-horn steer.

The challenge plate of the National Stock Journal Company was awarded as follows:

Best beef animal any age or breed — Grade Short-horn steer.
Best fat sheep any age or breed — Cotswold wether.
Best fat hog any age or breed — Poland China barrow.

The entries to date give assurance that the exhibition of cattle, sheep and hogs for 1879 will be a grand success, and that a much larger attendance of visitors may be expected from this section.

The practical benefit to feeders and breeders of an exhibition of the best butcher's stock to be found in the world cannot be overestimated, and all interested should make it a point to be present at the forthcoming show.

Hints on Maple-Sugar Making.

From "The Country Gentleman."

The following article will be read with interest by any one interested in the making of maple sugar. Now that the bush is easily accessible to teams is the time to build the sugar house to fill up the wood shed and prepare generally for the action of spring:

The maple sugar industry is a growing one, not so much

in the quantity as in the quality of the product. It is not probable that the sugar will compete largely with cane sugars for table use on fruit, &c., or in tea and coffee, or for culinary purposes, where a simple, unflavored sweet is desired. But the *syrup*, if it is properly made, and its flavor properly retained by sealing hot, like fruit, in jugs or cans, has no possible competitor as an article of luxury on buckwheat cakes at breakfast. And, even as a substitute for honey, the flavor of No 1 syrup is preferred by many, and it does not cloy the taste as honey does. But, poorly-made, maple syrup is little better than cane molasses, and will not bring a remunerative price. There is as much difference in flavor here as between "gilt-edged butter," and that that is only "fair to middling"; and when that difference is fully understood, the prices of the two grades of syrup will differ as much as that of the two (or half dozen) grades of butter.

Hence, our profits will come mostly from our syrup, and from our best quality too, and any suggestions as to the mode of securing the best results will, I am sure, be welcomed I wish to call attention to some of the essentials to success, and if I omit any, or fall into error in any respect, I hope some of your ever-watchful readers will call attention to it.

Following the order of the work involved, and noticing the tools, implements, etc., as they are required for use in their order, we have:

1. *The tapping* should be prompt and rapid, as soon as suitable weather really comes; not till then. A drizzling rain, that freezes before the sap can be gathered, never makes the best syrup, and buckets, spouts, and trees, are injured for the

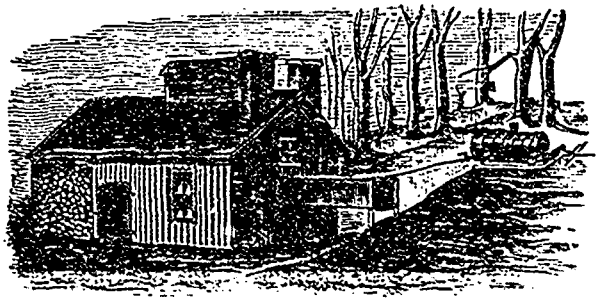


Fig. 1.

rest of the season, if the bush is tapped several days before the season really opens. The Cook bit, half-inch size, is best, and the galvanized iron Eureka spout. By repeated and continued trials of it side by side with various wooden and tin spouts, I am fully convinced that it sours the sap least of any, and gives the largest yield The first merit is more important than the other, for sour sap will never make good syrup. The buckets should always be tin, soldered, inside and out, at every seam. They will not rust inside in many years, and should never be painted there, as that makes them more rough and more liable to sour Painting the outside, however, will help to preserve the bucket. For our Ohio climate (and I am inclined to think it true anywhere), the buckets should invariably be covered tight. A hole just below the wire rim splits over the notch of the spout, and a board a foot square is laid on top, and excludes rain, snow, dirt, or insects, and prevents the sap from freezing, except in extreme cold, or souring by the sun's heat, except in very warm weather. I know of no one thing more essential to the production of the best grade of syrup than covers. They should be planed and painted, and it is a great help in gathering to have one side painted, say, red, and the other white. All are placed red side up, for instance, in tapping, and then, all are reversed at each gathering If a tree is missed, the color of the cover shows it at a long distance. So, none need be missed, and two trips need never be taken to the same tree in doubt whether its sap has been gathered. This was mentioned more fully last year, but I find it so great an advantage, that I feel like repeating it every time I have the attention of sugar-makers.

2. The gathering should begin as soon as the tapping is done. The former should be finished by noon if possible. Otherwise, one force of hands should continue this, and another force should begin soon enough to overtake, before dark, the force that is tapping. Sap should never stand over night in the buckets if it can be avoided, but should be gathered as late as possible before dark, and boiled as soon and as rapidly as possible. It begins to deteriorate almost as soon as it leaves the tree, especially if it is very warm, or on the other hand, if it freezes and thaws.

The gathering cask, figured and described last year, and shown again in fig. 1, seems best adapted of anything for the work to be done. It is simply a cask 5 feet long and about two feet in diameter, fastened firmly to a "boat sled", large end behind, the front end a little the higher, so that when the sled stands level, the sap will all flow from a faucet in the rear, through a tin conductor with a funnel-shaped "head" down the slope, into the store trough below, as shown in fig. 1. The sap need never be lifted but once, or dipped or rolled up skids in barrels at all. It is poured down into the gathering pail from the bucket which hangs at the tree, and is not removed from the spout in emptying. It must be lifted a little and poured into the funnel of the gathering cask, and that is all. After that, by taking advantage of a slope, it will run into the store trough, and thence into the boiler without further labor.

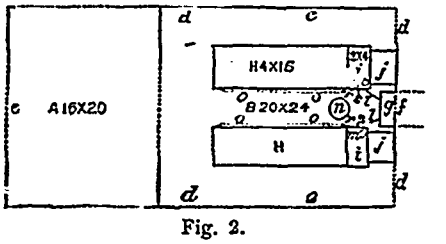


Fig. 2.

3. The sugar-house, its location and its arrangement. The former is indicated in fig. 1. The sugar-maple seldom grows spontaneously except on ground that is somewhat rolling, and in almost every sugar camp can be found side-hill advantages in a sufficiently central location. If the slope is not as steep as that represented in the cut, a longer conducting tube must of course be used, so that the gathering cask can stand far enough off up in the slope to bring it to the required level. In hilly New-England there is usually no trouble on this point, but even there, I have seen sugar-houses on level ground near a fine slope of which they took no advantage. And in Ohio, until within a few years ago, such was the common custom. The store trough stood on a level with the "arch," the barrels were laboriously rolled up two skids and emptied into the trough, and then the sap was lifted, pailful after pailful, and poured into the kettles or pans. Men are strangely slow in learning to take advantage of gravitation and the other forces of nature, even when she seems daily to thrust them before our very eyes. Fig. 2 gives the ground plan of the sugar-house seen in perspective in fig. 1. It is planned for two arches, so that one man can boil the sap from 2,000 or 2,500 buckets. It will be understood from a brief description, if figs. 1 and 2 are both kept before the eyes. A is the woodshed; B, the boiling-room; H H, the evaporators, set on brick arches, z z, heaters running a foot below the level of the evaporators, and perforated like the

tubular boiler of a steam engine, so as to send the flame through these tubes (horizontal cylinders), which are surrounded with cool sap, and thus economise heat that would otherwise waste up the chimney; *j j*, are the chimneys; *g f*, store-trough (compare fig. 1); *l l* (curved dotted lines), flexible rubber tubes, conveying sap from store-trough to heaters; *m m*, self-regulating sap-feeders; *n*, tall receiving can for syrup; *r r*, stopcocks for drawing off syrup; *s s*, siphon stopcocks for draining hot sap from heaters when desired. The tops of the siphons pass through the sides of the heaters (watertight) on a level with the bottom of the store-trough, and run outside below the bottom of the heater, so that when the sap is above that level the siphons will start when the stopcock is open, and flow till the heaters are drained dry. *o c* are tin tubes feeding hot sap from the heaters into the front end of the evaporators; *c d d d d* are doors, and *e e* are windows. The self-regulating sap feeders are Guild's patent, and are usually furnished with the evaporators.

The working of them, in brief, is this: A float rises and falls with the sap in the pan or heater, and works a pair of jaws which bite the flexible tube when it gives sap too fast, and relax their hold and admit more sap when it is needed. When the boiling is uniform, they admit a uniform stream just fast enough. If the man goes away over night, and leaves a big fire, these watchful sentinels supply sap while the fire lasts, and then stop the stream lest it should overflow the boilers.

4. The patent sorghum evaporator, is, in my opinion, the only pan that will make the very best grade of syrup uniformly, rapidly, and in large quantities. Kettles were long since abandoned, and flat sheet-iron pans introduced; and now the latter are fast being supplanted, among the best sugar-makers, by the patent evaporator. The principle is that of the rapid evaporation of a very shallow body of sap moving slowly and transversely over alternating hot and cool spaces. This result is secured by a succession of ledges or "crimps," running crosswise of the pan, one every six inches

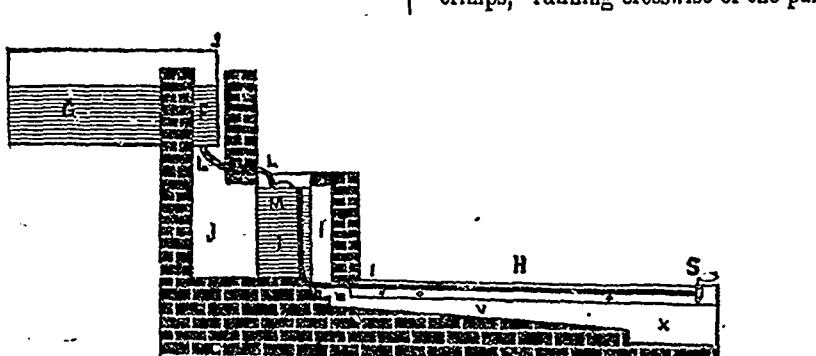


FIG. - Side view of the whole apparatus.
(Drawn and engraved for the Journal of Agriculture).

of the pan's length, the first meeting the side on the right, the next on the left, and so on (see fig. 3). The cool spaces are secured by letting the pan project beyond the fire on each side. The pan stands perfectly level, (it *e*, a 15 foot one should,) and the sap enters at *a*, passes slowly along the channels, around the points *b. c. d. e. f* etc., till it reaches the stopcock, *s*, in 30 or 40 minutes, finished syrup. In starting, just enought sap is admitted to cover the bottom and make it safe to boil. A few pailfuls must be at first drawn off at *s* and turned back near the middle of the pan, until it comes to syrup in the spaces, *u* and *v*, after which it will remain syrup there, and may be drawn off in a small continuous stream (which, I believe, is the rule for sorghum), or a gallon at a time every twenty minutes or so, which is perhaps preferable for maple syrup. At *o* and *r* are partitions with tight gates to check the flow of sap, if it is necessary.

The ledges that divide the channels are formed by "crimping" the broad sheet of heavy galvanized iron that forms the bottom as represented in fig. 4. The bottom is crimped clear across, of course, and then each alternate crimp is cut down vertically, six inches from the edge of the pan, split horizontally from its end to this point, lapped, countersunk, riveted and soldered, and a cap soldered over the open vertical end of the crimp. The crimps not only serve as ledges, but greatly increase the heating surface of the pan, for they are all open to the fire from beneath, as seen in fig. 4. These hints of construction are simply to explain the principles involved, and not to enable any one to make a pan. Every valuable feature is covered by patents which have been extended and do not expire again for several years. Expensive machinery is required in their manufacture. They are made by the Blymyer Co., Cincinnati, the original owners of the patents, and, under licence (with royalty) from them, by firms in St. Louis, Bellows Falls, Vt., and a few other places. They make better syrup, and do it much faster and easier than any other pan. Decent sorghum syrup cannot be made without their use, and to that fact are we indebted for the invention and the improvement they render possible in the quality of maple syrup. They secure an enormous saving of fuel and of labor too. All the man has to do is to fire up, skim, and draw off the syrup ready for market. With the fixtures in fig. 2, one man can boil into finished (11 lbs. to the gallon) syrup, 75 barrels of sap in 12 hours, and even more; and by boiling nights, during flush runs, the apparatus has a capacity for 2 500 average trees (buckets). But in order to do this, we must have the next essential.

5 This is fine, dry wood. The flame does the work. The wood is 3 feet long, the pan and heater are 17 feet. and yet the pan (evaporator) is in a perfect foam the whole length, and the sap in the heater usually scalding hot. But if the wood is green or very coarse, the pan will not boil the whole length, the steady flow of sap is not maintained, and the best quality of syrup cannot be made. The wood-shed should be filled for next season *as soon as one season is over*, or it is apt to be neglected. At least half of the wood should be split quite fine. The man who runs two evaporators has no time to split it.

6 Perfect cleanliness and sweetness of vessels and sap, is another essential. The Vermont climate is better, but in Ohio, as a rule. I find I must scald all the buckets about once a week, and store-troughs, evaporators, etc., much oftener. It costs a good deal, but pays in product. With a cask of

hot water and a team, two men will scald well 1,200 buckets at the trees in a day, and there is almost always a rest between "runs" as long as that each week. Our climate, too, requires that the sap be stored out-doors (see figs. 5, 1 & 2). The trough runs into the house just far enough to feed the sap into the heaters, but not to sour that in the store-trough by the heat of the fire. The store-trough, or troughs, should have close fitting covers, to protect them from rain, sun, and freezing by night. In Vermont, the cold is so great at

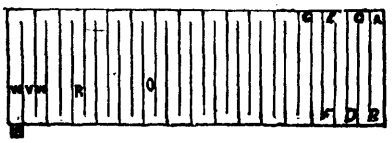


Fig. 3.

night that it is common to store the sap in the sugar-house.

I wish to give special emphasis to the fact that the most rapid and best work is secured by keeping the sap as shallow as is safe in the pan. A careful man can boil safely with the regulator set for an inch deep at the arch end of the pan. If the pan be perfectly level, this will make it about half an inch deep at the syrup end. Many suppose the sap must cover the crimps to prevent burning. But the heat of this metal, partly submerged in water, can never be above boiling point, and that is not burning point.

The full heat of the fire under and in the crimps is utilized too (even if they are not covered) by the sap at their bases. And, if the crimps are covered, the transverse current is broken up, and sap and syrup mix more or less the whole length of the pan unless prevented by the two gates. Such a use of the van uses the extra heating surfaces of the crimps it is true, but it throws away all the other benefits of the evaporator. It is a thoroughly established law, too, of evaporation by heat from below, that the shallower the water (sap), the more rapid the evaporation.

Fig. 4.

The flavor of syrup is best retained by canning, or jugging, hot, like fruit, and setting in a cool, dry part of the cellar. Jugs of syrup should never be set on a damp cellar bottom. The bottoms of jugs are seldom glazed outside, and the moisture sometimes moulds the syrups.

At the close of the season, every vessel should be washed, scalded, and wiped with scrupulous care, and the buckets stored bottom-side up ready at a moment's notice for next year's tapping.

W. J. CHAMBERLAIN, Summit County O.

Sugaring Implements.

We willingly insert the following letter from W. A. Morrison, manufacturer of sugaring implements:

I see in your list of Prizes taken at the Dominion Exhibition by this province, that you have left me out entirely. I took 5 first prizes and one second, and was recommended for a bronze medal, but, instead, got a diploma, as the Medals were all gone. The Medal was recommended for the best collection of sugaring implements, and for the best display of maple sugar.

I took first prizes for the Bests Evaporator saps, Heaters, Buckets and Spouts. 2nd prize for stirred sugar.

The first Prize for best stirred sugar was for E. E. Spencer, which I had in my charge, I would like you to mention these in your next issue. I remain, &c. W. A MORRISON, Freligsburg.