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Vol. 16, No. 1. MONTREAL, JANUARY 1, 1894. $1.00 per annum, in advance

PUBLISHED BY
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PROPRIETORS,
20 *St. Vincent Street*,
MONTREAL.

The ILLUSTRATED JOURNAL OF AGRICULTURE is the official organ of the Council of agriculture of the Province of Quebec. It is issued Monthly and is designed to include not in name but in fact anything concerned with agriculture, as Stock-Raising, Horticulture, &c., &c.

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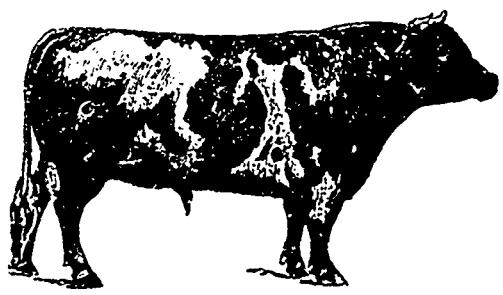

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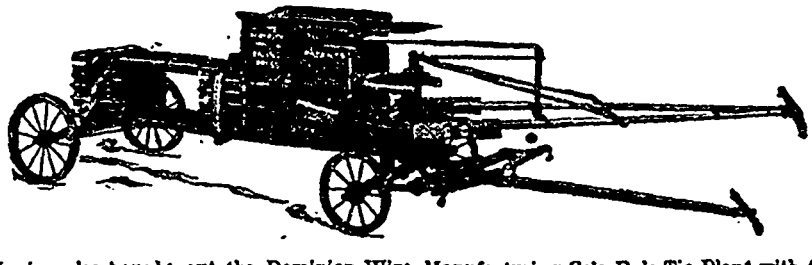

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SIR,—The piano which you were so kind as to send me during my stay in Montreal is excellent in every respect, and has given me entire satisfaction. I desire to congratulate you.

Please accept my heartfelt thanks.

EA. ALBANI GYE.

Montreal, June 9th, 1892.

Dear Mr. PRATTE,

Prior to my departure for England, I write to thank you for the very excellent instrument you sent me for my use.

The piano as I understand is of your own manufacture and as such does you credit. The tone is rich, full and of a "velvety" quality such as artists appreciate, whilst the touch is everything, to my mind, than can be desired.

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Believe me to remain,
Yours truly,

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MOUNTAIN HILL, QUEBEC.

THE ILLUSTRATED

Journal of Agriculture

Montreal, January 1, 1894.

Table of Contents

Notes by the Way.

HORSES AT CHICAGO.—It is almost incredible! In the class of "thoroughbreds" no United-States' horse was exhibited. Robert Davies, of Toronto, won easily both with single horses and collections. Nearly all the heavy teams in the parade of draught-horses were *Percherons*. The most useful team was one of six *Shire Clydesdales*. A four-horse team and a two-horse Shire-Clydesdale team from Canada were highly approved of, but, says our authority, the prizes for good looks went mostly to Percherons. According to M. Auzias Turenne, the system of having only one judge, instead of three, was not a wise step. Well, that depends upon circumstances. We were once judge of Jerseys, at Mile-End, with two others: one of our co-judges had *once* seen a Jersey-cow, but had never seen a Jersey bull; the other had never seen either the one or the other!

"How much does that horse weigh? He must go over 2,500 lbs;" was a remark M. Auzias-Turenne often heard; as if bullocks not horses were being judged; and the 2nd prize went to a Percheron, a monstrous mass of fat, whose defects were concealed by a vast accumulation of adipose tissue.

The *Normans* were highly satisfactory, and Mr Ness won 3rd prize, with *Maltôt*, and the Haras National the 11th with Marquis de Puisaye.

The *Hackneys* brought Ontario to the front. "They are miniature Normans, said M. Auzias-Turenne to a neighbour." "Hum!" replied the other, "the Normans are only enlarged hackneys."

Suffolks poor. Indeed, we have never seen a really good Suffolk on this continent. Useful beasts, they are; rattling fast walkers, and that is the pace for a farmer's horse. Not bad roadsters, either, for 8 miles an hour in a tax-cart is quite pace enough for a market-horse.

VETERINARY-INSPECTION. — We all have our favorite points in an animal, be it horse, bullock, sheep, or hog. As an old hunting-man, we confess to look at a horse's hocks and loin, more than any other part, to the neglect, very likely, of other points just as material. But a veterinary-surgeon, who is examining horses every day, not only brings his scientific knowledge to bear, but conducts his examination systematically, taking in every point of the animal from hoof to withers. Not only will the skilled, experienced veterinary detect any manifest unsoundness, but, he will discover lurking symptoms of unsoundness, particularly as regards the sight, that one of the laity would very probably pass over unobserved. Wherefore, when buying a horse of any value, submit him to the examination of a veterinary-surgeon of established reputation.

KOHL-RABI. — Of this very useful vegetable, we never saw but one piece in the province, it was at Sorel, on the farm of Mr Gustaf Gylling. As the plant requires rather heavy land, it did not turn out a heavy crop on the Sorel sand. We grew them once or twice in England, and found them very useful for ewes and lambs in spring. They will stand frosts that would rot a swede, and grow up to the very latest day of the season of growth. The leaves are good for milch-cows, and the bulb has about the same feeding value as a swede. As the seed is very dear here, it might be sown in a nursery-bed, and the plants set out like cabbages, only rather closer together: 24 inches by 10 inches. If the seed is sown on drills, as usual, put it in as early as possible; it cannot be sown too early. The fly does not seem to touch it; perhaps because the beast is not much about when the plant comes up. And the earliness of the sowing season has another advantage, where a great breadth of root-crop is grown: it can be finished and done with before it is time to get the other seed in. One thing is certain. milk never tastes of *kohl-rabi*.

TURNIP-TOPS. — We have always turned our *ewe-flock* on to the land after the turnips and mangels were harvested and never found that the leaves, if not too abundantly eaten, did them any harm. They make cows scour too much to do them much good. and the milk they give when eating mangel-tops is poor enough to prove the truth of the position that food *does* influence the quality of milk. We hear, however, from England, that, in many cases, the tendency to abortion in cows and early lambing ewes has been traced to the practice of feeding them when pregnant on turnip-tops and mangel-leaves. Can any of our readers give us any information on this point?

BASIC-SLAG.—Are we not going to import a cargo of this valuable source of phosphoric-acid? It is to be had, in England, at 30s. a gross ton = $6.48 for 2,000 lbs., and 500 lbs. is a full dose for an acre. Something must be done, and that soon, to lower the price of fertilisers here, and we look to the Farmers' Syndicate to aid us in this. Superphosphate, analysing 28 o/o of soluble phosphate is selling at Bristol for £2.2s a gross ton = $9 00 for 2,000 lbs.

THE WHEAT-FIELDS OF THE WEST.—Good heavens! Listen to the following, from that very trustworthy paper, "Farm and Home:" "In sections of the West where farmers have planted 700 acres of grain, they have been obliged to find work as day labourers at day-labourers' wages, and in counties far distant from their own, simply because crops did not germinate and grow the past season. And this is not all. The brave wives and daughters cannot find land, in some sections, on which stock can get enough food to sustain animal life." All this is intended to prove that it is very wrong of the Eastern mortgagees to howl out because interest is not paid. Is it possible that men who have "some 700 acres of grain" cannot stand the failure of one year's crops? Is this not a pretty fair argument in favour of "mixed farming"?

AGRICULTURAL SCHOOLS. — Again, Dr Hoskins, of the Vermont Watchman, lets off one of his incisive paragraphs against *sham* agricultural schools and colleges. are we, in this province, going to do any better than we have done?

DR. T. H. HOSKINS:—"The attempt has been made, and has well nigh succeeded, to make the alleged agricultural schools a scientific department of impecunious literary colleges; or to furnish work for a lot of professors too ignorant and too genteel, and, in most cases, too lazy and inefficient, to make any kind of a school successful. The results are seen, in almost every State, 'agricultural colleges' teaching very little agriculture, and not enough of anything else to attract the public patronage, or awaken any feeling other than something very closely akin to disgust and contempt."

Strong language, the above, is n't it? but not a bit too strong. The waste of money in the *experiments*, as they call them, that are being carried on in some—most?—of the stations in the States; experiments that were tried fifty years ago in England, and descriptions of which, with their results, are to be found in publications known to every one interested in agricultural science; the *waste* of money, we say, lavished on these experiments would go far towards providing for the building and equipment of a real, practical school of scientific farming.

WHITTLESEA POULTRY-SCHOOL. — Whittlesea Mere, in Cambridgeshire, England, was really a *mere*, i. e. a fen almost under water, in my younger days. Its chief products were geese, plucked for their feathers, wild-fowl, eels, and pike. Steam-drainage, however, cured the land of its surplus of humidity, and bulky shorthorn beasts, heavy Lincoln sheep, and superb flocks of turkeys now feed profitably, where once the *boom* of the bittern and the sharp screech of the snipe were the principal sounds to be heard. And it is on this once almost uninhabitable fen that the Cambridge-shire Council, last month, opened a great Poultry-school, where the entire rustic population of the county was invited to come and study gratis, under professional tuition, every phase and problem of profitable poultry-raising. With some thousands of minor bodies given similar powers of initiative and expenditure, we are likely to see things in England which no previous system of government has introduced.

This seems to us to be the beginning of a very satisfactory state of things The *county*, which votes the funds to be expended in this and other "new-fangled" ways, is not likely to enter upon a "Grandmotherly" style of proceding, and there will not be that absurd waste of money on which Dr. Hoskins expended the vials of his just wrath in the passage we quoted above.

FARM-IMPLEMENTS. — We believe that, at our instigation, the Central Farmers' Syndicate of Canada will import specimens of *Coleman's Dragharrow*, early in the new year. This is by far the best of all the grubbers, or scarifiers, in use in England. It works well, as a grubber with narrow teeth, with two horses; and, as a scarifier, for breaking the crust of stubbles with the paring-shares, three horses will not find it too heavy.

Now, we have plenty of good, skilful implement-makers, and there is no reason why they should not,

having one of these drag-harrows as a pattern, make others just as good.

Another implement we should like to see more commonly employed is the chain-harrow. Those who have seen its exquisite work on a drilled crop of potatoes before the plants come through the ground, will know why we are so much in love with its work. And besides taking the place of the old Scotch "saddle drill-harrow," which was a comparatively clumsy tool, the chain harrows may be considered as the modern representatives of the old bush or brush harrow, which was, and is sometimes still, employed for brushing in grass seeds or dressing pasture lands in the spring. The chain harrow is infinitely more efficient than its prototype. It is very useful in gathering together couch after the drags and harrows have brought it to the surface. The way it rolls up the weeds into masses easy to gather and burn is admirable, and no farm should be without one. It varies from simple links to cusped and pointed ones, which successfully tear out the moss from grass land, or pulverise clods if taken over a rough surface at the proper stage of dryness or of moisture. The chain harrow is a capital pulveriser of a cloddy surface, and in this effect resembles the North-country "scrubber," which is not so well known as it deserves to be.

Rollers, too, are not nearly so universally used as they ought to be. In a climate like this, where land dries up so rapidly after a shower, every newly sown piece of land in roots should be rolled down firmly; we do not say with a heavy roller, but with a lightish wooden one, covering two drills at once: if more than two are taken, the chances are that one of the lot, from uneven work, may escape the needed pressure. A heavy iron roller, is indispensable on any farm, as a protection against wireworm, in which case, it cannot be too heavy. As to "clod-crushing," a good downpour of rain will do more good than the heaviest "Crosskill" or "Cambridges," and in the case of a very obstinate lot of clods in a piece of clay-land, *waiting time* will prove the most profitable working time.

ROTATIONS.—As a rule, the rotations generally followed in this province appear to us to cover too many years. The rotation pursued at the Trappist-farm at Oka, seems to us to be quite long enough, and, we confess, we should like to shorten it by cutting off one year of the pasture-limb. It is as follows:

1st year..... manured hoed-crop;
2nd " ..... grain;
3rd " ..... meadow;
4th " ..... do;
5th, 6th, and 7th, year. pasture,
8th " ..... grain.

We should like to have noticed that the first or second year's meadow had received a moderate dose of manure, for we suppose no one now holds the theory that top-dressing meadows, &c, is a waste of manure. The experiments of Mr. Shutt, Professor of Agricultural Chemistry at the Ottawa Experiment farm, showed satisfactorily that the waste of nitrogen, the only wastable constituent of dung, was, in a dressing of ten tons, only, in money value, equal to 34 cents!

WOOL.—If, as we are told, the Americans are going to take off the duty on wool, we ought to make preparations accordingly. To this end, we shall find it advisable to give up all our long wools and turn our attention to the larger breeds of short-wools: the Hampshire downs and the Shropshires. For although the long wools yield a heavier fleece, the short-wool's fleece fetches a higher price, and, as mutton-sheep, they are, of course, undeniably superior, so that, taking wool and mutton together, and considering that 5 Downs can be keep on the food required by 4 Lincolns or other long-wools, it would pay the farmer best to keep Downs. As far as we can foretell the future, the proposal in the State to admit wool free and to lower the import duty on barley, opens a very bright prospect to the Canadian farmer. England evidently will not take our barley, and the States' brewers want it badly. Things *do* look better all round: don't you think so?

SUGAR.—By some peculiar act of heedlessness, a paragraph in an exchange is made to read." The most *flesh* forming food is sugar; thin people can't use too much of it; for people can t use too little of it. "It should of course be "fat forming." Sugar, containing no nitrogen, cannot form *flesh*. The writer probably only meant to say that sugar would add weight to the body of the animal fed on it.

THE ARAB.—Many years ago Europeans are said to have tried to find our the secret of the great superiority of Arabian horses, and they could ascertain nothing, unless it was the food—barley. Arabs no doubt feed their horses on "The golden barley of Yemen," as the Emir tells Sir Kenneth of Scotland, as they sit by the "Diamond of the Desert," eating their frugal collation after their escape from the lances of the treachrous Grand-Master of the Templars. But it was tried in England many years ago, and not found to answer, being found to be *too* heating. Steeped for 48 hours and allowed to germinate slightly, in other words, partially malted, barley loses its injurious effects, and many of the large Norfolk barley growers utilise their tail-barley in this way. The only thing we see against it is that perhaps the excise might view it with suspicion, as calculated to lead to surreptitious distillation.

SHEEP.—A clipping, not from, but in the Vermont Watchman, says, very sensibly, that "sheep, to give the best results need the best care. Both wool and mutton will soon show the effect of neglect." If sheep are well fed for a month and then neglected, the wool will be feeble in resistance at exactly that point in its growth when the neglect began to take effect on the animal. As to the injury done by semi-starvation to the meat, it is clear that regular feeding will in all cases result in a regular addition of tissue; irregular feeding must produce an evil effect on the digestion, and therefore on the general health of the animal, which must affect the quality of the meat.

COWS.—Little, if any, outdoor exercise is needed for milch-cows in winter, although we see, by our exchanges, that some of our neighbours in States hold a different opinion. Water, of the same temperature as the cow-house, should be always before the cows, so that they can drink at their pleasure. A little crushed linseed will have the effect of brightening their coats wonderfully. If the house is warm enough, carding and brushing daily is good practice; but in a cold cowhouse, we would rather omit it, as it lays the animal more open to the effects of the cold. A well-licked hide seems to us to be sufficient for all purposes, and if a cow enjoys good health, is sensibly fed, and is not tied up too tight, her tongue will save the trouble of carding, or, as we English call it, *currying*.

OUR ENGRAVINGS. — After seeing the portrait of the shorthorn cow, taken from "Hoard's Dairyman," and comparing it with the portrait of the Dairy-shorthorn, 1st prize at the London Dairy show, no one can feel surprised at the comparatively disgraceful exhibition the American shorthorns made of themselves.

By the bye, the editor of the "Country-Gentleman" evidently does not understand that there are two kinds of shorthorns in England (see his remarks on the engraving p. 141, one kind, the Bates, Booth, &c., pedigreed stock, in most cases incapable of providing milk for their own calves; the other, the unpedigreed Dairy shorthorn, the favorite farmer's cow in almost every county in England. A good tour through the dairy-districts of that country would enlighten some of the American writers considerably.

SHORTHORN-HEIFERS AT CHICAGO.—Mr. Val. Fuller, who is always fair in his judgments, speaks thus of the Chicago Heifer-test:

THE CHICAGO HEIFER TEST.—The last dairy test at the world's fair was for two-year-old heifers. The butter was estimated by analysis of milk on the basis of 80 per cent. oil for pound of butter. A fixed price was set per pound of estimated butter—40 cts. The object was to demonstrate the profits of the breds at an early age

The Jersey had won all along the line against the Guernseys and Short-Horns in the three preceding tests, in which the Guernseys had been their closest competitors, but the Guernseys did not participate in this heifer test. From the foregoing statement it would at first appear an easy victory for the Jerseys, and on the strictly dairy basis, leaving out increase in live weight, they had an easy victory, but in the test as it was, it is a marvel they won at all. This test included not only butter but by-products, and increase in live weight was credited at 4½ cts. per lb. Again, the average price of butter in the former tests was 45 to 46 cts. per lb. The Short-Horn heifers went into the test thin, and for 21 days they gained the unprecedented average per head of 3.04 lb. per day, against 1.02 lb. for the Jerseys, so the Jersey babies had to make out of butter and solids not fat (at 2 cts. a pound) over 9 cts. a day to equal their larger competitors. Had the test been a prolonged one, the Short-Horn heifers could not have maintained the same ratio of increase and kept up their flow of milk, as it is an impossibility for a cow of any breed to put the fat on her back for a great length of time and maintain the flow. But in this instance the Short-Horns—be it said to their credit, from their breed standpoint — did both, speaking in the highest terms of their characteristics of fattening and the excellent handling they had.

The amount of daily increase in live-weight is enormous, very seldom realised by the most skilful feeders on the most perfect bullocks, and is another proof, if proof were needed, that the heifers in question, like all the rest of the shorthorns at Chicago, were not *Dairy*-shorthorns at all.

CROSS-RIDING FOR WOMEN. — Such is the curious heading of an article in the Cultivator, which, being translated, means: Riding on cavalier. A few women in England, we hear, have taken to it, but we do not think it will ever take the place, even with the hounds, of the graceful side-seat. The writer of the paragraph very properly objects to the use of the word to ride being used to designate sitting in a carriage; its primary meaning is not so, but to sit upon a horse;" and he quotes that much talked of but little read "Faerie Queen:"

"And lastly came cold February, sitting
In an old wagon, for he could not ride"

"And," he adds, "only the few cultured people distinguish between riding and driving." Alas! Macaulay, Thackeray, and Dickens, all of whom were cultured people, use the words "riding in a carriage." In our younger days, it was decidedly a sign of ill-breeding to do so, but now, it seems to be permissible, though to our ears it is most unwelcome.

DEBT.—A most unwise thing for a farmer to incur, is debt, except for the purpose of draining his land. On this subject, read Mr. Wm. Ewing's lecture on Farming in general and draining in particular, delivered at the Farmers' Congress, held at Quebec last January, and now in print in both French and English.

CLIPPING HORSES. — Mr. Charles Wood, a leading veterinary-surgeon in the States is, like the writer, a strong advocate for clipping horses. We remember well when a boy seeing the grooms strapping away at our brothers' hunters for a couple of hours before they could get them dry. Then came the *shaving*—really, with a razor—then clipping was invented, and half-an-hour after the return from the run, the hunter had been fed, watered, dressed, clothed, and was at ease for the rest of the night. In England our five teams of plough-horses were invariably clipped, and *did all the better for it*; but we should not clip farm-horses here unless their stables were *much warmer, their clothing* much more plentiful, and their attendants much more careful than they usually are. *After clipping, it is a* good plan to singe the coat over lightly once a month, *as far as appearance goes*, as the hair of most horses grows irregularly, and soon begins to look rough. A tube, with a broadish burner, attached to a gas-pipe, soon effects the job.

THE ADVANTAGE OF CLIPPING HORSES.—We have no hesitation in placing ourselves on record as an uncompromising advocate of the practice of clipping, says Charles R. Wood, a prominent veterinary surgeon, in the American Horse Breeder. He asserts that clipping is no more an outrage on nature than is domestication, and that the former is made necessary by the latter. Some who speak on the subject try to make a point by asserting that the horse that has been clip-

ped is more liable to catch cold than his brother who has not been introduced to the clipper. This, however, is not correct, as in practice we find it is the unclipped animal that almost invariably takes cold. According to Stonehenge, clipping and singeing a horse render him far less liable to catch cold than if left in his natural state. There is no possible doubt but an animal's health is slowly, certainly, surely undermined by being permitted to wear thick, heavy hair, while at the same time he is compelled to work so hard or so fast as to produce copious perspiration. The latter takes hours to dry, and frequently breaks out afresh, thus greatly debilitating the animal and reducing his strength. Our daily experience, both amongst healthy and sick animals, compels us to state unhesitatingly that clipping is of incalculable benefit to the animal so treated as well as to the owner.

With respect to the after care of horses which have been clipped, we should say immediately after the operation has been performed the animal ought to be sponged all over with alcohol, and warm blankets put on; no drafts allowed, and the stable kept warm; for the first few days the blankets should not be removed, than one only, and a lighter one made to take its place. These may be taken off after a week or so. Then the warm blanket only, which is usually worn in the stable, left on. When the animal is in harness, though at rest in shed &c., he should invariably be covered warmly, and never left uncovered while standing. If these precautions are observed there is little danger of the horse catching cold. At first, the legs should be well hand rubbed and bandaged; but if the animal is healthy this need not be continued. The foregoing remarks are intended to apply to road and fast horses, as those are generally clipped.

A CURIOUS CALCULATION.—In London, it is estimated that 25,000 horses are employed in the carrying trade. Their value is put at $250 a piece, and their food costs $4,000,000 a year - $160 each. The curious calculation is, that the value of the food consumed is based upon the height of the individual horse; i. e. a horse standing 16 hands high, should consume food to the value of 16 shillings = $4, a week.

SEWAGE.—Since the solid matter of the sewage of the Great Metropolis has been sent far out to sea in specially constructed tank-steamers, the water of the Thames has become wonderfully purified; so much so that fish are once more ascending its stream. The last salmon, if we remember, that was killed in the Thames, was taken near Battersea in, or about, 1812; but, now, whitebait, shrimps, and small crabs have come up the river as high as Erith, which place is not more than 25 miles from London. The whitebait, a tiny fish, about two inches long, on which Londoners *pretend* to dine at Greenwich and Blackwall: whereas an excellent meal of water-zouché, salmon-cutlets, *sauce piquante*, ducks and green pease is always provided in addition: was proved by the late lamented Frank Buckland to be the young of the herring. Did any one ever try the smallest of those delicious smelts, caught at Quebec, cooked white-bait fashion? It is very simple: dry the fish, dip them in a thin batter, plunge them into a pan of scalding hot fat, having previously placed them in a wire cage, and in a minute or so they will be done. Use no sauce but a sprinkling of cayenne and a squeeze of lemon.

HOW TO GROW MANGELS. — The *Country Gentlemen*, last month, contained a letter from a farmer who wanted to know how to grow mangels. The answer was not a very full one, as the writer had evidenly not had much experience in growing this root, or he would not have advised making the drills 35 inches apart, and singling at 8 inches. A few words on this crop may not, perhaps, be unacceptable to our readers:

Preparation of the land: a good deep fall ploughing on all soils. On heavy land, where there is no wash from melted snow in spring, the coat of dung may be ploughed in with the autumn furrows, but, in that case, the seed must be sown on the flat, which does not suit this plant, it having a tendency to make it throw out forked roots. In the spring, pass the grubber along and across the ridges, and after a sufficient number of harrowings, draw out the drills 24 inches apart. Cart out the dung—just well rotted—spread it carefully — no lumps unbroken—in the drills, split them, roll down with a light wooden roller, sow the seed, at the rate of 6 lbs. to the acre, roll again, and the job is finished. *Single* at 10 inches apart in the rows, taking care to cut away the drills down to the level of the land between them. the deeper the hoe goes the less bifurcation of roots will take place. Forked roots often break off in harvesting; this makes the mangel bleed until a great part of its most valuable constituents are utterly wasted. If a real crop, like those grown this year in Cornwall, Eng., some of which weighed 95 tons to the acre, be desired, the addition of 200 lbs. of sulphate of ammonia, or 250 lbs. of nitrate of soda, will produce marvellous effects on the yield.

In harvesting, *wrench* off the leaves; never use a knife for the purpose.

LADOGA WHEAT —This wheat, from which so much was expected on its first introduction, does not seem to turn out well. The Fife is still the most popular of all the wheats grown in the North-West, for though the Ladoga appears to ripen a few days earlier, the general opinion of the bakers tends to show that it is very difficult to make good bread with the flour. It is proved, by analysis, that it contains a high percentage of gluten, but this is inferior in colour and elasticity than the gluten of the Red-Fife. The colour of the bread is usually quite yellow.

Unless the proper methods for treating this flour to procure uniformly good results can be ascertained, it is not likely that Ladoga will be acceptable either to millers or bakers as long as the flour of the Red Fife is obtainable. Hence wherever Red Fife can be ripened the efforts of those settlers engaged in wheat-growing in the Northwest should be directed to its production in the greatest perfection by early sowing and a proper preparation of the soil. * * * While the idea of growing Ladoga wheat as a competitor with Red Fife for export or the general home trade should be abandoned, there is no doubt that the flour of the Ladoga makes excellent and nutritious bread for home use, and where wheat-growing is carried on in the more northern districts in a limited way for home consumption, and where Red Fife seldom ripens, or on the Indian reserves, where a yellow tint in the bread is not a matter of so much significance, the Ladoga wheat will still prove a most useful and desirable variety.—A. C. T.

GRASS-SEEDS.—The sowing of grass- and clover-seed is too often conducted in this part of the world in a sadly perfunctory manner. Where the land has been well prepared before the grain-sowing, people, as a rule, seem to think that sowing the grass-seed and giving the land a "scart o' the harrows" is sufficient to secure a "catch," never considering for a moment that the covering of these tiny seeds deep or shallow is a matter of great importance. If grass-seed is sown in late April or early May, a clothing of half an inch of earth is protection enough to secure the sprouted seed from the danger of being killed by drought before the rootlets have had time to get a firm hold of the earth. But the later sowings should have proportionately deeper covering, the seeding of the end of May as much as an inch and a-half Of all the means of interring grass-seed, there is nothing like the *chain-harrow*.

The Iowa Station tried experiments on various depths of covering seeds from 1 to 3 inches. The results were as follows:

The indications for such a season as that of 1892 are that clover, covered 2 and 3 inches deep, stands a severe fall drought better than that covered less, while lighter coverings give better yields at first cutting.

Timothy covered 1 inch deep gave most hay at first cutting; but that sowed 2 inches deep stood drought best.

Tall-meadow-oat grass, covered 2 inches deep, gave the most hay at first cutting and showed the best fall conditions.

SUGAR-BEETS.—At the Kansas experiment-farm, reports were received from 251 farmers, to whom beet-seed had been sent. The results were decidedly unfavourable, and the crop "cannot be regarded as lending much encouragement to the hope of successful establishment of the beet-sugar industry in Kansas." Beets grown on the station-farm were faulty in form and gave a low percentage of sugar.

RAPE AGAIN.—As this crop becomes better known on this continent, farmers will find out that the almost invariable practice in England of sowing it broadcast, at the rate of from 6 to 7 pounds an acre is by far the best mode of treating it. It is not the stems but the leaves that are wanted. The rape plant is generally exempt from the attacks of "cabbage-worms, lice, &c." in the old country, and there are never bands of grasshoppers there. We should imagine that the crop was allowed to stand too long, if *lice* attacked it, but the climate of Iowa may account for the difference. The italics in the extract are ours

Rape.—English field rape was sown in drills at several dates, beginning May 27. Some rows were left unthinned and others were thinned out to from 1 to 8 inches in the rows, four rows in each case receiving the same treatment. The yield ranged from 12.8 to 16.8 tons per acre.

The heaviest yield came from thinning to 8 inches in the row, but the stems were heavier, and when fed to sheep and other stock there was more waste in the rape grown this way than that grown with finer stems. *The indications from this trial are that it does not pay to thin* * * * The crop was attacked by grasshoppers, cabbage worms, and lice, and this occurred to all plantings on all soils. The plants were injured to the extent of half of their foliage. All kinds of stock relished it. Calves would leave their grain for it, but when it became lousy stock refused it.

The results of growing and feeding rape were very satisfactory, and were it not for the insect enemies there is no doubt but that the crop would soon take an important place in farm management for soiling and late fall feeding.

OATS AND PEASE —This mixture, in which the substitution of ¾ of a bushel of vetches—tares—for part of the pease would do no harm, was grown at the Iowa experiment-farm to test the comparative yield of six varieties of pease in the blend. The best seems to have been the Rennie No. 10; but the yield of either of the six would depend greatly upon the habit of growth as regards the length of bine, the amount of shade, the date of sowing, &c., &c. The most interesting results is the

COMPOSITION OF OAT AND PEA-FODDER.

	Green material.		Water-free material.	
	Cut July 7.	Cut July 29.	Cut July 7.	Cut July.
	Per cent.	*Per cent.*	*Per cent.*	*Per cent.*
Moisture	83.07	67.76		
Crude ash	1.56	2 12	9.19	6.61
Crude fat	0.64	1.14	3.78	3.53
Crude protein	3.21	4.51	18.94	13.99
Crude fiber	5.01	9.63	29.62	29.87
Nitrogen-free extract	6.51	14.82	38.47	46.00

CALF-FOOD. — The Iowa-Station, under the management of Mr. C. F. Curtis, experimented on the feeding of calves with skim-milk and linseed-cake meal, skim-milk and ground oats, against a mixture of corn-meal and ground flax-seed, and skim-milk, finding, as we, from an experience

dating from 1848, should have prognosticated, that the "gain was the larger and the cost per pound of gain less with the mixture of corn meal and flax-seed-meal." The trial lasted for 60 days, and the following were the results:

GAIN IN WEIGHT, AND FOOD EATEN, BY CALVES.

	Total gain.	Cost of food per pound of gain.	Digestible nutrients in food.			
			Protein.	Carbo-hydrates.	Fat.	Nutritive ratio.
	Pounds.	*Cents.*	*Pounds.*	*Pounds.*	*Pounds*	
Lot 1: Linseed meal and skim milk.....	115½	5 4	72 60	97 6	2 1	1: 1 4
Lot 2: Ground oats and skim milk..... ..	128	4.4	52.14	106 6	4 9	1: 1 6
Lot 3: Corn meal, ground flax, and skim milk.....	155½	3 0	52 02	118 5	7 9	1: 2 7

It is a pity the nomenclature varies so much on this side of the ocean from the English nomenclature. By *linseed-meal* an Englishman would understand crushed linseed, whereas the American would mean ground linseed-cake. We are glad to see that the Iowa-station grinds its flax seed, for, as we have often *mentioned in* this periodical, linseed—i. e. flaxseed—unground, is the most extravagant of foods, never mind how long it is steeped and boiled. Our own calf mixture, to be used with skim-milk, was, by weight, part of crushed linseed to 4 parts of pease-meal and 4 parts of corn-meal or barley-meal.

The following observations on the effect produced by the different constituents of the foods given to the calves will be found worthy of attention.

"The protein of these rations does not seem to have been the controlling factor in determining gain. On the contrary *we find the greater influence exerted by fat and* CARBOHYDRATES a principle in feeding that I believe always prevails where protein is fed in excess as in quite narrow rations." (The italic are ours ED.)

CAPONS.—One operator in Rhode Island caponised 20,000 birds in the season of 1892, at 3 cents a head! The losses by the operation seem to have been about 3 o/o. At Boston, large birds sell the best. When 10 lb. capons bring 22 cents a pound, 25 cents will be paid for 12 pounders and 28 cents for those weighing 14 lbs. Cannot we go into this practice? The art is easily acquired.

COWS DRINKING AT WILL.—A herd of Dutch cows was kept for a time in ordinary stables, and water brought to them twice daily, they were then changed to stalls having troughs in each manger with constant water supply; and afterwards they were changed back again to the ordinary stables and watered twice. The milk yield increased, on an average, 0.53 litre per cow daily, and there was no decrease in fat conter The increased yield is calculated to be about 100 litres per cow annually. Unfortunately, the abstract does not state the duration of the periods. The cows drank a little less when allowed to drink at will than when watered twice a day. The author mentions several advantages from a hygienic stand-point. —(Litre = 22/25 of a quart imperial.)

OATS.—At the Illinois station, experiments on thick or thin sowing of oats gave the appended results:

One bushel an acre yielded 52.5 bush. and 3,820 lbs. of straw.

2 bushels an acre 61.4 bushels and 4,540 lbs. of straw.

3 bushels an acre 61 9 bushels and 5,220 lbs. of straw.

3.5 bushels an acre 62,5 bushels and 4,400 lbs. of straw.

And 4 bushels gave a little less than the last both of grain and straw. We have usually recommended 3½ bushels as the proper seeding of an acre of oats, but a good deal depends upon the condition of the land, its state of friability, &c. When comparing our quantities of seed with the apparently enormous dose of 5 and even 6 bushels to the imperial acre used in Scotland, we must not forget that in that country, owing to the greater plumpness of the grain—44 lbs. to the struck (*rasé*) bushel being there no uncommon weight — there are far fewer—"pickles" in a bushel than with us, our oats seldom exceeding 38 lbs. With our favorite yielders, the *Black-Tartars*, with their long tails, which occupy a good deal of space, we do not think 4 bushels too heavy a seeding.

CANADIAN CHEESE.—We extract the following *from* Hoard's Dairymen, to the deserved praises given to the "men who produce and deliver the milk to the factories, and those who manipulate it there," we would add that if these merit praise, what do they deserve who taught the manipulators their business. The Dairymen's Association—in session at St-Hyacinthe as we write these words—may justly feel proud at the ungrudging recognition given it by all who have watched its undefatigable exertions during the last twelve years. It is to the work of the active members of that society that is due the proud position occupied by the cheese of the province of Quebec.

CANADIAN CHEESE AT THE WORLD'S FAIR.—Concerning the October exhibit of cheese at the World's Fair an Associated Press dispatch says.

The result of the final cheese competition at the World's Fair is published to night, and is of startling significance to all interested in the dairy industry. The cheese was judged by two United States and one Canadian judge. In the classes for Cheddar cheese made previous to 1893, Canada won 110 awards and the United States not one. In the classes for Cheddar cheese of this year's make Canada took 369 awards, against 45 to the United States Canada had 130 exhibits of cheese which scored higher than the highest of the United States exhibit.

Ontario had, in all classes, 275 exhibits of cheese of 1893 and won 260 awards. Five lots scored 99½ points out of a possible 100 for perfection.

Quebec had 113 exhibits of cheese and won 105 awards.

Nova Scotia had 10 exhibits and secured 3 awards.

New Brunswick had 4 exhibits and obtained 2 awards.

Prince Edward Island had 19 exhibits and took 8 awards.

Manitoba had 4 exhibits and received 3 awards,

The total number of exhibits of cheese from Canada was 539, which secured altogether 490 awards. Nine of the exhibits from Canada secured 99½ points out of a possible 100 for perfection. Five of these lots were from Ontario and 4 from Quebec.

Most truly such a report is of "startling significance"! We most heartily congratulate Canada, her Dairy Commissioner and cheese makers, and all others who have contributed, directly or indirectly, to the accomplishment of these results, upon the recognition awarded to their indefatigable labors for improvement in the science and art of cheese making. There is nothing in the climate, the soil, the water, the food, or the cows in Canada, that should make Canadian cheese superior to United States cheese. The fault is not in these things but in ourselves that our cheese averages so much inferior to their cheese. It is the men—these men who produce and deliver the milk to the factories, and those who receive and manipulate it there, that makes the difference. These Canadian men have been more teachable, more willing to adopt and follow improved methods, than we. That is all. Their success should be our encouragement, and if accepted and acted upon in this spirit it will prove, in the end, more valuable to the cheese interests of the United States than to the winners of the awards."

SOREL-FARMING.—It was what boys call "a great sell" to find, when we reached Berthier, on the 9th of October last, that it was hopeless to expect to be shown over the Beet-sugar Factory, as the day was devoted to a grand function, the Benediction of the factory by the Archbishop of Montreal. There was such a crowd assembled at the station, that we determined to cross over to Sorel at once, and thereby gain more time for the inspection of the farms of our old friends and former neighbours.

A heavy thunder storm, at the Ste Martine Junction, drew from us the exclamation. Oh! a long, fine autumn, eh! a prediction that was *fully* verified; for up to the last of November, the hounds could have hunted every day except three or four It was quite a novel experience to see, in the neighbourhood of St Henri de Mascouche, a lot of tobacco unharvested, and absolutely untouched by the frost: a rash thing to do, to leave it out so late, but it was probably a late-planted piece, and there was not much of it. All tobacco should be set out by June 20th, in which case it will be fit to cut, in average seasons, by the 5th or 6th of September. Tobacco, when dead ripe, will stand three or four degrees of frost, but when green, a very slight frost will destroy it. Of the large kinds, too many leaves are generally left on the stem after topping, and the three next the ground are allowed to remain, which is wrong, as they never come to much. Strip the 3 lowest leaves, and leave only at most 10 leaves: for the great "Connecticut seed-leaf," 8 *leaves* are as many as can be depended upon to ripen.—The delicious little queer-shaped Canadian, with its drooping *head and curved stem, the leaves of* which seldom exceed 14 inches in length, is by far the finest flavoured tobacco grown, but we fear the true *sort* has disappeared; for since 1872, when we gave our last packet of seed to the Curé of Compton, we have never been able to find any.

The people at Sorel, when I got there, were all busy with their potato-and sugar-beet harvest. The sugar-beets had, generally, done well, but why plant them so far apart? Eighteen, even sixteen inches, between the rows, is sufficient space, as large beets are not desired by the factories. Of course, if the single row horse hoe is the only one available, 24 inches must be allowed, as this implement will not work in a more confined space. But so many acres may be tilled in a day by "*Smith's horsehoe*," *that does* three drills at a time getting over 8 or 9 acres a day, that one or two of these implements would do the work of a whole *parish*, very few farmers as yet, growing more than two acres of beets: therefore, combine, and buy one between you.

It was a sad sight to see the finest crop of potatoes we had ever known at Sorel lying rotten on the land It was really pitiful. Three fourths of the tubers were quite gone, and of those that were fit to put into the cellars many more would go, as they were evidently most of them affected

Poor M. Séraphin Guèvremont! He had planted 9 acres of potatoes and 2 acres of beets on the newly cleared, upper part of his farm, where the land lies in a sort of basin; when the potatoes *had been horse-hoed twice*, and the beets had been singled, down came a heavy storm of rain.; the land was flooded; the water lay there, and the upshot was that the beets and four acres of the potatoes had to be ploughed up and sown to swedes, July 7th, too late, alas, to make more than half a crop. We say half a crop, because, judging by the eye, the swedes would not weigh much more than 2 lbs. each, whereas, some of the same seed, accidentally dropped in instead of carrot seed on the 27th of May, would certainly weigh 15 lbs. apiece! Such soil for swedes we never saw

And all this destruction was due as M. Guèvremont honestly confessed to his not having taken our advice in July 1891, to continue the ditch from the St Lawrence to the upper end of the farm *à fur et à mesure of the land* cleared and brought into cultivation yearly. The extension and deepening of the ditch, in such light, stone-less *land, might have cost* $20 at the outside: but the loss to the proprietor of the crop of 4 acres of potatoes and 2 acres of beets, even allowing for the substituted crop of swedes, cannot be estimated at less than $200. The land too, which is usually, in fact, I may say invariably, noted for its cleanness, was covered with *chickweed*.

In revenge, the hay-crop was enormous, the new, as well as the old, barns being full to, literally, repletion, for the side of one of the new barns was bulging out with the weight of well stamped down timothy

Well, the ditch has since been made and well made, and we hope, if we visit the same farm *again* next year, to see the beneficial effects of attending to drainage before expecting a crop from new land.

There seemed to be a general improvement on most of the farms I looked over; but the season was too far advanced for any correct judgment to be formed about the grain-crop. Oats were reported to be the best crop of the year, and wheat the worst, which would of course be the case in such a damp season. No improvement visible in the stock, which we hoped our Guernsey bull,—3 years at Sorel—would have done something to alter for the better. Most of the farmers will grow beets next year; in fact, we found everywhere that a very favourable impression existed as to the prospects of the Berthier factory. Still, we must agree with the opinion expressed by M. Joseph Beaubien, at the Farmers' Congress, last year: it is a pity the first factory was not established on the Island of Montreal.

Apples.—The Americans classify apples as: *Cooking* and *Eating* fruit; we prefer the English formula: Cooking and Dessert fruit. Apples, in England, are a superabundant crop this year; hence, exportation of them from this country has not been very profitable.

Mulching strawberries.—If you mulch your strawberries with hay or green manure from the stable, what a lot of weeds you will seed down! Clean straw has no such companions. Do not mulch too soon. the later the better, it is the alternate frost and thaw of the end of winter that injure the plants. Many a good bed of strawberries, as well as of other plants, has been ruined by mulching early in November with long manure: the rain thaws out the frost, and the dung rots the plants. This happened, in 1892, to a bed of pansies of the editor's.

Grapes.—Do grapes, at 2 cts. a pound, pay here? If the crop grown does not exceed 5 tons to the acre, we should say, decidedly not. Lots of this fruit were sold this season for less than the cost of picking, packing, and marketing. At all events, if you grow grapes, grow only the finest qualities.

Potatoes.—The potato-crop in the "Aroostock-country," though cultivated in the old-fashioned way, without potato planter or digger, is said to have been very large this last year. The distance between the sets is generally 15 inches apart, in the rows, and 32 inches between the rows, which, for the kinds usually grown, seems to us to be too great. Beauty of Hebron and Roses, the sorts preferred, do their best and most productive work at 24 x 12 inches. Every man strives for not less than 100 barrels an acre (250 bushels), and, now and then, reaches 500 bushels. These would be good crops anywhere=7 tons and 14 tons gross to the acre, the latter a yield seldom equalled on the best, and best farmed land, in Britain. This shows what can be done, and yet the average crop throughout the States does not exceed 90 bushels an acre!

The Annual Meeting of the Dairymen's Association.—This meeting one of the most useful of the kind, was held at St-Hyacinthe on the 5th, 6th, and 7th of December. The dinner in honour of Monsieur J. de L. Taché, for ten years the Secretary-Treasurer of the association, was largely attended and the speeches, that were fully reported in the Montreal Star and other papers, were most deeply interesting. In another part of this number, a report of the general proceedings of the meeting will be found.

Sweet-corn.—Mr. Peter Collier, of the New-York Experiment-station, has been trying to discover whether making sugar from the stalk of sweet-corn, after the ears have been stripped for the canning fatories, is likely to be profitable or not. He finds that the yield would average something like 50 lbs. of cane-sugar an acre, and the stalks, by the necessary crushing for the extraction of the juice, would be excellently adapted to the practice of ensilement.

Canadian hay in Great Britain.—Canadian hay exporters are at present shipping hay to the Old Country *via* Portland, Boston and New-York. A decline in prices has taken place in the English market lately, although not enough to take away all the profit. Sales of Canadian hay have been made in London from $25 to $26. One lot of No. 2 was sold at $23, Liverpool shipment last half December. At Bristol sales have been made at $24.75 to $25. Up to the close of the ten months ended October, Canada had shipped 39,000 tons of hay to England. Dealers expect a continuation of the present demand for Canadian hay in England, although possibly at lower prices than have hitherto been ruling.

DEPARTMENT OF AGRICULTURE AND COLONISATION, QUEBEC.

Programme of operations recommended to the Agricultural Societies and Farmers' Clubs.

The noteworthy growth which the dairy-industry has attained within the last few years and the important position it now occupies among our agricultural industries call for special attention and more direct encouragement than in the past, from the Agricultural Societies and Clubs.

Therefore, at its last meeting, the Council of Agriculture adopted a resolution recommending the Agricultural Association to encourage, through the medium of prizes, the production of fodder, roots fit for fodder, or any other cultivation of a nature to improve the dairy-industry.

In order to enable the Societies and Clubs to meet the views of the Council, we have embodied herein, as an example, a series of several prizes which might be offered in the future, each association naturally modifying them according to the means at its disposal.

1st. $10.00 for the best fields of clover of 2 acres.

1st. prize $4.00—2nd. $3.00—3rd. $2.00—4th $1.00.

2nd. $10.00 for the best fields of tares or vetches and oats of one acre.

($4.00,—$3.00,—$2.00,—$1.00.)

3rd. $10.00 for the best fields of Indian corn-fodder of one acre.

($4.00,—$3.00.—$2.00,—$1.00.)

4th. $15.00 for the best fields of half an acre of mangel wurzel, swedes or carrots.

($5.00,—$4.00,—$3.00,—$2.00,—$1.00.)

5th. $15.00 for the best fields of one acre of mangel wurzel or carrots.

($8.00,—$4.00,—$3.00.)

The Government grant may also be used for the purchase of bulls or other registered reproducing cattle.

At the same time, we cannot too highly recommend the hoed-crops, because they give good immediate results and put the land in very good preparation for following crops.

No expenses are to be incurred without the previous sanction of the Honorable Commissioner, the Government grant cannot be used for the purchase of seed for fodder.

Quebec, November, 29th, 1893.

Science.

THE FOOD OF PLANTS.

VI.

By D. P. Penhallow.

THE APPROPRIATING OF FOOD.

Sulphur. — Sulphur is found in a variety of forms. In volcanic districts it is often found in the uncombined state and thus constitutes the source of the commercial article. Such free sulphur is of no value in the plant economy, and indeed, if brought into contact with the growing parts of plants would be likely to produce more or less well defined injury owing to the action of its products arising through oxidation. It is also found in the waters of many hot springs in combination with hydrogen, in the form of that rank smelling gas known as sulphuretted hydrogen. In soils, it most generally occurs in the form of sulphates, compounds which are for the most part readily soluble in water It is in these forms that it is presented to the roots and taken up by the plant.

In the plant, sulphur is always found in the albuminoids though in small and somewhat variable proportions. Its constant presence in these bodies, however, shows that it is an element of first importance in the plant economy, although its precise physiological value has not yet been ascertained. It is also found in some plants, as the banana, in the form of crystals of sulphate of lime, and in the onion, turnip, mustard, horse radish and assafœtida, it is a constant ingredient of the volatile pungent principles of these plants.

Presented to the roots of the plant as a soluble sulphate, it enters into the system and undergoes rapid decomposition. Thus the sulphate of lime upon being taken up by the plant, is quickly changed to oxalate of lime, while the sulphuric acid enters into new combinations The most advantageous forms in which sulphur can be presented to the plant are the sulphates of calcium, magnesium, potassium and ammonium

Iron.—Iron occurs in nature chiefly in the forms of an oxide, and in this combination is very generally distributed through soils in variable proportions.

In the plant it is a constant ingredient of the ash though generally in very minute quantities. In a few cases the amount of iron contained in plants may amount to seven per cent, but in the great majority of cases, and particularly in the case of agricultural plants, analysis shows the iron to be less than one per cent.

In the living plant this element is found very generally distributed, but it is known to be essential only to those plants which contain chlorophyll. Indeed, the formation of this pigment appears to be directly dependent upon the presence of minute quantities of iron. This may be readily ascertained by a simple series of experiments. If a seedling plant be grown in water holding in solution all the necessary food elements except iron, it will be found that the plant grows continually more and more colorless until all appearance of green has disappeared. The plant is then said to be chlorotic. If now, to the solution in which the plant is growing, a small quantity of a soluble salt of iron be added, the plant will gradually regain its normal green color. It is therefore clear that the iron is an essential factor in the formation of chlorophyll, and as this pigment is indispensable to the functional activity of the ordinary green plants, it is clear that iron constitutes one of the most essential food elements of the highest plants.

Phosphorus. — Phosphorus occurs in nature chiefly as phosphates, of which, for our present purposes, the phosphate of lime is to be considered the most important. Mineral phosphate occurs in two forms, either as the mineral phosphate of lime, or apatite, as found in extensive deposits near Buckingham, P. Q., or as phosphates derived from organic remains as are now found in extensive deposits in Florida and South Carolina. These two forms of material are of the greatest value commercially, and constitute the chief source of supply of phosphate of lime for agricultural purposes. In either case, certain mechanical and chemical process, are required to convert the insoluble phosphate into a soluble form in order to make it available for purposes of plant nutrition.(1) Another important source of supply is to be found in animal bones, but in this as in the two preceding cases, the material requires to be subjected to mechanical and chemical treatment in order to make the contained phosphates available.

In plants, phosphorus appears to be an essential constituent of the albuminoids, and appears to bear an important relation to the chemical changes involved in growth though its precise value is unknown. It is, however, probably connected with changes in the nitrogenous compounds, since it has been observed by Boussingault, as also by Lawes and Gilbert, that the phosphates exert a beneficial influence upon the assimilation of nitrogen; serving to effect a better diffusion of these substances, and thus to facilitate their translocation in the plant. This may seem to explain the well known association of the albuminoids and phosphates in seeds.

Magnesium.—Magnesium is one of the least abundant of the ash constituents of plants, yet it is always present. It is taken up with advantage in any one of its soluble forms except the *chloride*. According to Goessmann the presence of sulphate of magnesia in the soil seems to facilitate the distribution and ultimate absorption of the potash-salts, hence it is a valuable ingredient of all commercial fertilisers into which potash salts enter, while it is also clear from the recognised relations of this element to functional changes, that it is an important food element.

According to the investigations of Van Raumer, the exclusion of magnesium from the food supply results in a cessation of chlorophyll production, whence one may infer that this element is demanded for the formation of

(1) Just what we stated 12 years ago when it was asserted that fine-ground apatite was as useful as any superphosphate.—Ed.

chlorophyll, and therefore to the promotion of those operations upon which the conversion of inorganic into organic matter depends.

Magnesium is often found in the protein grains of seeds in association with lime, and according to Naegel, it may be replaced by this latter compound.

Calcium.—Calcium in some one of its several combinations, is a very common constituent of soils, though some soils are much more deficient in it than others. The form in which it is usually supplied to plants is that of the sulphate, phosphate, nitrate and carbonate. but as this latter is an unstable compound in the presence of acid solutions, it is found to undergo decomposition in the process of absorption and the lime thus enters the plant in some other form.

Within the plant, calcium constitutes one of the most prominent ash constituents and it may often be recognised in some one of its several crystalline forms as oxalate, sulphate, and even carbonate. Crystals of calcium oxalate are of very common occurrence and may be met with in almost any tissue, though they are specially numerous in the skin of the onion and in the bark of most trees, especially the hickory.

The precise use of calcium to plants is unknown, but the fact that it is a constant constituent of the ash and usually in large quantity, would seem to imply that it is of considerable importance. It would seem, however, from the investigations of Bohm and Van Raumer, that this element is directly connected with the building up of the cellulose frame-work of plants, and it is also known that in chlorophyll bearing plants, it cannot be replaced by any other metal, although, as Goessmann has shown, under certain conditions of cultivation, the transfer of the grape from its wild state to conditions of cultivation in which potash salts are employed, involves a diminution of the amount of calcium found in the ash.

Sodium.—One of the most widely distributed elements, it is as might be expected, a common constituent of the ash of plants though in small quantity, except in sea-weeds, where it is abundant. It has been held from time to time by various investigators that this element may serve as a substitute for potassium when the supplies of this element are deficient, but there are no facts to substantiate such a view, and the general opinion entertained by physiologists at the present is, that it is wholly valueless, its presence being accidental. Certain it is that it may be eliminated from the food supply without introducing functional disturbance.

Potassium.—Potassium enters the plant in some one of its several soluble forms, either as the sulphate, chloride, nitrate or phosphate, and also possibly, as silicate. The three first forms appear to be those which are most important, and we shall consider their special relations to nutrition in a subsequent article.

In the plant, potassium is found in the form of one or more of its numerous compounds with organic acids, thus we have potassium bitartrate in the grape, potassium oxalate in honey, potassium malate in garden rhubarb, &c.

With respect to the value of this element in the plant economy, we are yet very much in the dark, but it has been clearly ascertained that when potassium salts are withheld from the food supply, there is a general deficiency of structure, a failure in the reproductive function, and the plants show an unusually small amount of free acid in the sap.

Furthermore, the investigations of Nobbe and Schroeder in the case of buckwheat, show that a deficiency of potash causes a corresponding failure in the assimilation of carbon, i. e. in production of starch, and these results have more recently been confirmed by the observations of Goessmann, who has also shown that potassium in some of its forms is directly connected with the sugar percentage of fruits and the sugar beet. It would, therefore, appear that potassium is directly connected with the fixation of carbon and the building up of the plant structure, and from the observations of de Saussure, it would seem that the amount of potash in an organ affords an indication of the functional activity of that organ, as is also shown by the following:

1000 parts of potato tops containing (Wolff).

at the end of August ..... 2.3 o/o potash
at beginning of October 0.7 " "

The proportion of potash in 100 parts of dry solid of different organs of the Horse-Chestnut (Wolff).

Leaves in spring..... 2 80
" " autumn..... 1.50

Finally, that potassium bears some important relation to the formation and storage of organic bodies such as the starches and sugars, is shown by the fact that the organs in which these processes are taking place, as the leaves, seeds, tubers &c., are those parts which are richest in this element.

Chlorine. This element which is a very constant ash constituent is presented to the plant in the form of a chloride, usually of potassium or sodium. Much diversity of opinion exists as to the value of this element in the plant economy, and the assertion is often made that it is of no value.

On the other hand the experiments of Noble and Leydecker with buckwheat, seem to show that it is of great importance in effecting a transfer of the organic products of digestion, and this view has received confirmation from the researches of Goessmann relative to the fruit of the peach. In the case of the first two investigators they found that in the absence of chlorides the terminal leaves of the buckwheat became thick and fleshy from an extraordinary development of all tissue, while they curled up and finally fell off upon slight disturbance.

The stem became knotty, transpiration of water was suppressed, the blossoms withered without perfecting fruit and the plant prematurely died. The very fleshy leaves were found to be overcharged with starch, the transfer of which, to the flower and fruit, was impossible in the absence of chlorine.

Goessmann has likewise shown that in certain similar conditions of the peach, the addition of chlorine to the food supply effects a distribution of the starch to centres of growth.

Silicon. This element which is the most common constituent of all rocks, is taken up by plants in the form of soluble silicates as of potash or soda, and constitutes a very common ash ingredient. In the plant it is very often found in the outer membranes, especially of grasses, to the stems of which it imports a large measure of strength and hardness.

In some larger grasses, such as the bamboo, it may even be found as a solid residuum of the sap in the hollow stems, when it is known as "tabashir" The very common and abundant occurrence of silicon in the ash of plants has suggested an equal measure of importance, in promoting the vital functions, but this view hardly receives support from observation.

Thus, Sachs found that corn will grow perfectly in a solution containing no silicon, although the ashes of the plant would under ordinary conditions of growth contain from 18 to 20 per cent of this element. Wolff in the other hand, has found that in the case of oats, the number of perfect seeds produced is greater when the plant is abundantly supplied with silica.

Aside from the elements thus considered as constituting the food of plants, it is clear that any of the other elements contained in the soil in a soluble form may be taken up, but it may be observed (1) that with respect to such, as to all other elements, the plant appears to exercise a well defined selective favour, (2) that even though taken up, such elements do not participate in the functions of growth. Thus it is quite possible for even poisonous substances such as arsenic and copper to be taken up, their absorption proceeding at such a slow rate that the plant system becames gradually adapted to their presence and they exert no deleterious influence. But such cases are rare and need not be taken into consideration.

The Garden.

CHICORY AS A VEGETABLE.

This is a common plant in cultivation abroad—too common many will say, with their experience from its detestable effect on coffee. In gardens it is now becoming important, though most of what we use comes from abroad. The very common Barbe du Capucin of the Paris markets is chicory dug up and blanched in cellars. That would never come much into English gardens or use, and we do not wonder, because it is to tough and hard for a good salad. But now it is coming in a somewhat different form to us from Belgium. It is a larger variety of this plant, blanched and looking something like seakale. Sometimes we see it in London shops labelled as a salad, but that is probably a mistake. It is excellent boiled or braised, and served plain or with dressing. It has a pleasant bitter taste quite distinct from that of any of our own vegetables, and is well worth having. Most of what is in London now comes from abroad. but it would be easy to grow chicory in English gardens, and it would be a pleasant change from the forms of cabbage, which do not suit everybody. In the Paris and London markets it is erroneously known as endive; in reality it is the Witloof or cabbage-headed chicory. The particular variety of chicory from which Witloof is produced is distinguished by the broadness of the leaves and by the great size of the midrib. These leaves, when blanched by forcing the plants under ground, form a solid and compact ivory white head, which, properly attended to, will keep fresh for days. In the raising of Witloof the seed is sown during June or the beginning of July, in deeply-dug and well prepared soil, preferably in drills from 6in. to 12in. apart, the seedlings being subsequently thinned out so as to leave from twenty to thirty plants to the square yard. For transplanting, sow the seed in a nursery bed in June, and about June 10 plant out the seedlings about 6in. apart. In October the plants will have attained their full growth, and the roots will be as thick as an ordinary spade handle. They are now lifted, the leaves cut off about 2in. from the neck, and the roots shortened 6 in. all lateral growths and shoots being cut away. Thus prepared, the roots are placed upright side by side in the bottom of the forcing tranches, in a well drained part of the garden or where the water does not lodge naturally, and about 16in deep the bottoms being well broken up for the insertion of the roots. The roots having been deposited in the trench, enough soil is shovelled back to fill the spaces between, and to cover the roots up to their necks, about 8in. deep, of comparatively dry soil is shovelled in. This soil may be prepared, in sheds or other shelter, some weeks beforehand The trenches are usually 4ft. to 4½ft wide. Portions of a trench may be forced in succession as required. by covering a number of roots with a layer 8in. to 12in deep of fermenting manure; and in from twelve to fifteen days the soil will have become sufficiently heated, so that the manure may be transferred to the next portion, fresh manure being added to keep up the heat if required. The heads are not fully developed until twenty days have elapsed

WONDERS OF THE VEGETABLE WORLD.

The other evening Mr. George Moore, lecturer on agriculture and horticulture for the Quebec Government, delivered a most interesting address on "The Wonders, Beauties and Uses of the Vegetable World" The lecture was given under the auspices of the Montreal Gardeners' and Florists' Club, at their place of meeting in Cathcart hall The president, Mr Walter Wilshire, occupied the chair and introduced the lecturer. The profession of a gardener was stated to be a most honorable one. He is face to face with nature and nature's god. He is not tempted to indulge in tricks of trade, and is not addicted to what is called "sharp practice" in business circles. Also he lives with his family and is not away from home all day as are other men The lecturer spoke of the tendency of one plant to choke out another by too rapid growth. This tendency was checked by the wide distribution of seed, as in the case of the thistle. It was shown that leaves constituted the lungs of trees and plants. For this reason the insects that destroy the leaves of the potato plant stop the growth of the "tuber" itself though they may not directly attack it. Sap rises through the trunks of trees, but does not go back to the roots in the same state. It invigorates the leaves and branches and is itself purified by the air in the leaves even as the blood is cleansed by the air in the lungs. Some of the parasitic bacteria which destroy plants are so small that 800 of them would lie upon one-twelfth of an inch square, 1,000 of other kinds could pass through the eye of a needle, walking abreast. Diseased potatoes should not be left on the ground or on dunghills, as they tend to propagate the disease Much less should they be planted But they may be given to animals for fodder as animal organizations are not injured by this kind of diseased vegetable matter At first it was difficult to "diagnose" the potato bug disease. It was found at last that it originated from a species of "fungi," so that if the "fungi" can be destroyed the insects will not appear. The best cure for the potato bug disease is a mixture of sulphate of copper and lime called Bordeaux Mixture. This kills the incipient fungi. It was shown that a cake of yeast was

full of minute insects, and that they produced a gas which raised the cake or bread. Many fungi are so small that they cannot be seen without a microcope. The lecturer contrasted these vegetable productions with the gigantic pines of British Columbia. A section of these trees measured 28 feet in diameter. Orchids are, perhaps, the most wonderful plants. Some resemble butterflies and bees in shape. One contains within its flower a formation resembling a dove. This is called the "Holy Ghost Plant." There is a variety of it in Sir John Abbott's conservatory. Apparent difficulties of growth of some vegetable productions are overcome by special provisions of nature, for example · The banyan tree has straight branches at right angles from the trunk. These would break off if they were not supported by a kind of natural support which forms beneath them. Some leaves of palms grow to a length of 20 feet. They could not support their own weight, but when they reach a certain size a natural ligament is developed which winds about the trunk of the tree and encircles the longer leaves. Epiphytes grow upon trees and plants, but derive no nourishment from them. Parasites, on the contrary, both grow about the plant and draw strength and vitality from it. "Clover dodder" is an example of the first mistletoe of the second class. Vegetable fibres are now used instead of rags in the manufacture of some kinds of paper. Speaking of the culture of roses the lecturer stated that Mr. William Paul, of England, had no less than 90 acres devoted to this purpose Rose culture was very ancient. Highly developed varieties were grown by the Romans 500 B.C. Nero at one of his feasts distributed 50,000 rose buds among his guests. Mr. Moore stated that it would be better if an Arbor day was appointed for each county separately instead of each province, as climate varied greatly between different parts of Ontario and Quebec. It would also be well if the school children were made to take a greater interest in the day At the conclsion of the lecture a vote of thanks was tendered to speaker.

BUDDED OR ROOT-GRAFTED APPLE TREES.

WHICH WILL LIVE LONGER.

A READER—I saw it asserted a short time ago in a farm paper, that budded apple trees would not live nearly so long as root grafted ones. This is not in accordance with my experience. Will some of THE RURAL experts take this for a "target"?

I have in my orchards apple trees grown both from buds and root-grafts, and have never been able to discover any difference in their habits of growth or vitality. It is true that nearly all trees grown here in Ontario County, N. Y. in the nurseries, are budded, and they make fine trees in appearance and usually develop fine systems of roots that please planters, but in this locality either budded or grafted trees will outlive the generation that plant them; hence the question scarcely causes us any anxiety.

S. D. WILLARD.

There is no foundation whatever for the assertion of some writers in farm papers that budded apple trees will not live as long as root grafted ones, provided the stocks upon which they are worked are as hardy as the variety of bud used and so nearly allied in kind as to form a perfect union. As a matter of fact, for a climate like ours here in Minnesota and the adjoining States, the budded tree on hardy stock has considerable advantage over the ordinary root-graft: 1, for the reason that many of the stocks used in root-grafting are seedlings of the most tender varieties or of crabs that do not prove congenial; 2, because the union of root and graft or the knitting together draws out the vital forces stored in the trees at a time when the trees cannot draw on the soil or atmosphere to replace them, and as a result they cannot begin growth as early or make as vigorous a growth the first season as the budded trees and they are more liable to be overtaken by the following winter in an unripened condition which invites black heart from the killing of the pith and young growth. Again, the uncongenial root is very liable to give a weak root system and short-lived tree The union of the bud to the stock is formed while the roots are drawing nourishment from the soil and the following spring the bud is as ready to start in vigorous growth as any other portion of the tree and has the advantage of beings as thoroughly united as any natural branch of the tree; but the cut portion of the graft and root can never grow together. The union takes place in the inner bark of the two and that very frequently only on one side, which would tend to make them more sensitive to unfavorable conditions than budded trees.

We in Minnesota are continually warning our people against purchasing from unknown tree venders, trees which they sell as budded; for the reason that they are grown for South and are very likely to have been worked upon tender seedlings or stunted, unsalable stocks of their nursury, and I have found that such trees invariably kill below the point where budded trees upon hardy stock are equal to the best common root-grafted trees, if not better, so far as hardiness, productivness and prospect of long life are concerned.

J. S. HARRIS.

It is much easier to make an assertion like this than to prove or disprove it. I have been in orchards and nurseries now for over 40 years, and I never have observed anything to lead me to believe that budded trees are generally shorter lived than those which have been grafted; that . , nursery stock. Budding in larger trees is better than grafting, because it leaves few wounds that do not heal the same season; therefore no such chance for the entrance of decay germs. But I can conceive that budding near the ground on seedling stocks, inasmuch as it causes a crook at that point in the young tree, may leave a tendency toward sun-scald, unless the tree is planted deeply, or turned about when transplanted, so as to have the outer curve stand toward the sun at 2 o'clock. I think this may be a point worth noting; but as I have set very few budded trees, I am not very sure about it, as a practical matter. I do not think it worth while to pay much attention to oracular statements given without proof or reasons like the above. Ignorant people seem to have a great fancy for such, and are usually insulted by a request for evidence of their statements.

T. H. HOSKINS.

Orleans County, Vt.

It is surprising what stories tree agents will get up to sell trees, and it is more surprising to see how people will believe these romances. There is no way by which an apple tree can be grown so perfectly and well as to set out a stock and grow it one season and bud it just above the ground or graft it at the collar. A better tree can be grown in this way, but not so cheaply as by root-grafting. Some nurserymen raise all their trees by budding while others raise all their apple trees by root-grafting. We do not suppose that there is really much difference in longevity in the two cases, so long as good trees are raised. There are some varieties however, that are less hardy than others, and when the scions go into the ground, as in root-grafting, they are more liable to cracking of the bark near the ground, owing to freezing and thawing, thus large portions of it die, leaving large scars which sometimes take several years to heal over. This we have never seen on budded trees, as the natural stock seems to be more hardy than many of our grafted sorts. From our experience in growing trees and from our observation we should say budded trees would make the longest lived.

STEPHEN HOYT'S SONS.

R. N.-Yorker.

"CANADA'S FRUIT EXHIBIT at the World's Fair; Ontario makes the finest showing; superior exhibits. To most visitors at the World's Fair it is a perfect surprise to find that Canada has one of the largest fruit exhibits in the Horticultural building. It is situated in the rear curtain, north of the Dome, and occupies nearly one-sixth of the whole space devoted to pomology. In variety of fruits Canada also excels."

Orange Judd Farmer.

THE ADORNMENT OF THE HOUSE AND GROUNDS.

Not very long ago, I described, among the divers pleasant things fit for the interior of our abodes during the gloomy season of winter, the cultivation of the Passion-flower. as a brilliant decoration for the window or for those pretty little recesses facing the East, in which "Josette," a woman of taste, loves to display her charming chrysanthemums, her splendid oleanders, her sweet-scented mignonette, her gorgeous striped (*margotés*) carnations, her sumptuous hydrangeas, and various other marvels of the kind.

More than one traveller of distinction, in passing through our rural districts and the suburbs of our towns, has been astonished, in the dead season of the year, by the brilliant spectacle afforded by many a Canadian home, not by the luxuries of the old countries, but by the treasures of Flora, the finest specimens of the tropics, in full bloom, which are a thousand times more enjoyable.

How many times, at the meetings, in September, of the Board of Directors of the gardeners of Quebec, has it been proposed to offer wreaths and prizes for these displays . but, in September, "the windows and the recesses of Josette" were, alas, void of their annual decorations.

May I, in my position as a former president of the Horticultural Society of Quebec, be allowed to offer some suggestions on the ornamentation of the exterior of our abodes, whether in the country, or, if space permits it, in the towns? I trust I shall gain consent to my request. Nature has been lavish of her bounties both to our good town and to the landscape that enframes it. Can not we add something to the setting of this picture? I believe it to be possible · it is only necessary to see what is being done in other great Canadian towns, and in the prosperous cities and villages of New-England: at Montreal, Ottawa, Toronto, Boston, Concord, Troy, Buffalo, &c.

In summer, both rich and poor, in their hours of siesta, seek for shade, flowers, the verdure of leaves, and light: all of which are easily to be procured here, if we like to follow the example of our neighbours. Let us plant trees around our old homes, in our squares, along our boulevards, in our towns. Let us group together clumps of pines, slender maples, especially the majestic and long-lived elm on our road sides, in our pastures, to guard the flocks and herds against the scorching heat of July and August, around the springs of our watercourses, to retain the humidity during the great droughts of summer.

There is another style of ornament for the gardens, and for the avenues that lead to the house: the live hedge, a very durable and cheap decoration. Without reckoning the lilac, which makes a most attractive hedge, rich in perfume and flowers about the end of June, there is a crowd of trees and shrubs, willows, spruce, cedars, thorns, &c., which are easily clipped into any form, square, semi circle, or punctiform, just as the master pleases.

On my land there are many hedges; two are specially remarkable, one, a lovely hedge of black spruce, as bushy, as green, and as graceful in the gloomy days of January as in the leafy month of June. The gardener, with his pruning-bill, only requires two days to keep them in order; they are as healthy now as they were when planted, 25 years ago. The hedges set out in the gardens or along the roads round Quebec have almost always succeeded.

Of this, a look at the hedges planted by Col. Rhodes, at Benmore; by Mr. Dobell, at Beauvoir; Mr. Beckett, at Marchmont, will convince any one, as will those planted at Clermont by our late regretted Lt.-Governor Caron; the cedar-hedges of the late Dr. James Douglas, at Beauport; those set out by the Hon. Louis Panet, at Caly-le-Castel, Rivière St Charles, and divers others.

Hedges are cheap and easily made; they add to the value of an estate, especially in the eyes of wealthy foreigners, who wish to take up their abode in the vicinity of towns.

J. L. LE MOINE,
A Former President of the Quebec Horticultural Society.

THE SILLERY FARMERS' CLUB

The Gardeners' and Farmers' Club of Sillery, organised under the zealous guidance of Robert Campbell, Esq., of "Kirk Ella," continues this winter its good work. Each fortnight, the members assemble at 8 p. m. at the Sillery School House to hear subjects discussed, to promote agriculture, horticulture and farming generally. A very useful and interesting paper was read at the fortnightly meeting held on the 30th ult. by the Rev. Mr Audet, Chaplain of the Sillery convent, on the ventilation of public and private buildings. The rev. gentleman, who has made ventilation a life-long study, was listened to with unflagging attention for more than an hour. Most useful information was given on the danger to health in imperfectly heated and ventilated tenements, the modern improved system

of heating and ventilating was discussed in its various aspects, how sewerage gas can be guarded against in private houses, how inexpensive shafts can be erected in stables, to remove the foul air and provide for the introduction of fresh, cold air, without affecting injuriously the normal temperature of the stable. Several of the proprietors of villas at Sillery were present, though many were prevented from attending by the inclemency of the weather.

A discussion was elicited by the various systems proposed by the learned lecturer, in which the Rev. Canon Von Iffland, Mr. Armitage Rhodes, Mr J. Lemoine, Mr. Robert Campbell and the gardeners, took a part. The meeting was ably presided over by Mr. P. Lowe, steward and head gardener at Cataraqui and a cordial vote of thanks tendered to the Revd. Abbé Audet, who consented to submit for publication by the Club his practical views on ventilation

J M LEMOINE

The Quebec Daily Telegraph.
2. Dec. 1893.

The Flock.

EXPERIMENTS WITH RAPE

A number of reports have come in from farmers to whom the 1 lb. samples of rape seed were sent from the NOR'-WEST FARMER office in June last. Only one man, Jacob Scott, senior, Brant, near Stonewall, Man., had enough rain at the start to give the seed a fair chance of success. He expresses himself as highly pleased with the result. He sowed the seed on summer fallow on July 4th and used the crop for pasture. After his stock had eaten it down he kept them off for a few days, when it was soon ready for use again. This was repeated five or six times and the crop is still (October 10) green. Mr. Scott says he intends sowing the whole of his next year's summer fallow of 30 acres, as he considers it will pay to pasture in the manner above described. One or two others, finding the drought so great as to spoil their chance of getting a fair test, held over their seed for another year. E. J. Bissicks, Cotham, sowed much too thick and in consequence the result was much inferior to what it should have been under fairer conditions. The rest report as follows: G. Allison, Burnbank, Man., sowed on middling heavy land, manured, once plowed, broadcasted by hand, well harrowed. It was eaten by sheep, in the end of August, and he says:—"I think there is nothing better for fattening sheep. I have had a few acres the last two years and eaten it off by sheep, which do exceedingly well, and manure the land at the same time producing a good seed bed."(1)

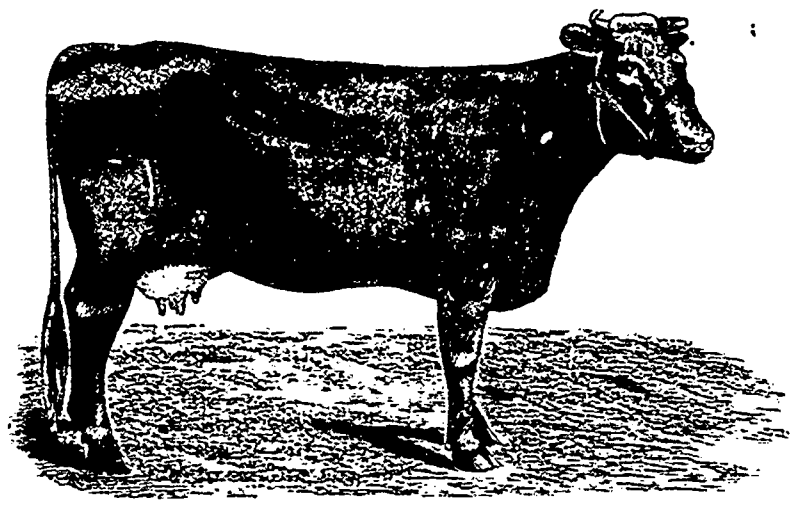
Thomas Wilson, Cotham, Assa., sowed on a black loam on a gravelly bottom, that had been plowed late in May, broadcasted June 19th, and rolled, hand hoed when the plants were small and thinned to about 14 inches apart. Size of plot, 40 x 88 yards. A few transplanted yielded well, the thinnings given to pigs, and latterly to three milch cows, on to October 20, but for cows he prefers ox cabbage. He thinks it first rate for sheep but would sow earlier, say 1st week in June, as fall frost injures it easily.

Henry Smith, Russell, Man., sowed a plot of rich black loam 230 x 20 yds. broadcasted, with a few black oats mixed in. The oats did poorly, owing to dry weather, but the rape was an extra good crop, and given mainly to cattle intended for exhibition at local show, which ate it greedily when let in for half an hour at night after a day's ranging on the prairie. He has seen a good deal grown in England, but never a better crop than this.

Mrs. E. Hembroff, Russell, Man., sowed 15 x 5 rods by hand in the end of June on a piece of garden ground meant for summer fallow. It grew well till the drought of August and hot winds nearly killed it. It did better later on, and was fed to pigs, calves, cows and sheep, which all ate it greedily. She thinks if seed can be had reasonably and sown thin on summer fallow, to be eaten off in fall, it would be a capital thing.

John Correll, Carberry, Man., found it very difficult to grow. The drought was severe and kept it back, and when it did get up, his fowls ate up every leaf they could get at. A little of it grown in a garden did much better, but it proved rather tender, as an early frost nipped it. (1) The stock were very fond of it, and in a wetter season it would be valuable as fall feed.

Nelson Bannister, Oak Lake suffered severely from the drought, but thinks highly of the rape if the season was at all right. He broadcasted on a sandy loam, rich though rather high, and put on a good coat of well rotted manure, (2) having it in good shape for seeding on June 21, but only sowed June 30, after a nice shower, putting in turnip seed alongside. He reports: "I rolled the seeds next morning and in four days the rape was up, but no sign of the turnips. We had nothing but hot winds afterwards, no more rain until July 15. All through the great heat the rape continued to grow a little, and never looked dry or shrivelled, always retaining a rich green color. No weeds grew, the heat was too much for them, neither did the turnips grow at all. I am sure if the rape seed had had the slightest chance it would have grown to a splendid crop. What little there was, the cattle would almost eat the ground to have the full benefit of it. I think there would be no surer method of obtaining a good wheat crop. Share plowing summer fallow in June, then harrow and roll, harrow again and sow with rape about the end of June, and then let the cattle on after the pastures begin to get bare. I am convinced, with



TYPE OF SHORT HORN COW ENGAGED IN THE DAIRY TEST AT THE WORLD'S COLUMBIAN EXPOSITION.—(*From Hoard's Dairyman.*)

The rape seed received from you in June last was sown on a part of my summer fallow, well harrowed and firmly pressed down by a rude implement of my own construction consisting of three planks spiked to cross beams and placed on the level so as not to drag the soil, but merely to press it down. We ride upon it. The seed was sown broadcast as my drill was out of order. I would prefer drilling. I have planted all my garden seeds for three years with field seed drill. I remove all the coulters but four and thus sow four rows at a time, mix the small seed with dry sand and fill the cups over the four coulters using judgment and common sense, and I have the best garden in this settlement. Sown in the middle of June it was a trifle late and it should be sown earlier to catch the early June rains. Yield good, the crop was fed to hogs which were given two rations a day of rape and one of boiled wheat, they seemed wonderfully fond of the rape, it was pulled up root and blade, aways thinning out the thickest and tallest as we went along. It was used in the latter part of August and first of September. I may mention that

(1) As we have mentioned many times, our rape, at Sorel, stood well up to December 7th.—ED

(2) A few bushel of bone-dust for rape and keep the dung for the meadows or roots.—ED.

(1) The pressure of the feet of the sheep conduces to the retention of a firm root-hold in the subsequent grain-crop.—ED.

may little experience, that cattle would fatten well on it. I intend to try a large piece next year."

Josiah Gatley, Austin, Man., writes: "It was grown on sandy soil in flat rows, 24 inches apart, sown by hand and twice hoed. Plot sown 50 by 13 yards Only three-quarters of a pound of seed was sown as the weather became so dry I reserved one-quarter of a pound to sow early next year to produce seed. The first lot was sown June 26, the second June 30, and the third July 8. First and second lots yielded well, reaching a height of 2 ft, 6 in. (1) and covering the ground completely. It was cut from September 2 to October 2 and fed daily to pigs and calves. The third sowing was a failure for want of rain. It seems to me to be just the crop to grow in those sections of country where the prairie grass dries up early, and the second growth would be good to plow under as a green manure. Thick or thin sowing does not make much difference in yield, but thick sowing keeps weeds down best, and I think it would be best for that purpose sown broadcast. (2) Pigs, calves and fowls eat it greedily.

Alexander McKay, Estevan, Assa, and Jas. Muir, Alcester, Man., were both severe sufferers from drought and of course the rape was a comparative failure but did much better than turnips under the same conditions.

And. McCloy, Fairlight, Man., writes: "cattle, horses and even the fowls were all fond of it Every farmer who raises pigs should grow rape, just try a pound at first and you will be pleased to find how much all your stock enjoy the rape patch. I have again ploughed the rape ground, which is now in splendid condition for growing wheat next season.

S. T. Kellaway, Killarney:—The land on which the seed was sown is a deep black loam, lying rather low being part of this year's summer-fallow. It received a light dressing of well rotted barnyard manure, about 20 loads an acre, was then plowed to the depth of five inches and immediately harrowed down fine. The seed was sown broadcast and the land rolled. The plot was 20 rods long and four wide, running north and south. The seed was sown on June 29 and as there was a fine shower of rain the next day it had a very good start. But as we had no rain from that date until after the middle of August, with several days of very hot wind, it did not make a very good growth for some time, but afterwards reached the height of 18 inches. During the last week of September I turned the cattle into it and found they were fond of it. In fact they would hardly leave the ground after they had it all eaten. And if a solid seed bed counts anything in growing wheat I shall have a big yield off the rape ground. I am satisfied it will do well here in an ordinary summer and would be a great help to cattle if fed about harvest time when the pastures are getting bare and before they can run on the stubble. I shall sow it two or three weeks earlier next season and put in drills as by sowing it broadcast there is no chance to keep weeds down except by hand cultivation and that is too slow for this country. (1) I think THE FARMER should advise its readers where to get seed true to name as there has been some difficulty in obtaining it in past."

Jas. McCowan, Summerberry, Ass., writes: "I tried it on a quarter acre of heavy dark loam that was in wheat last season. I plowed it deep, harrowed it well, and sowed broadcast on June 13th. It got a good shower on the 15th. I believe every seed grew, as there came up plants enough for a whole acre; it grew very fast however. At one month from the time of seeding, I commenced to thin out sufficient plants each day to feed ten hogs their mid-day meal. Towards the latter end of July we had very hot weather and scorching hot winds that brought the growth to a standstill about the first or second week in August, so that the crop might be considered middling. I believe it is a first-class feed for hogs. Shortly after commencing to feed on the rape, they appeared to thrive better, their skins got smooth and glossy and I believe they got as much feed from the small plot of rape as they would have done from 20 bushels of wheat. I think it would have done much better sown in rows or drills. As I summered fallowed the land on either side of the rape plot, going over it a few times with the harrow, I found that the plants on the outside of the plot continued to grow and flourish after the others had come to a stand still. The only way I could account for it was the cultivation. On pulling these plants, I found they had roots about three feet long and as thick as my thumb. I intend to try it on a larger scale next year."

E. K. Smith Maskawata, sowed broadcast one-quarter of an acre. Owing to excessive drought it did poorly. He says:—"Had I sown the seed

(1) We have short partridges in it, on the East-hills in Kent, when the rape was certainly 3 feet 6 inches high.—ED.

(2) Quite right.—ED.

(1) If 6 lbs an acre are sown broadcast, the weeds have no chance.—ED.

in drills and kept it cleaned, I believe it would have been a good deal better, as pigweed grew among it and kept it back. However, owing to the very dry weather we had this summer, nothing could grow and do well, some of our grain was so short we could not cut it with binders. I believe rape will make a first class feed for cattle, pigs or sheep late in fall. I have fed it to the two former and they both eat it greedily. I will never sow broadcast again, no matter how clean the land may be, as like turnips it pays to keep land stirred up around it."

BUILDING A MUTTON FLOCK.

There can be no better sheep for a foundation flock for the average farmer than the common ewes of the country with a portion of Merino blood. Such sheep are blocky, have good constitutions, are very healthy, are fully adapted to country and climate, and may be kept in much larger flocks than most imported stock. The man in any part of the country where there is a good demand for mutton who wishes to make most money in sheep growing will keep a flock af these ewes, annually cutting out the older and poorer, and supplying their places by fresh additions. Then, on these use a ram of some of the mutton breeds, so as constanty to raise cross-bred lambs to be put into market as early lambs, or kept to feed the succeeding winter, selling them when coming one year old.

My reasons for this course are these: There is an almost unlimited demand for this class of mutton, and this demand is growing faster than the supply. The crossing of bloods always results in progeny superior in vitality, quick growth, and get-there-ativeness to either of the breeds selected for the cross. One great reason why this Yankee nation excels all others is because it is so thoroughly cross-bred.

The choice of a breed for the ram depends entirely upon what is desired by the flock master. If early lambs are sought, then, as I have so often said, no breed equals the Dorset Horned. No other will get so many lambs, get them so early, or put them into market in such fine condition at so young an age. If lambs are sought, to be carried over winter, to be fed and sold when coming one year old, then I know of nothing equal to the Hampshire. They are larger than Dorsets, and their lambs will be larger at one year old and, with good feed, will be in prime condition. A study of the fat sheep shows of this country and English will show the correctness of this statement, as crosses with Hampshire blood on one side, usually the sire's, always carry off the prizes for yearlings (lambs? Ed.).

Uniformity is a quality greatly desired in all market products, and in nothing more so than in lambs. Both these breeds named stamp their get very uniformly. They are both very old breeds, well and long established, and indelibly mark their offspring. The same is true of the South Down, but this breed is of too slow growth for this purpose, and its head is so short and thick between the ears as to make it very dangerous to use the males on common ewes, too much loss occurs in lambing.

My objection to the Shrophire for this purpose is that the breed is entirely too new, and the lambs will have legs and faces of all shades of color and "ringed, streaked, and speckled, and spotted." Even Shropshire breeders know that in their thoroughbred (?) flocks they must be continually weeding out those lambs which breed back to one of the foundation types.

(Right. Ed.)

As to the building up of a grade flock, I have had little experience. A few ewes which we have crossed a second time, using thoroughbred rams, have not given us such results as would encourage us to continue. I surely would not advise this course. Why try to establish a grade flock when the ultimate result would be to come very near to the thoroughbred type? When the American farmer has reached the point where he is willing to bestow the care and attention, and give the feed requisite to succeed in this, why not take some of the established breeds and try to improve them?

If the breeder be young and wish to experiment, it is well, and in that case he should make the cross, select the ewes of this cross most nearly to his fancy and on them use a ram of the breed first used, and from the lambs of this cross endeaver to select and breed so as to build up a new breed. But this opens up a subject so large that space will not permit me to follow it. Suffice it to say that for averrge mortals the continual raising of cross-bred lambs from the common Merino ewes of the country will give greater satisfaction and certainly more money.

J. S. Woodward.

AN ENGLISH SWEEPSAKES DAIRY SHORT HORN COW.

The Dairy.

THE GENERAL-PURPOSE COW.

Eds. Country Gentleman—Some men are deterred from buying fine cattle because they want the finest or none. They see the finest (or at least those having the highest reputation) selling for a great deal of money; therefore they wait a while longer. It is not every man who should buy a high priced cow with a long pedigree and a big milk and butter record, even though he has money and wishes to invest in that way. It is only those who have the time, skill, patience and taste to attend to these costly pets who should buy them. The man who is full of other work should only buy the cow that is useful for all the things for which a cow is made, and buy her at a moderate price.

I am not depreciating those phenomenal yields where cows, through much skill of herdsman and long training, have been made to milk 100 lb. per day, or those whose milk per day has made four or more pounds of butter. It is interesting from a scientific standpoint, showing the possibility of the cow—I will not say *extreme* possibillity, for we cannot fix a limit to the quantity of milk and butter a cow can be made to yield. I say in some degree, for it must not be supposed that if a cow is pushed to an anormal yield of dairy product, her heifer calf can also be pushed there. In the natural yield there is more hereditary quality.

I would say that a practical man who has other things to attend to beside cows would wish a cow, or even a herd, that would yield in the flush of flow about six gallons of good milk, from which could be made 1½ lb. of butter per day. This would taper down to two gallons, six or seven weeks before calving, from which time it is best to dry the cow and give her a little rest. This is best for the calf, and makes the cow give more and richer milk after calving than she would without the rest. This good average cow that I am writing about, with good average attention, would yield 10,000 lb. of milk per year, and though this looks small when compared with three times that quantity, still the practical man would rather have the smaller milker at the smaller price. There is much less danger of milk fever, spoiled udder and garget. This cow will pay for her food and in a very reasonable time will pay her cost; but if she dies before she does it, her owner will not have sent a round sum into a cow's grave.

I am writing for such readers as want help to support their families, and I say that money invested in a good all-round cow will give more profit for her cost than the same sum invested in any other way. The practical man does not wish to invest a large sum, for he does not expect to be a fancy breeder. He does not wish to buy a *pedigree* unless he also gets a *cow* that has intrinsic merit, nor a cow whose family has been specialited to yield a very large quantity of very poor milk: nor one that has been bred to give milk rich in one quality to the neglect of others, as well as to quantity. As he expects to convert his male calves, barren and old cows into beef, he would be glad for his cattle to be good beef stock, but not so good that a cow with a calf two months old would fatten herself instead of increasing her milk when her feed was increased. He does not expect to get one cow that has all the best qualities of all other cows. He simply expects to get a good cow with a good average of all those qualities for which cattle were made. He does not care what may be the color of her hair, for he knows that has no more to do with her dairy products than has the color of any other cow. He does not care in what book her pedigree may be recorded, for he expects to feed her on something more substantial than genealogy.

As much as specialists may argue against the phrase, there is such an animal as a "general-purpose cow," and when the practical man finds, he will buy her and carry her home, and she will be to him a pearl of great price.

Milch cows want plenty to eat and water twice every day; after, the cow wants rest—that is better for the cow and for the milk and butter. The cow should not be salted periodically, once or twice a week, and I would not recommend mixing salt with the food, as you are likely to put in more than is needed. The better way is to put the salt were the cow can get it when she wants it. Regularity with the cow in every department of the dairy is necessary. Let no dogs run after the cow, or otherwise abuse, excite and ill-treat her. Such a course will invariably result in loss of butter fat. The dogs make many cows lame, and plenty of cows lose their calves with the dogs. Treat her kindly, and she will repay you with interest.

Cleanliness is an important factor in the dairy. There is nothing so susceptible to odors as milk. Have everything in the barns extra clean; that is just as good as good feeding. It is a good plan to tie the cow's tail while in stable to a hook fastened overhead in such a way that when she lies down, the brush is held up from the dirt, but when standing, the tail is in its natural position. Let your most faithful man attend to the feeding. Brush and card the cows daily — sickness is often avoided in this way. Kindness to animals costs nothing, and they appreciate and pay for good treatment.

A. H. Janssen.

Maples Stock Farm, N. Y.

MEETING OF THE DAIRYMEN ASSOCIATION OF ST-HYACINTHE.

WEDNESDAY'S PROCEEDINGS.

The second day of the Convention of the dairymen of the province opened with a splendid attendance under the presidency of Mr. S. A. Fisher, M. P., vice-president of the Association during the momentary absence of the president. Rev. Abbé Montminy.

The morning was spent in listening to one of finest lectures that farmers and dairymen could have heard, it was delivered by Professor Robertson, and was on the subject of "Dairy Farms."

The professor exhibited to his audience charts of different animals and told them that although he did not intend to favor any breed in particular, still he felt bound to speak of the animal that best serves man. "I wish to give some points that are necessary in a cow, so that she may make a good return for all she eats, and, besides, that she may give a profit. This constitution by which is meant the good health and good work of the cow, and not the pedigree, is valuable in that animal. For that she must have good breathing powers, with good heart power. This is known by a flexible skin. A cow to give a profit must consume bulky and cheap food. *Any cow can give good milk if fed on rich food, but the question is to get rich milk from cheap food.* (1) The ribs should be wide apart, and the pouch should be large.

(1) The italics are ours.—Ed.

A wide muzzle between the nostrils shows the good feeder, and this, consequently,

BENOTES GOOD HEALTD.

When the extremity of the nostril is covered with dew, the cow is in good health, for the skin inside and outside is the same, and if, on the nostril, it is covered with dew, it shows that she assimilate and digest her food. A cow with bright eyes indicates her good staying power, for it is part of the nervous system, and if they are so she will give good milk. To keep the cow in health the one crying need in the Province of Quebec is good stables and juicy feed; when the feed inside is juicy and succulent the outside skin shows it. Grain is not needed; but farmers should grow carrots, mangels, corn and straw. Give the animal a comfortable dry, warm, light and ventilated, but not necessarily large and elegant, stable. Another important consideration is pure water. A cow gives 87 parts of milk and the rest is water (sometimes farmers adulterate this percentage); so, if the water is impure, so will the milk be. Cows of 1000 lbs. or 1200 lbs, should get one quarter pound of salt daily, so that the milk may be rich The animal turns the blood contained in the udder into milk of which the fat is the principal constituent. There are two parts in the udder—the blood in the glands is slightly changed and afterwards drawn from the teats as milk. In the udder are found cells, at the extremity of which are globules of fat, which are seen in the milk, and which come to the top, for they are lighter than milk. Abuse reduces these globules. The process of butter making is to get these globules together in a mass, which is called butter. The process of cheese making is to take the caseine (or curd) and retain the globules of fat through the cheese. There should be 110 lbs. of butter for 100 lbs of milk fat.

THE MILK OF A COW FRESH CALVED

improves the milk of others. Therefore, to give a good flavor to the butter, the number of cows fresh calved should be increased in the province. Cleanliness is a fact which cannot be sufficiently impressed on the farmers.

The Professor complained of the way the butter had to be shipped to the World's Columbian Exibition, which tended to make it worse, whereas the cheese improved under conditions that deteriorated butter. American butter had everything to favor it in winning prizes; but under the circumstances the Professor was satisfied.

Wooden pails he said prevented the milk from remaining sweet. The Dairy Industry requires moral and physical cleanliness. France and England know that the Canadians are clean, and therefore these markets are open to us. Professor Robertson thought that a winter dairy ought to be added to all farms and thus increase the revenues for a period of six more months. "Siloes can be built by the farmer himself. Let him put up studs or strong poles about sixteen feet square, lined with lumber, the bottoms and corners made strong and fast This would keep corn, beans and sunflowers as well as any pit, lined with brick and cement. Remember that the object is not to improve corn, but to preserve it The mixture of corn, beans and sunflowers makes a succulent feed, full of oil, and it gives good milk." The speaker believed that it would be the better system to pay for milk according to quality, and he felt convinced that this method would shortly be adopted all over the country.

During the afternoon session, the Rev. Abbé Montminy was present and presided. Professor Robertson and M. J. C. Chapais, Assistant Federal Commissioner, were named on motion of Mr. Ed. A. Barnard, Secretary of the Council of Agriculture, to compile and translate reports on the subject of the morning's session. Dr. J. C. Coulombe, of Maskinongé, advised all farmers to teach their young boys all the technicalities of the industry, and thus make them prosperous; for the best of advantages are offered them as regards education. A diary of the business of the farm and its products, which would be useful for future reference, should be kept. He advised the

CULTIVATION OF VEGETABLES

and the breaking of a piece of ground, which could be enlarged every year.

Mr. S. A Fisher, M P., then entered upon the question of weighing the cheese Complaints had been made as to shortage of weight and the difference existing on this point between the dealers and manufacturers. The Reverend M. Côté, of Shefford, thought that this unfortunate and unjust state of affairs was too prevalent, and he would have liked to see a Government inspector of scales named to remedy the defects.

M. J. A. Vaillancourt also spoke on the subject, and he believed that the shortage occurred in transit, for which it was unfair to make the dealer pay.

Some claimed that the lapse of time between weighings was the cause of the shrinkage.

All agreed that a uniform system of weights, and the appointment of a public officer to weigh goods, would settle the difficulty. A hanging balance was preferred to a platform scale.

Messrs. J. C. Chapais and Walker of Huntingdon, expressed their views also. Mr D. M. McPherson promised to bring the matter to the notice of the Board of Trade. A resolution was adopted to appoint a committee to adopt a uniform system of weights and to report before the adjournment of the convention. The committee named was: Messrs. W. H. Walker, Wm. Parent and A. Clement. The Rev. M. Chartier, of the College of St. Hyacinthe, moved that prizes be offered for the growth of green fodder.

Moved by the Abbé Gerin, that the Council of Agriculture be asked to foster that plan. Both motions were carried.

Dr. Grignon gave some good advice to young farmers, and Mr. D. M. McPherson read a scientific paper, treating of the reclaiming of waste lands, which proved of the greatest interest.

M. L. T. Brodeur was the last speaker of the afternoon session, and he interested the audience with his personal experience of ensilage.

The Rev. Abbé Choquet and Mr. S. A. Fisher, M. P., made a report on ensilage, and the meeting rose.

The Hon. M. Beaubien sent a telegram congratulating the Society and giving them some advice.

M. J. C. Chapais, representing the authorities at Ottawa, addressed the meeting on the invitation of the chairman.

He gave those present some very interesting details of his experience and counselled them in certain things.

M. Gigault also addressed the members in the place of Hon. M. Louis Beaubien, to whom he wished to bring particulars of the meeting.

The distribution of diplomas then followed.

Cheese—Mr. G. St. Pierre, who, with three others, succeeded in taking 99½ points at the Columbian Exhibition, was presented by his Lordship, with a first-class. "Very good" was accorded Messrs. A. MacFarlane, F. Paradis, J. A. Plamondon, E. Bourbeau. "Good" was accorded Messrs. J. W. Ross, G. W. Ferguson. N. E. Clement, L. A. Robillard. L. Gilbert, A. S. Lolyd, G. Boland C. E. Roy.

Butter—"Very good," C. Zetterman; "good" A. W. Kingston

The officers elected for the coming year are. Hon. pres., Hon P. B de la Bruère; hon. vice-pres., Mr. Maz. Bernatchez, M. P. P.; president, Rev. Abbé Montminy; vice president, Mr S. A Fisher, M. P.; sec.-treas. Mr. E Castel.

Directors. Messrs. H. S. Foster, G. Dumont. Derome, J. L. Lemoine, J. de L. Taché. D. O. Bourbeau, L. T. Brodeur, Rev. Abbé Gerin. T. C. Cartero, R. Ness, P. Veilleux, E. A. Barnard, F. Paradis, M. Monet, I. J. A. Marsan, J. C. Chapais, A. Chicoine, Frs Dion.

CLOSING SESSIONS OF THE ASSOCIATION AT ST HYACINTHE.

ST. HYACINTHE, December 7.—The twelth annual convention of the Dairymens' Association of the Province of Quebec was brought to a close this afternoon, and the dairymen are now on their way home well satisfied with the result of their deliberations.

The convention has been a harvest for the hotel keepers here, and all the hostelries were over crowded. To-day's session was the most interesting one of the convention. Next year, the convention is to be held at St. Joseph de Beauce.

The third meeting of the convention was held this morning, with the Rev. R Montminy in the chair. Before the adoption of the annual report, M. E. O. Dalaire, the agricultural lecturer of St. Rose district, spoke of the best methods of seeding and of using manure in such a manner as to derive most benefit and yet retain the ingredients of the soil as much as possible.

Then, the annual report was adopted unanimously. Following this, Henry Livingstone, of the St. Hyacinthe Dairy school, spoke of the loss of fatty matter of the milk used in the manufacture of Cheddar cheese.

This lecture created considerable discussion between Messrs. Barnard, Livingstone, Fiset, Macfarlane, Taché and Trudel and many inspectors of the province.

A proposition was moved by M. Trudel to have a committee appointed to discover whether good butter and cheese could be made from frozen milk.

It was decided to leave the matter to the school committee. Then the committee charged with the studying of the system of payment for milk by its richness submitted its report. The committee recommended very strongly that the report be circulated throughout the factories, and that the association make up a bulletin for the use of those interested and for the syndicates this winter, and that the inspectors should undertake next season to do a reasonable amount of testing for some of their factories. It was decided that these bulletins be distributed free.

At the opening of the closing session M. J. de L. Taché read a treatise on the treatment of milk to the end that the best methods might be adopted.

The use of the Babcock milk tester was advocated.

Mr. Barnard spoke of the best remedy to prevent milk from souring during thunderstorm, and also advocated that cows be sheltered while such storms were going on. La Mouche des Cornes, an annoying fly, was a menace, and the best means for its extinction must be sought.

Paul Côté said the question required great consideration, and it should be determined whether they fly really was injurious to cattle.

J. G. J. Henry, C. E., of the Ecole Centralide, Paris, and a former cheese dealer of France and Manitoba, spoke of the best methods and modern machinery for the manufacture of butter and cheese.

Mr. Fisher thought it was best that a committee be appointed to wait on the Cheese Board for the purpose of bringing about as universal system of weighing cheese as suggested by Mr McPherson on Wednesday. It was moved that Sydney Fisher, J. de L. Taché and L. T. Brodeur be appointed a committee to call both on the Cheese board and the Chambre de Commerce. This was unanimously adopted, and the following resolution was passed in this connection:—

Resolved that the Cheese and Butter association of the city of Montreal be requested to establish rules of practice stating definitely how the weighing of butter and cheese should be done, and how best to do away with the varying methods now in vogue; that the weighing of cheese and butter being done in Montreal for the purpose of checking factory weights is sufficiently large to warrant the appointment of a weigher.

The convention suggested that 10 per cent, of the boxes for cheese and 20 per cent. of the tubs for butter be also weighed and that the names of accredited public weighers be duly communicated to the association; that a committee consisting of Messrs. Fisher, Brodeur, and J. de L. Taché be appointed to meet the Cheese Board to have the above resolution carried out; that the cheese and butter trade of Montreal be requested to express a strong opinion in favor of continuing the present system of syndicates, which have proved an advantage to the trade throughout the province, and that a level beam should be adopted as standard and correct weight all fractions being left to the buyer.

It was proposed by M Taché that the question of the establishment of a legal standard of the minimum of fatty matter in milk to be used or bought by factories manufacturing cheese and butter be studied. This was carried.

The Household.

LITTLE PIGS IN BLANKETS

They make a delicious dish for entertainments, and are made as follows: Take nice breakfast bacon, trim off the rind and ragged edges, and slice as thin as possible. Be careful to keep the lean streaks whole, as they represent the borders on the blankets. Next, take large oysters and lay one the borderless end of each blanket; fold the border ends over the oysters, making both edges of the blankets meet, and pin together with wooden toothpicks. Broil in butter and serve hot.—*Farm and Fireside.*

CREAKING SHOES.

The creaking of soles, which is always such a nuisance—both to the wearer and to all others within hearing—may be cured by the application of linseed oil. A good plan is to turn a small quantity of the oil upon a dinner plate, and let the sole rest in it. The leather will absorb the oil

and, in addition to stopping the creaking, will make the leather proof against water. Another method of making soles water-proof is to slightly warm them, rub over with copal varnish and allow it to dry. This treatment, two or three times repeated, will be found thoroughly effective. — *Good Housekeeping.*

OUR DAILY BREAD.

"I solved the dry bread problem" said a friend the other day. "When at the fair, I saw some wooden plates or bread boards among the Swiss carved wood in the manufacturers' building, and, remembering a hint given by Aunt Lucy some time ago, I brought one. We use it every meal. The bread (part of a loaf) is laid on it uncut, and covered with a napkin. It is cut at the table as wanted and passed on the board on which it is cut, which is quite ornamental with its carved border. We like the custom much, and have not had one inch of bread dry up or thrown away since we adopted this way." — *Do.*

TAKING OFF GLOVES

As there is a right way and many wrong ways to put on gloves, there is also a right way to take them off. They should never be drawn off by the finger tips, unless they are old and very loose. Taking them off in that way soon stretches the ends of the fingers so that they can never afterward be made to give a pleasing fit. Instead, take the glove by the wrist, and draw it gently back over the hand till the second joint of the fingers is reached. It can then be drawn off by the fingertips, without damage. When it is thus taken off, the very best way to treat it is to leave the fingers distended, just as they came from the hand; when it is next wanted, it will fit the hand much more easily, and look better, than if it were smoothed and flattened back into the form of a new glove.— *Do.*

PUTTING ON GLOVES.

If a glove is of the right size and cut, much of its subsequent tractibility depend upon the way it is first put on. It should be perfectly adjusted to the hand, with every seam straight and true, each finger pushed down to its proper place, and the whole fitted smoothly and carefully. This will require a little time, but it will be minutes well invested, for the glove entering upon its usefulness in this way will ever after be found ready to the hand, flexible when flexibility is required, and in every way pleasing. Of course if the glove is not of the proper shape and cut for the hand, it can never be made to fit well, and all the time spent in the effort will be wasted No attempt should be made to button the glove till the hand is perfectly fitted; then begin at the bottom and proceed gently — do nothing with gloves in a hurry. A dress glove for visiting or evening wear should fit closely and perfectly; but at all other times those which have more room inside should be employed. For walking, driving, and other service where protection of the hands is the object in wearing gloves, they should be sufficiently large to give the hand entire freedom, and allow it to be used with vigor, if necessary, without danger of rupturing the covering.—*Do.*

THE CARE OF APPLES.

There is no question about the importance of so far as possible preventing the bruising of the fruit. It may be safely assumed that germs of decay are lurking about everywhere, ready to come in contact with any substances. A bruise or cut in the skin is therefore even worse than a rough place caused by a scab fungus, as a lodgement provided by the minute spores of various sorts. If the juice exudes, it at once furnishes the choicest of condition for molds to grow. An apple bruised in the fruit for the decay of which germs are specially invited, and when such a specimen is placed in the midst of other fruit it soon becomes a point of infection for its neighbors on all sides. Seldom is a fully rotten apple found in a bin without several others near by it being more or less affected. A rotten apple is not its brother's keeper.

The surrounding conditions favor or retard the growth of the decay fungi. If the temperature is near freezing, they are comparatively inactive, but when the room is warm and moist the fruit cannot be expected to keep well. Cold storage naturally checks the decay. The ideal apple has no fungous defacements and no bruises. If it could be placed in a dry, cool room, free from fungous germs, it ought to keep indefinitely until chemical change ruins it as an article of food.— *Vermont Watchman.*

HOW TO PREPARE CAMPHORATED OIL.

Put 3 ounces of gum camphor cut in pieces into a bottle and add a pint of sweet oil. Put the bottle in a pan of hot water on the stove, raising it from the bottom of the pan by setting it on nails or keys. Leave until the camphor is dissolved; then shake well.

HOW TO REDUCE IN WEIGHT.

A young English girl afflicted with an undesirable amount of adipose tissue has succeeded in ridding herself of a large amount of it without injuring her health by following the regimen given below. She began by getting up at 6 o'clock every morning and taking a three mile walk before breakfast without considering the weather. At 9 o'clock she had a large cup of coffee, with very little sugar, and a slice of dry bread. Then she occupied herself as she liked until 2 o'clock, when more bread and some vegetables composed her meal. At 4.30 she was off for another long walk, followed by a cup of tea and a few dry biscuits. Ninety days of this regimen reduced her weight from 185 to 145 pounds. —*Do.*

HOW TO MAKE BUCKWHEAT CAKES.

The old fashioned rule for buckwheat cakes is undoubtedly the best, and it calls for 4 cupfuls of buckwheat, a small cupful of Indian meal, an even table-spoonful of salt. (1) a half cake of compressed yeast, 2 cupfuls of water and 2 cupfuls of milk, mixed together and added when lukewarm. These cakes must be mixed up over night and left to rise till morning. In the morning they should have risen and fallen back. This condition of the batter may be told by inspecting the sides of the dish, where the mark to which the batter has risen will be found.

This would not be a desirable state of things in the case of any other batter, as it would indicate that it was sour, but the slight acidity which would exist in a properly raised buckwheat batter if it were not corrected by soda is completely done away with when an even teaspoonful of soda stirred in half a cupful of lukewarm milk is put in the morning just before the cakes are baked. When the soda is added, the cakes should foam up like yeast.—*Do.*

(1) The *table*-spoon in all New-England recipes is evidently the English *dessert*-spoon. —Ed.

HOW TO CLEAN MIRRORS.

Wash them off with a chamois skin wrung out of clean water. They will dry brilliantly and need no polishing. This is the easiest way to wash glass in doors or windows also.—*Do.*

HOW TO PREVENT A COLD.

Do not allow yourself to feel "chilly." It may indicate a circumstance or physical condition, either of which can be modified by prompt attention. If you are chilly from a draft, move away from it, stop it out or put on more clothes. If the coldness arises from a physical condition, you are probably taking cold. Heat a brick and sit with your feet upon it until you are heated through.— *Do.*

HOW TO MAKE A LIBRARY ATTRACTIVE.

A good cartridge paper, in a soft, light olive, a clear gray blue or gray, is one of the best medium priced coverings that can be selected for a library wall. Red—which is ideal as an evening color, and also for its daytime warmth—can only be safely used in a very sunny or a well lighted room. Otherwise it absorbs too much light. Certain shades of old red and old pink have not, however, that drawback. The dull colored tapestry papers with much blue and green make a quaintly effective background in a library, but they, too, require a bright room. If a library is little used as a daytime workshop and is well lighted in the evening, any color that is not too delicate may be chosen. —*Do.*

HOW TO CLEAN GLOVES, RIBBONS AND LACES.

A popular preparation for cleaning such articles is a mixture of a dram sulphuric ether a dram chloroform, 2 drams alcohol and a quart deodorized benzine. Pour the fluid into bowl and wash the articles, rubbing them gently. Rinse in a fresh supply, then pull them carefully into shape and hang them in a current of air for a short time. — *Do.*

HOW TO MAKE CRULLERS.

One and one-half teacupfuls of sugar, half a teacupful of sour milk, one-third of a teacup of butter, an egg well beaten a small teaspoonful of soda dissolved in hot water, flour enough to roll out into a stiff paste. Fry in hot lard. — *Do.*

HOW TO CLEAR THE VOICE FOR SINGING.

Gargle with borax water or let a small pinch of the borax melt gradually in the mouth and then swallow it. — *Do.*

ROSE LEAF jam is a common dish in Roumania, where roses are grown by the million.— *Do.*

FIRST-RATE TABLE BOARD.

Brown Stew: Wash a thick piece of beef, with little bone and some fat, put in the pot and cover with boiling water. Cover tightly and boil gently 3 hours. As the water boils away add just enough to keep it from burning. When you put in the water for the last time add a teaspoonful of salt. When near serving time allow all the water to boil away, the fat will keep it from burning and the meat will brown nicely. Turn three times. Place on a platter and make a nice gravy by pouring a cup of boiling water into the pot. Thicken with cornstarch and pour the gravy around the meat on the platter.

Raised Bread: Four quarts of flour, half a cup of sugar, 2 tablespoonfuls of salt, $\frac{3}{4}$ of a cake of compressed yeast or $\frac{1}{2}$ a cup of home-made yeast. Add equal parts of milk and water to make a stiff dough. Knead well, cover and set it in a warm place. In the morning butter tins and mold into loaves. Always have a nice tin of rolls the morning you bake.

Meat Balls: Three cupfuls of fine chopped cold meat, 1 cup of bread crumbs, a little fine chopped onion, a little gravy or melted butter to moisten the crumbs, season, form into balls and fry.

Chicken-pie: Cut into pieces one good sized chicken. Boil, in enough water to cover, until tender, adding a tablespoonful of salt when nearly done. Take the chicken out and thicken the liquid with one tablespoonful of flour and butter rubbed together. Season, boil 5 minutes. Take 1 quart of flour, two teaspoonful of baking powder, a little salt and a small cup of butter. Mix as for biscuit. Take half, roll one-quarter inch thick and line a deep dish, leaving an inch over the sides to turn up over top crust. Put in the chicken, pour the gravy over it, cover with a crust, leaving a hole in the centre for the steam to escape. Wet the edges and fold over the under crust; press them together.

Snowball Pudding: One quart of milk, 1 tablespoonful of cornstarch, yolks of 4 eggs, 3 tablespoonfuls of sugar, lemon flavoring, 4 tablespoonfuls of powdered sugar. Boil the milk and thicken with the cornstarch; add the sugar and the eggs well beaten; pour into a pudding dish and brown it in the oven. Beat the whites of the eggs to a stiff froth, add the powdered sugar, flavor with lemon, and drop on the browned pudding in balls as large as a walnut, set in the oven and brown a little. To be eaten cold.

Baked Custards: One quart of fresh milk, 5 eggs well beaten, 5 tablespoonfuls sugar, a little nutmeg and a little salt. Mix well, pour into custard cups. Fill a large deep meat (or milk) pan half full of hot water and set the cups in it in the oven Bake until when you put the handle of a teaspoon down in the center of a cup it comes up clean and not milky. If baked in the morning they will be cold for supper and they are very nice.

Omelet: Six eggs, a little salt, 3 table spoonfuls of milk, 1 of butter. Separate the eggs and beat very light. add the salt and milk, have the pan very hot, put in the butter and pour in the eggs. Shake on the hotest part of the stove till the eggs begin to thicken, then place in the oven to set, run a knife between the sides of the omelet and the pan, fold and serve on a hot dish.

IT MAY HELP YOU TO KNOW.

That a heated knife will cut hot bread as smoothly as if it were cold.

That in washing black or delicate tinted goods it is always a good plan to put a little salt in the last water.

The best thing with which to wash windows is alcohol and water (1)

That when anything has been spilled on the stove the easiest way to do away with smoke and smell is to sprinkle the spot with salt.

Farm and Home.

Poultry-Yard.

SOMETHING MORE ABOUT CHICKENS FOR MARKET—THE HOUDAN AS A FOWL FOR THE TABLE—THE WHITE PLYMOUTH ROCK AND WHITE WYANDOTTE—SUMMARY OF REMARKS AS TO TABLE FOWLS.

(By A. G. Gilbert, Manager Poultry Department, Central Experimental farm, Ottawa.

An esteemed correspondent takes exception to my recommending old hens. as better than chickens, and says he would rather somebody else should eat them. Both of us may be correct. He has a perfect *right to gratify* his liking for chickens, by buying nothing else, and my efforts are directed in urging upon the farmers to bring chickens of eight pounds per pair, rather than half that weight, to market. And I thought I had made it clear that the farmer should either kill for home use, or sell, his hens over two years of age. And those who buy the hens, at less cost than the chickens, will find them very good eating if properly cooked. And there is some difference in hens of two and a half years, as compared with those of five years. The latter will be much more difficult to boil tender.

AGREED ON THE DORKING.

But my correspondent agrees with me in recommending the *Dorking* to the farmer as a table fowl and prefers the coloured. But until the Dorkings are bred in greater numbers by the farmers, they will be comparatively scarce. As it is they are in the hands of only a few breeders, who hold them at a high price. In England—where first class poultry must be put on the market to find purchasers—the coloured Dorking is the barn-yard fowl It is not to be understood from this that only Dorkings are to be purchased in English markets, for an immense quantity of poultry and eggs, is imported annually from France. From the latter country comes the Houdan, the layer of a large white egg and an excellent table fowl. Indeed, a recent poultry paper of the United States claims a higher rating for it, as a table fowl, than the Plymouth Rock, but says that the prejudice against it is on account of the dark coloured legs. (1) And doubtless the statement is correct. A chicken or fowl with yellow legs is preferred in our market, but the preference is not so strong as it is in the United States The Houdan flesh is white and of very superior flavour and there is plenty of it on the plump breast and body. As compared with the Plymouth Rocks the chickens do not show quite so much gain per month, but there is not very much difference, and the breed deserves to take high rank as a market fowl. The remark made in the case of the Dorkings applies to the Houdans, viz: that for one Houdan in the country a dozen or more Plymouth Rocks will be found And the moral to the farmer is the same. As a layer I have not found the Houdan so good as the Plymouth Rocks, in confinement The Houdan is a great forager and likes range, when it can be had And the farmer would find the Houdan chicks fall easy prey to hawks on account of the large crest on their heads (2)

THE WHITE PLYMOUTH ROCK AND WHITE WYANDOTTE.

Of late years the White Plymouth Rock and White Wyandotte have forced themselves to the fore on account of their genuine merits. The White Plymouth Rock is a sport from the barred variety There are poultry fanciers, however, who contend that it is the result of skilful and careful mating. The same may be said of the White Wyandotte. No doubt skilful mating and breeding have done much to develop new varieties, but I doubt if any two more useful varieties have been developed of late than the two we are now discussing. The flesh development of the White Plymouth Rock is just as great, if not slightly more so, than the barred and it is preferred for a market chicken on account of the "pin" feathers not showing so darkly, after plucking, as in the case of the last named variety. Much the same may be said of the White Wyandotte as compared with the Silver laced and Golden varieties. It will be seen from the foregoing and from the contents of last letter, that there are breeds in plenty for the farmer to choose from, but, as before remarked it might be as well for him to take hold of a breed that is most easily obtained in the country. As the poultry interests of the country are developed, and the large markets call for superior quality of flesh and size of fowl, the farmer or breeder will surely make efforts to secure the fowl that will fill his purse, and his customers stomach, to their mutual satisfaction: it is only a matter of time.

A SUMMARY OF REMARKS ON BREEDING.

The following summary of the discussion of the breeds mentioned as making good market fowls and good layers, may be more easily remembered.

PLYMOUTH ROCKS, BARRED.—Good layers under two and a half years. After that should be killed. Cockerels make rapid growth and are hardy as chicks.

PLYMOUTH ROCKS, WHITE—Possess all the good qualities of the barred, with a preference for the cockerels, as a market fowl, on account of pin feathers not showing so darkly.

COLOURED DORKINGS. — Medium layers as pullets and fowls. Cockerels make a grand table fowl on account of quantity and quality of flesh carried on long square body. Cannot say much about their hardiness as they are being tried for first time by me.

COLOURED DORKING AND PLYMOUTH ROCK CROSS.—Recommended as perhaps easier to make, than to procure all Dorkings. Also recommended as improving the quality of—and quantity of flesh of the Plymouth Rock cockerels, and making a better layer of the female cross than the original Dorking. The cross should also meet any objections as to lack of hardiness on the Dorking side.

WHITE WYANDOTTES —Embracing all the good qualities of the Silver Laced variety, with the advantages as a market fowl, claimed for the White Plymouth Rock cockerels.

HOUDANS —A superior table fowl. The females are layers of a large white egg, when permitted free range. The chickens grow well and are hardy. The large crest on the head is apt on a farm to make them an easy prey to hawks.

My letter is already too long and further discussion of this interesting and important subject must be left to another opportunity.

(1) And *tag-locks* as the distillers, call the fusel oil refuse, is still better.—ED.

(1) In England, fowls for *boiling* must must have white legs. Fancy white sauce and dark legs! For roasting, the colours of the eggs is immaterial.—ED.

(2) In 1874 or '75, we lost, out of 245 chickens, 220: some by hawks, a great many by foxes, and lots by rats. This was at St. Hugues.—ED.

A POULTRY COMMISSIONER FOR CANADA.

(From the Poultry Review, Toronto.)

Such has been the success that has attended the appointment of a Dairy Commissioner that it is now in order to ask if the appointment of a Commissioner to look after the extensive poultry interests of the country would not be followed by equally good results. Such a step on the part of the Dominion or Provincial Governments would meet with the hearty approval of the farmers and poultry fanciers of the Dominion. A bulletin, recently issued by the Finance Department states that Canadian poultry and eggs of superior quality and which arrived in excellent condition, realised the very highest prices in the London market. The same authority tells us that a Canadian dealer recently made a shipment of turkeys to the Liverpool market which arrived in such good form that the shipper realised a handsome profit, and expresses himself confident beyond all doubt that an UNLIMITED, STEADY and PROFITABLE trade can be done with England in Canadian Poultry. The faults found with some of the shipments were small size of the eggs and bad packing, which resulted in low figures as compared with prices received for shipments of a superior article well packed. The aim of the Canadian shipper should be to procure the best, and that of the farmer to produce the choicest poultry and largest eggs.

Now, a practical Poultry Commissioner would find among the farmers a great and undeveloped field to work in. His duties might take shape as follows:—

He should meet the farmers at every possible point, such as Institute Meetings, County and Township Fairs. Blue Books, containing elaborate reports, may be sent out in great numbers but they are read by comparatively few.

He should be able to tell them which breeds of fowls lay the largest eggs with the view of keeping none but such

He should instruct them how to house and treat such breeds so as to obtain the greatest possible number of eggs.

To tell them which breeds make the best market chickens in the shortest time.

Whether it is best or not to use artificial incubation in producing such chickens.

To instruct the farmers in the most approved method of dressing their poultry for market.

He should give exhibitions of dressed poultry at different points, so that the farmers, their wives and daughters may take lesson.

He should be able to give instruction as to the best method of packing poultry so as to arrive at point of sale in the very best condition.

He should make experimental shipment of choice eggs and poultry, so as to ascertain the highest price attainable for a superior article.

In fact, he could work up, throughout the Dominion, a large and paying branch of agriculture hitherto neglected by the farmers.

The Central Experimental Station at Ottawa has an extensive poultry department and an experienced officer at its head and he should be the man to reach the farmers in the manner briefly outlined. The appointment of the gentleman named, or one equally experienced, would be an auspicious beginning for a new Minister and an earnest of his intent to further the interests of the farmers of the country.

A DAIRY SHORTHORN COW

The engraving on this page is a portrait of the sweepstakes Shorthorn cow at the London Dairy Show in October, a red five-year-old called Tulip, property of Mr. C. Birdsey, Southcott Farm, Leighton Buzzard, "her breeder being unknown"—so says the Mark-Lane Express, from which we copy the picture. How an animal whose breeder is unknown can possibly be proved to be eligible for competitor in a class for thoroughbreds, may puzzle Americans to understand. (1) However. Tulip appears to be a very good dairy cow, whatever her breeding. "Her average milk-yield during the days of trial was 28 for the morning meal and 26 3 for the afternoon, which was very rich in cream, the percentages standing at 5.39 and 6.06. Her percentages of total solids were also large, being 16.62 and 14.98."

Country Gentleman.

(1) Tulip is a *Dairy* Shorthorn, and not a *pedigreed*, i., e, herd-book animal, at all.—ED.

Ensilage.

HOW TO BUILD A SILO

E. M. S., *Orangeville*, Ont.—Q.—Would you kindly tell us in an early number of the Montreal 'Witness' where to get information how to build a silo? It was in a number of the 'Witness' some time ago, but now that we want to build one we cannot find the article. Ans—If full and minute directions are desired, apply to Professor Robertson, Dominion Dairy Commissioner, for his bulletin on the subject, which gives the details very particularly. If only general hints are desired they may be gathered from the following brief condensation: The first point of importance is size. This can be estimated pretty closely

by allowing one cubic foot of settled silage for each animal every day. For ten animals there should be not less than 1,800 cubic feet of silage, and as the silage should be 20 to 24 feet deep, we may expect 18 feet in depth of silage after settling. A pit 10 feet square, or 9x12 feet, and 20 to 24 feet deep, would be about right for 10 animals. As the number of animals increases, enlarge the silo until a pit 10 x 20, or say 15 feet square, is reached. Instead of building a single pit larger than this, it is generally considered advisable to build two or more pits. A silo should have a good stone or brick foundation sufficiently high above ground to admit of what filling in may be necessary to secure good drainage from the building. To prevent rats from burrowing under the wall and getting into the silo, there should be a shelf of concrete about ten inches below the surface, extending out about a foot from the wall. It is a good plan to anchor bolts in the foundation, to come up through the sills and hold them firmly in place. Two thicknesses of two-inch joists are usually employed for sills, breaking or lapping joints on corners. For small silos 2 x 8 joists are used for studding, which are set 12 to 16 inches from centres, and back from the inner face of the wall, according as single or double lining is used on the inside of the silo. Cut no mortices in the sill, but in lieu of this nail on an inch strip to the sill, six inches from the inner edge. Notch the studs to fit and spike them down At a convenient place place omit one stud for a doorway into the silo. Cover the outside first with any cheap lumber, then with building paper (tar-board) and over all such siding as you may prefer. Line the inside with best quality narrow flooring, using tar or paint in the joints, or with two thicknessess of cheaper lumber, with building paper between them. Paint the inside with a mixture of coal-tar and gasoline, three parts of the former to one of the latter, or as may be necessary to make the mixture flow readily from the brush. Use no heat, and light no match within 'forty rods' of the gasoline, or the mixture, or inside the silo, until the gas has all passed away. Rip a piece of 4 x 4 or 6 x 6 cornerwise, and nail securely in the corners. Use movable boards, cut to proper length to fill in the doorway, two thicknesses with paper between. In other words and in short, make an air-tight pit. Fill the bottom with clay 4 to 6 inches deep, or with water-lime concrete. When the silo is 20 feet or more in depth it is considered well to fill in, say, 10 feet, and put a covering of boards (they need not be close together), then fill in 10 feet more, put on another covering, and so on. The object of this is to prevent the mass of silage from pressing outward to the injury of the building. A thin layer of whole corn-stalks, laid butts outwards all round the edges of the silo, would answer the same purpose as the boards and may be put in every four or five feet.

The Farm.

MANGEL CROPS IN EAST CORNWALL.

THE *Western Morning News* (October 30th, 1893) states that, at the invitation of Mr Edward Trood (E. Trood and Co., Saltash), about a score of prominent agriculturists, representing Devon and Cornwall, made an inspection on Saturday of some mangel crops at Linkinhorne, grown from seed supplied by Messrs. Trood, and for which there has been a competition for this firm's valuable awards. Mr. Trood said their object in promoting a competition for mangels was to show the way to grow the greatest quantity, combined with good quality, in the least space of ground. Mangels would take more out of the land than anything, and therefore it should be more heavily dressed. Having referred to the many prizes which Mr. Wm. Henwood had won for roots, Mr. Trood said a medium-size root would produce better quality, big roots very often being a failure. A field of big roots was not worth so much as a crop of good average size roots throughout the field. He also tendered some good advise about planting roots close together. The company then proceeded to inspect the mangels on Mr. Henwood's and Mr. E. Kittow's farms. The two crops inspected were generally pronounced to be of wonderfully fine cultivation, and regret was felt that the want of daylight prevented the two other competitor's farms being visited. Upon re-assembling at Mr. Henwood's farm, and instructive and profitable discussion took place on the astonishing result seen that day. The company unanimously endorsed the opinion of the judges, and agreed that Mr. Henwood's mangels averaged about 96 tons 11 cwt. to the statute acre. One member computed that this tonnage represented about 40,320 mangels to the acre.

A BOON TO THE FARMER.

THE NEW TARIFF BILL WILL BENEFIT CANADIAN BARLEY RAISERS.

The United States new tariff bill was freely discussed on Chicago to-day. The general opinion was that it would benefit Canada if passed. Barley is the cereal that it would benefit most, and no doubt it would prove a boon to the Canadian farmer, especially in Ontario the home of barley. Before the McKinley bill was made law Canada raised between twenty and thirty millions of bushels of barley a year, but recently the production had dropped to about four million bushels, and even at that the market was glutted, for now it is selling at less than one cent a pound, the cheapest grain on the market. Montreal grain men shipped some to England but it was too light for that market, and would not sell at figures that would pay the producer. The United States was the only market for Canadian barley but thirty cents a bushel tax was more than the American could pay, so he was compelled to look to his own country for the cereal. But American barley is inferior to the Canadian article, and although the American farmer tried hard, he could not produce anything that would come up to the standard. Under the new bill Canadian barley will be admitted to the United States at a twelve cents rate, about the same as it was before the passage of the McKinley bill. There should now be as much barley produced in Canada as there ever was,' said a grain man to-day.—*Star.*

SIR JOHN LAWES ON THE WHEAT CROP.

We publish to day Sir JOHN LAWES's report on the wheat crop of 1893, which, as was to be expected, is one of the most unfavourable that he has ever given. The average yield of his selected plots proved to be only 21½ measured bushels per acre, equivalent to 22½ bushels of 60 lb., as compared with and average of 29½ bushels of 60 lb. for the ten previous years. It will be noticed that the weight per struck bushel is nearly 63 lb. or more than 2 lb. above the average for the ten years ending with 1892. The yield of the unmanured plot was 3 bushels an acre less the average for the ten years preceding 1893, and this shows how unfavourable the season was for wheat. But wheat ground continuously on a plot not manured for forty-one years is produced under exceptional conditions, and a better idea of the deficiency is afforded by comparing the 20½ bushels given by the plots dressed with different mixtures of artificial manure with the average of 37 bushels for the preceding ten years. Here we have a deficiency of no less than 17 bushels an acre. On the other hand, the yield of the farmyard manure plot was 31¼ bushels an acre, or only a bushel under the ten years' average. It will be seen, then, that the season was peculiarly unfavourable to artificial manures, no doubt because the drought prevented them from acting. Sir JOHN LAWES attributes the deficiency in the yield of his plots, taken together, to the breaking of the plants from their lower roots by the raising effect of a rapid thaw succeeding a severe frost in the spring; the mischief thus done being increased by the drought, which prevented the plants from sending down fresh roots into the soil. It is probable, however, that the drought by itself was sufficient to account for the deficiency, and it will be seen that the farmyard manure plot did well, because the soil was full of accumulated fertilising matter in a condition ready for assimilation by plants, while its mechanical condition, owing to the abundance of decayed vegetable matter in it, was such as to enable it to defy drought to a great extent. Again, good crops of wheat have been produced in the North of England, where the drought was occasionally broken by rain. Moreover, spring corn, sown after the severe frosts of March, was even more seriously affected by drought than wheat. Sir JOHN LAWES hopes that the average yield of the kingdom will be better than the average of his plots, and certainly no one has ventured to predict an average as low as 22½ bushels. We shall soon learn what the official reckoning is, and until that is forthcoming very little confidence can be felt in estimates, the variations of yield in different parts of the country being quite exceptional.

Agricultural Education.

CAMBRIDGE AND COUNTIES AGRICULTURAL EDUCATION.

The first year's course of scientific instruction in subjects bearing upon agriculture ended in June, ten students having attended.

The instruction is in the following subjects:—

Agriculture; Chemistry—Elementary and Agricultural; Physics; Botany—Elementary and Agricultural; Physiology; Geology; Economic Entomology; Book-keeping, Mensuration and Surveying; Agricultural Engineering.

Opportunities are offered for the study of Veterinary Science, and may be for that of Agricultural Law.

Certain professors and teachers in the University admit to their lectures, and to practical instruction in their laboratories, students, not members of the University, under the following conditions:—

That the students are not under seventeen years of age. That the students give satisfactory evidence that they have received a sufficient previous education to enable them to take advantage of the proposed instruction.

That from outside sources an annual contribution be provided towards the stipends of teachers, and other necessary expenses.

In aid of the above objects the Cambridgeshire county Council voted £300 for the preliminary expenses, and £100 a year for the subsequent working of the scheme. Other County Councils have voted money for it as follows:—

Isle of Ely,	£100 a year.
Huntingdonshire,	50 "
West Suffolk,	50 "
Norfolk,	55 "
Northamptonshire,	50 "
Leicestershire,	50 "
Essex,	100 "
East Suffolk,	50 "

In addition to the above a grant of £100 has been made by the Board of Agriculture towards the expenses of the present financial year.

Besides the above-mentioned subsidies for the payment of teachers and other working expenses, the County Councils have offered scholarships to promising young men desiring to take the course, as follows:

Cambridgeshire, various scholarships, up to £30 a year.

Huntingdonshire, number and amount not decided at present.

Northamptonshire, two of £25 a year.

Leicestershire, four of £30 a year.

Norfolk, twenty of £50, some tenable at Cambridge.

Essex, number not decided, of £50 a year.

East Suffolk, two of £25 a year.

Students should commence their studies in the Michaelmas term, which begins on October 12th.

The course will extend over two years, and consist of two parts:—

1. Elementary Science, principally, to be taken in the first year. Chemistry, Physics, Botany, Geology, Mensuration, and Surveying.

2. Special applications of Science to Agriculture, to be taken in the second year. Agricultural Chemistry; Agriculture with field lectures; Physiology; Geology; Botany; Vegetable Pests; Economic Entomology; Engineering; Book keeping; Agricultural Law; and Veterinary Science.

The course of instruction may be reckoned to occupy about half of each year, and those intending to become farmers will have the other half in which to learn the practice of farming.

It is estimated that any student for the whole course will have to pay, the first year £19 19s., and the second £18 18s., in fees; and that for board and lodging the cost will be—if the student desires to be economical—from £6 to £8 a term; so that the necessary expense will be from £38 to £ 4 per annum for the whole course.

Students from non-contributing counties will have to pay double fees.

It is known that some gentlemen in the neighbourhood of Cambridge will give the students the privilege of walking over and inspecting their

farms, and that they will try some experiments for their own and the students' benefit. Permission has been obtained for the students to examine and study the experiments conducted at the farm at Woburn by the Royal Agricultural Society of England, and at the experiment stations of the West Suffolk County Council.

A common room has been secured for the students, and a library of standard works and geological maps, &c, is being formed for their use.

It is hoped that, in a short time, the University will sanction an examination in connection with the course, and that it will grant a diploma to successful candidates.

The students are under general supervision and control, securing good conduct and regular attendance at the lectures.

The Hon. Secretary of the Executive Committee is Mr. Henry Robinson, M. A., 113, Chesterton Road, Cambridge.

Swine.

IMPORTANCE OF PASTURE FOR SWINE.

Pasture is the key to profitable pork making. Saying this implies no disparagement or belittling of any others of the various essential items entering into the rearing and maturing of swine. It is the green stuff, raised with little cultivation and harvested in the seasons of dew and warm sunshine by the pigs themselves, which, in connection with other appropriate eatables and drinkables, comes nearest to giving the farmer what a large share of humanity covets, viz., something for nothing. It is a strong statement to make in the face of conditions as they exist, but no less true, that no man is rightly equipped for hog raising who has not arrangements whereby the growing animals can have the range of ground where there is grass, clover or other succulent herbage.

Other methods of keep may be, and too frequently are, substituted for this but they are artificial and expensive, if not more or less unhealthful, while this is natural, inexpensive and confessedly healthful. A weak point in a great deal of the general farming is giving too great a proportion of time and attention to the corn field and the increasing of its acreage, when if greater effort was made in the direction of having more ground seeded to a variety of the best grasses, more and better pork would be made with less outlay. Men of scientific attainments who have been in a position to make careful tests along these lines have invariably reached the same conclusion as the more observant farmers and feeders, to the effect that corn, however cheap, is by no means the cheapest material for meat making.

As applied to pork making, writes F D. Coburn to an exchange, a fair average of their experiments is seen in the following table. The estimate of six tons as the product (green) of an acre of clover is quite low, as with anything like a favorable season and fair stand the crop would weigh more. Alfalfa and its capacity for pork production, is not represented in the table, but it is well known that of all green food for hogs, alfalfa is the best. It will also produce twice or three times the amount of green food to the acre that is credited to clover, the production of dry hay not unfrequently amounting to six tons. The table is on the basis of four pounds of grain or fifteen pounds of green clover making a pound of pork, and probably most of us would consider the former a little high—not higher than has been reached, but higher than the average of us go:

	Gross product per acre—lbs.	Pork per acre—lbs.	Value at 1c. lb.
Wheat	900	225	$ 9 00
Barley	1,680	420	16 80
Oats	1 320	320	13 20
Corn	2 240	560	22 40
Peas	1,500	375	15 00
Green clover	12,000	800	32 00

If this is approximately true in practice, it is evident that an acre of clover is worth for pork making as much as one and one-half acre of good oats, or three and one-half acres of average wheat. The comparative expense of producing these can be seen by a blind man.

No argument is made here in favor of summering shoats on grass exclusively, they need grain to go with the grass, and grass to go with their grain; something less heating and concentrated than corn alone, and less bulky and less watery than grass. Nature asserts in many ways that a single food, whatever it may be, is not sufficient to best sustain the beasts of the fields or birds of the air, and it generally turns out that the man who persists in opposition to this idea gets worsted. Those who have not fenced pastures for hogs to range in, can, during the summer, supply them with green food such as alfalfa, clover, green corn, peas, etc., cut and hauled, with almost as good results, but the labor is greatly increased."

Southern Cultivator.

SWINE NOTES.

Cleanliness in the pig pen is especially desirable in hot weather.

Hogs prefer running water as much as any other kind of live stock.

If you want to fit them for market at eight or ten months, fine boned swine must be selected.

Young pigs should be taught to eat as soon as possible and given all the skim milk they will take

With a little grain and grass, hogs can be made ready at any time to meet the demand for lean meat.

The more comfortable you keep feeding hogs the more flesh they will put on, for a given amount of food.

If the falling apples are picked up by the pigs, many of the destructive insects of the orchard will be destroyed.

You can get some idea of the value of wheat for hogs by the way your stock thrives when turned into the wheat stubble.

A good way to experiment in pig feeding is to divide a good sized litter into a few lots, and then see what different rations will do for each. This may be a little trouble, but some good ideas may be obtained.

If you would have the boar the most serviceable and his litters of pigs strong and hearty, give him a good bran and oat ration, and a few roots and other green stuff. Nor should he be kept in too close confinement.

It is best to breed sows young, seven or eight months old, although the first litter is not likely to equal the one she would have at twelve or fifteen months. But the improved breeds at a year old are apt to take on too much fat, and there is more danger of sows killing their young at the latter period. (1) *Do*

(1) Worth attending to.—ED.

IMPROVED METHODS IN SWINE BREEDING.

FRED. GRUNDY, ILLINOIS.

A few years ago, many Western farmers considered it the best practice—in fact, almost absolutely necessary—to have all pigs farrowed in the early spring, and a great many of them still cling to that idea, though the high price of the past year have done much toward working a change. The shrewdest breeders, however, were quick to see that, with the improved methods of summer curing and packing adopted by the great slaughtering establishments, came in a new era in swine breeding and feeding, and they changed their tactics accordingly. Instead of breeding for spring pigs, as formerly, they began to breed for pigs almost any month in the year when they wanted the pigs. It mattered little to them what the season might be if they decided that they needed the pigs.

One of the best farmers and feeders I know, breeds his sows so as to have two or three litters of pigs farrowed every month, and he has done so for several years. (1) As a result of this practice, the recent high prices found him well supplied with pigs, and he made money. His neighbors poked fun at his methods for some time, but not they are adopting them. He has his sheds and pens, which are not extensive, so arranged that he can provide the best of quarters for his breeding sows at any time of the year, and he aims to so manage as to be able to turn off a lot of fat porkers every month. If the price is very low, he can hold them over a month without loss. Instead of a large annual crop of hogs, with attendant risks, he prefers a small monthly crop, with almost no risk. The fact that he has made money quite rapidly since he adopted this method of breeding and feeding is proof that it is both safe and profitable.

In cold weather, his farrowing sows have separate, small pens, warm and dry, and are supplied with such a variety of food that they never miss the "scented clover fields," usually considered so essential to successful swine breeding, and his loss of pigs is so small as not to be taken into account. In the hot days in summer the sows have the run of a clover lot, with cool shade and an abundance of pure water, and they bring forth great litters of fine, strong pigs, with scarcely any attention whatever. These progressive breeders have learned that certain conditions are essential to success. At the time of farrowing, be it winter or summer, a sow requires a quiet, secluded place in which to bring forth her young, and this she must have for the best results. And for some time previous to, and also after farrowing, no corn should be given her, because it is both heating and constipating, and these are two conditions especially to be avoided. In winter, oats, wheat, bran, potatoes, beets, pumpkins, artichokes, or other juicy food, constitute the principal part of her food, and in summer, clover. There will be no constipation, no fever, no cannibalism. At this period it is variety, not quantity, that a sow craves, and such a variety as is most beneficial is not expensive. The loss of a litter of pigs is almost invariably attributed to "bad luck," whereas bad management under unhealthy conditions, is the cause.

(1) Of course his sows and pigs are kept in a warm place.

There is as much success with pigs farrowed in autumn and winter as in spring and summer, and it is no more trouble to raise them. Of one fact every farmer may rest assured, and that is that autumn and winter pigs cannot be successfully raised in open, muddy yards and exposed to all sorts of weather. The humped-up, dirty, stunted runts we see in the yards of *slipshod farmers are proof of this.* Warm dry quarters, good care, and a variety of food, are the factors of success in this business, and if a man is not willing to provide these, he should not raise pigs. The short crop of hogs last year, and the consequent high prices of pork, are ample proof of the folly of following the old methods of breedings sows for a spring crop of pigs, exclusively. Methods of marketing and slaughtering hogs, and curing pork, are changing constantly, and the farmer must be progressive, must keep his eyes open and himself thoroughly informed, and be prompt to meet every change.

American Agriculturist.

The Grazier and Breeder.

CATTLE EXPORT.

THE YEAR'S TRANSACTIONS REVIEWED.

The "Lake Ontario," of the Beaver Steamship Line, sailed on Wednesday for Liverpool. This was the last sailing of any of the large passenger steamers from this port. Besides closing the passenger traffic, *the 'Lake Ontario' took* the last consignment of Canadian cattle.

The live stock export trade has been a disastrous one to the cattle shippers, many of whom have already gone under in consequence. There has been a heavy falling off all round. The failure of crops in Great Britain forced the British farmers to put their stock on the market just at the time that the best class of our cattle were going forward This resulted in a reduction of prices and a consequent loss to shippers from America. The embargo which put a stop to the stocker trade is also responsible for the season's failure. It was not possible under this regulation to send over any lean cattle to be fed, or to send any fat cattle to be held for good prices. Our cattle, like those from the United States had to be slaughtered at the port of debarkation. The result of this system was a loss of *several hundred thousand dollars both* to the Canadian shippers and the British farmer.

The falling off in the export of sheep has been much more marked than the cattle. This is owing to the large quantity of frozen mutton from Australia, which is being offered in the British markets. The following figures show the differences in the shipments for the last four seasons. It will be noticed that there has been a steady decline.

	Cattle.	Sheep.
1890	123,136	43,372
1891	109,150	32,042
1892	98,731	15,932
1893	83,322	3,743

There has also been a decline in the shipment of horses and hogs, and of the latter what were sent across were shipped at a loss.

The great importance of the live stock trade may be understood when it is stated that $6,312,572 were turned over in the business this year. Of this amount $5,414,760 was paid to the

farmers for their cattle, $230,000 went to the railway companies for transportation, and the stock yards received $41,650. Over $50,000 was paid for attendance to 3,389 men shipped during the season. There was disbursed for feed $125,100, most of which went into the pockets of the Quebec farmers. The cost of labor for putting up stalls, etc., reached the sum of $145,782, while the steamship companies received nearly one million dollars. Messrs. Pope and Morgan, inspectors of live stock, have every reason to congratulate themselves on the result of their work. Of the 83,322 head shippped, only 141 where lost, and of these 57 were washed overboard from the "Scicilia" during a hurricane. In 1892, the losses numbered 601. In the number of boats and number of cattle carried, the Reford lines head the list. The Allans come next, with the Beaver and Dominion taking third and fourth places.

Witness.

SHORTHORN CATTLE OF TO-DAY.

A leading English writer remarks that Shorthorns never showed their superiority more than during times of agricultural depression However low the prices of pure bred cattle may be at any time, the Shorthorns always maintain their relative place among breeds. There is another fact which proves, with still more emphasis, the substantial and inherent worth of the Shorthorns. It is that they have saved themselves from their friends. They have passed through "various manias" and "booms," not only without unfavorable reaction, but they stand higher in excellence as a breed, to-day, than ever before. There was a "color craze," which brought dark reds to the front as favorites, while other characteristic Shorthorn colors were neglected This mania was chiefly local to the United States. There was also a "Duchess craze" which pervaded the Shorthorn world, and culminated in the sale of the New-York Mills herd, some twenty years ago, where a cow was sold for $40 000 and a heifer for $27,000, simply because they were of the Duchess strain.

Meantime, Amos Cruickshank of Sittyton, Scotland, went on building up a herd of Shorthorns, which have upset many of the old theories. In selecting foundation stock for his herd, Cruickshank was influenced by clear, hard-headed Scottish sense. If a Shorthorn bull or cow was pure-bred and possessed the qualities desired, he did not ask whether it was of any fancy strain. The result was a herd which was one of the most notable in Shorthorn history. Representatives of the Sittyton herd not only won the prizes in British exhibitions, but were sent to the United States, to South Africa, in fact, throughout the "Greater Britain," which extends round the world.

In building up his Shorthorn herd, Amos Cruickshank "builded better than he knew." He not only advanced the standard of Shorthorn excellence, but by the silent influence of his example he dispelled a great deal of nonsense regarding Shorthorn strains and color. Breeders have learned to look less for pedigree and more for individual excellence. In no part of the world has this advance been more marked than in the United States American Shorthorns have always stood in the front ranks, and many choice bulls and heifers have been purchased at long prices by British breeders, and carried back to the original habitat of the breed. .. the new movement forward toward higher excellence, American breeders have kept fully abreast of their brother breeders in Great Britain. An evidence of this is shown in the Shorthorn bull, Abbottsburn. He is owned by Col. T. S. Moberley, of Richmond, Kentucky, and weighs 3000 pounds. At Chicago the animal was awarded the first prize for three years old or over, and the herd, at the head of which he stands, won the second herd prize. Abbotsburn, is not a shapeless mountain of flesh and bone, but shapely and symmetrical, possessing the desirable points all over.

Bee-Keeping.

THEFTS.

BY MONS. E. PÉLOQUIN.

An experienced bee-master soon perceives when his hives are being robbed. The bees fly about all round, searching out all the corners and cracks of the hive. When the robbing is on an extensive scale, a general bumming is heard, and the bees of all the hives are very much disposed to sting. The thieves leave their own hives at daybreak, and continue their work so late that they can hardly find the entrance to their abode. Some even pass the night in the hive they have been robbing. The clouds of thieves on arriving and departing can hardly be mistaken for honest workers, bearing with heavy flight their burden home These audacious robbers, when entering a hive resemble Pharaoh's lean kine; but, on leaving it, their heavy-laden bodies are more like those of alde men who, having dined at the expense of the rate-payers, have stuffed themselves as full as they can hold with all sorts of good things.

When the robber-bees have once become masters of a colony, every attempt to put a stop to their ravages, whether by closing the hive or carrying it to another place, is frequently, if care be not taken, more injurious than leaving them to finish their job. The air will soon be filled with various bees, which, excited by their defeat, will attack with blind desperation the neighbouring colonies

Under such circumstances, the strongest lot of hives is often overpowered, and thousands of bees perish in these bloody contests.

SECOND PART.

It will often happen that the pillaged hive is deprived of its queen, or that she is found to be unwell. One of the best means of stopping the robbery, when the colony attacked is worthy of being saved, is to transfer the plundered hive to the place of the plunderer's hive, or the reverse. The robber colony can generally be discriminated by powdering the robbers with flour as they leave the plundered hive, and studying the direction of their flight. Another way is to observe what colonies are in active work after the others are quiet, especially after sunset. Still, this method is not practicable when the pillaged colony does not belong to the same person as the other, or when several colonies join in the theft; though, the transposition of place of the strong robber-colonies and the robbed ones, a change that should always be made in the evening, and the stopping up of the entrances of the whole of the hives, commonly produce good results. The old robbers, astonished by the change, accepting as their hom the, hive they were in the habit of plundering, since they were used to find it in the place they carried the honey to, defend it as energetically, as they used previously to attack it.

THIRD PART.

If the bee-master is desirous of warning the bees against seem dishonest conduct, he must take the greatest care, in these operations, not to leave combs or honey in any place where the bees can find them; for as soon as they have tasted the stolen honey. they will flutter about the operator when they see him opening a hive, and pounce down into it, to seize the treasures laid bare to their view.

In times of scarcity, food should only be given to the bees at night fall, and it should always be put into the hive upon the combs.

The feeding of bees in the day-time gives rise to pillage in two ways: it excites the fed-bees and induces them to leave the hive in search of more, and the scent of the food attracts the bees from the other hives. Hence, result warfare and hostilities. Above all things the bee-master should keep his hives well populated.

When the nectar begins to be scanty, the hive entrance should be reduced in size by pushing in the block.

If the hive contains more comb than the bees can fill, the number should be reduced by means of the division board.

It is especially the weak colonies that should be looked after with the greatest care in spring and autumn; for the stronger ones, being more able to retain heat on account of the number, leave the hive earlier, and soon find out the weaker ones who, unless their honey is well protected, are overpowered. When this advise is attended to, if some of the robbers manage to creep into a weak colony, they are almost certain to be found out and put to death. Even if some of them should succeed in forcing an entrance, they will be met by hundreds of defenders ready for battle, and find themselves in as an evil case as those who, deceived by misplaced confidence, have climbed the walls of a besieged fortress only to perish at the hands of their enraged opponents.

The cracks and holes of badly made hives should be temporarily daubed with clay, until there is an opportunity of transferring the bees into securer lodgings.

When hives are opened, the work ought to be done as quickly and carefully as possible; and, if a number of robber-bees show themselves during the work, it is a good plan, after closing the hive and contracting its entrance, to lay a handful of grass, the finer the better, on the board before the hole, leaving it there for an hour at least, or until the excitement is over. The guardians place themselves in this grass, and drive off the thieves with greater ease; the latter soon find out that there is but a poor chance of entering the hive, and give up the attempt. We have never had any trouble with the rubbers since we disconcerted them in this way.

When the plundered colony is a weak one, the pillage, even if begun, may be arrested by preventing the bees from entering the hive till the evening, when the bees of the other colonies have ceased from their depredations, at the same time allowing those bees that want to be off to go. and then closing the entrance until late enough the next morning for the bees to be on guard. By this means, the robbers will be tired of trying useless schemes of attack, and workers of the plundered colony will be ready to repel all assaults.

Should any of these plans prove ineffective a small comb of Italian bees, ready to hatch-out, may be placed in the weak hive, with the aforesaid precautions, and the colony put into the cellar for a few days. The newly born Italians will receive the enemy warmly, when the hive is replaced in its station, for they form a better garrison than the common bees.

When a honeycomb is broken in the hive, by an accident of any kind. it should be removed at once, and the honey-moistened board should be changed for a clean one; in fact, no honey should be left in any place where bees have a chance to get at it.

(To be continued.)

THE APIARY.

CONDUCTED BY MR. ALLAN PINGLE

SPRING FEEDING AND STIMULATION.

Bees are fed in the spring with one or both of two purposes in view. They are fed, when deficient in stores, to keep them up till they can help themselves in the gardens, orchards and fields, and they are fed with the object of stimulating the colony to increased brood-rearing. The latter has been practised extensively in the past among the best bee-keepers, but is now "going out," as it ought to do. Queens which require such artificial stimulation to do their duty are not worth keeping. With plenty of honey in the hive a good queen will breed up in the spring quite fast enough. It may happen, however through accident or neglect, that there will be a number of inferior queens on hand in the spring, in which case it is, of course, advisable to hurry her up by artificial means, otherwise her little family will not be strong enough to take full advantage of the honey flow when it arrives. But great care is necessary in feeding a weak colony in spring, whether for stimulation or to supply needed stores. The effort to save the colony may be means of ending it, if robbing is superinduced. Feed just before dark on warm evenings, and the food will then be disposed of during the night without any exposure to intruders. Another method of stimulation often resorted to (especially by the amateur) is what is called "spreading the brood." This practice should only be pursued in exceptional cases. There is great danger of "chilled brood" resulting. The novice ought never to "spread" brood at all till he gets experience and knows what's what. The spreading consist in taking outer frames and either shaving of the caps from the honey or abrading it so that it begins to run and placing them in the brood-nest each between two frames of brood. The brood-nest being thus enlarged and the heat diffused, there is danger of the brood being chilled and thus killed. When spreading is resorted to at all it ought to be done by the expert and experienced apiaris.

Instead of scraping the caps off both sides of the frame of honey you wish to insert in the brood nest, scrape but one side and place the frame, not in the middle or heart of the brood-nest, but on one side or the other of it, with the abraded surface next to the brood-

EXTRACTED HONEY.

A suberiber writes .—" I have a few colonies of bees in boxes hives, and would like to get some extracted honey from them this summer. Would you be kind enough to tell me through the ADVOCATE how to proceed ?"

It would certainly be a little difficult to get extracted honey from box hives. You might get "strained boney in the manner described in a previous issue of the ADVOCATE, but that does not appear to be what you want. Ye vant extracted *honey taken with th* honey extractor. This machine can only be used on hives with movable frames—that is, frames which may be removed from the hives without injury to bees or frames and returned. You must, therefore, transfer your bees from the old box hives to movable frame hives before you can use a honey extracter on them. There are several methods of accomplishing this, but as you appear to be a novice without experience in the modern arts of bee keeping, you had better adopt a simple and easy method, as follows. —Have your movable frame hives ready, and when your bees swarm put the new swarms in the new hives Then in 21 or 22 days after the first swarm from every hive issues, the *young bees all being hatched out by* that time, you can transfer bees and comb to a frame hive. Take the box hive containing the bees, invert it, place an empty box or hive the same size over it in natural position, closing up any openings where the hives meet, and then "drum" the bees out of the under into the upper hive: Take the latter with the bees and put it in a cool place bottom up having covered the bottom (now the top) with wire gauze or cheese cloth to confine them to the box or hive. Now take the old hive of comb, cut the latter out and fasten all that is fit in the empty frames of the new hive. If you have a honey extractor the honey had better better be extracted from the combs before you fastem them in the frames, or afterwards, as you may fine it, easier. Should you do it before you insert them you would need what is called a "comb basket," with perforated sides, in which to place the combs before placing them in the extractor.

Having transferred the combs, set your new hive on the stand of the old one, bring your box of bees out of the cellar or other place, and after opening the entrance of the new hive wide dump the bees down in front of it, and the work is done.

Farmers Advocate.

Manures.

MANURES FOR SPRING CROPS.

During the past week we have received three publications bearing upon the seasonable subject of manures for spring crops. The first of these is a report of manurial trials carried out for the County Council of Northumberland by Dr. SOMERVILLE, Professor of Agriculture at the Durham College of Science; the second is the report of the Experiments Committee of the Norfolk Chamber of Agriculture for 1892, and the third is a paper on "The Rational Use of Artificial Manures," by Dr. BERNARD DYER, read at the recent meeting of the Rochester Farmers' Club. The Northumberland experiment were apparently commenced last year, and were of a very comprehensive character. We pass over those relating to the manuring of grass land for hay, because they appear to have been carried out without any consideration as to the effect of the manures upon the character of the herbage, and we have recently referred to experiments of a similar kind which appear to have been conducted on a better system. (1) The results of the experiments with oats may also be left unnoticed, as Dr. SOMERVILLE states that they cannot be regarded as satisfactory, for reasons into which we need not enter. The most elaborate set of experiments was one carried out principally to test the relative values of the chief varieties of phosphatic manure, carried out at four different stations. We cannot help thinking that the object of this experiment would have been better fulfilled if each of the phosphatic manures had been tried by itself, as well as with other manures, whereas the only one tried alone was superphosphate. Dr. SOMERVILLE states, however, that every plot concerned in throwing light upon the main question received the same weight of nitrogen and potash, and an equivalent weight of phosphate of lime Therefore, he adds, it is sufficient in making comparisons to refer simply to the phosphatic manure without mentioning the others used with them. The phosphatic manure that, on the whole, gave the best results was vitrolised bones, which gave the largest yield five times out of eight, but the increase over the produce of the unmanured crop was obtained at the cost of 7s. 6d. per ton, whereas that obtained by the use of two other phosphatic manures was less. On one pair of plots 575 lb of vitriolised bones per acre were used. with ½ cwt. of nitrate of soda, 2 cwt. of kainit, and 44 lb. of blood meal. Against this dressing were tried 393 lb of basic slag on one pair of plots, and 539 lb. of superphosphate on another. In each case the same quantities of nitrate of soda and kainit were used as on the plots supplied with vitrolised bones; but with 225 lb. of blood meal instead of 44 lb. to make up for the nitrogen retained in the bones. Other quantities of superphosphate and slag were tried, but those just given proved the most economical. The cost per ton of increase in turnips was 5s. 11d in the case of the slag, and 7s. 1d. in that of the superphosphate. When the quantity of slag was increased to 500 lb. the cost of the increase appears to have been 6s. 3d. a ton. But the best results of all appear to have been obtained by mixing the phosphates; the cost of the increase when superphosphate and slag were mixed and given with the manures above mentioned being only 5s. 9d. a ton. The general conclusions drawn by Dr. SOMERVILLE from the experiments are: (1) That basic slag is the cheapest phosphatic manure; (2) that a mixture of slag and superphosphate is better than either alone; (3) that part of a turnip manure should consist of soluble phosphate; (4) that kainit, as a rule, may be profitably added at the rate of 2 cwt. an acre to a turnip manure; (5) that the addition of nitrate is absolutely necessary to obtain a full crop of turnips; (6) that superphosphate alone added to dung is not directly profitable when used in large doses, (7) that nitrogen in the quantities used was not a profitable addition to sixteen loads of farmyard manure, (8) that so far as the turnip crop is concerned artificial manures are more profitable than dung, (9) that small doses of artificial manure are always more directly profitable than large doses. With respect to what is stated about kainit, experience has proved that its profitableness depends entirely upon the soil to which it is applied, and that on heavy land in good condition it has seldom proved advantageous. (1) In an experiment with white turnips, in which different quantities of superphosphate were used, 3 cwt. per acre gave an increase of 3 tons 12 cwt. over the produce of the unmanured plot, whereas by doubling the quantity of superphosphate the extra produce was only 1 cwt. It is true that when the quantity was brought up to 9 cwt. the produce was 2 tons 4 cwt. more than when the smallest quantity was used; but this was not sufficient to render the additional manure decidedly profitable. An interesting trial as to the effect of sowing nitrate of soda for a turnip crop at different periods shows that the best result was got when half the nitrate was applied at the time of sowing, and the other half at the time of thinning.

The Norfolk experiments of last season included some carried out for the same object as the main one in the turnip experiments in Northumberland, namely, that of determining the relative values of different phosphatic manures. The trial was made with swedes. Taking the results all round, the report states, superphosphate has come out just equal to bone compound and dissolved bones, as phosphates can be bought cheaper per unit as superphosphate than in any of the bone preparations, it is once more concluded by the conductors of the experiments that superphosphate is the most profitable form in which phosphatic manure can be applied to swedes. The basic slag did better than in previous seasons, but not as well as superphosphate. Experiments to test the value of salt in relation to the barley crop gave uncertain results. as in the previous season. In one case, after mangels, the addition of 3 cwt. of salt per acre produced an increase of 10 bushels, but in some other cases the crop appears to have been reduced by the salt. The idea that salt stiffens the straw seems to have been quite exploded by these experiments, as, the crops on some of the salt plots were badly laid. The only general conclusion come to in relation to some experiments in the manuring of barley on heavy land is to the effect that this crop does not require any special addition of cinereal manures, those applied to the other crops in the ordinary course of rotation being sufficient for it. (2) On the other hand, it is largely benefited by the application of nitrate of soda or sulphate of ammonia; but in every case in which more than one cwt. of either was applied the crop went down more or less. Some other experiments carried out in Norfolk in relation to the different varieties of wheat and barley are chiefly interesting in relation to the district in which they were tried."

(1) Nitrogen for the grasses, phosphoric acid and potash for the clovers.—ED.

METHODS OF BUYING MANURES.

EDS. COUNTRY GENTLEMAN — As spring is approaching and farmers are looking forward to planting various crops, a few remarks on this subject may be of interest. *Manures vary so* much in their constituents, and farmers being compelled to have manure in some form in order to keep up the fertility of the soil, as well as to feed *the plants while growing, they should* look well into the methods of buying. The principal ingredients needed when we buy artificial manure are nitrogen, phosphoric acid and potash. Natural manure from stable and yard do not always contain all these ingredients in the right proportions for the use of plants, and are therefore sometimes termed *incomplete* manures. But these are very essential, not only for the chemical elements which they contain, but for the mechanical effect they have on the soil, which cannot be readily calculated in dollars and cents.

Some natural manures may contain only one or two of the essential elements of plant-food, but from their mechanical effect, supplying humus, making heavy soils more absorptive, and thus more retentive of moisture, as well as of the fertility already there, they may be of great value, independent of the plant food which they actually contain. It is therefore essential that we use in connection with these natural manures, some *complete* or manufactured *fertilliser containing* all the ingredients in right proportions for plant use. It is in buying these that the farmer should be most careful, for in no way can he be more imposed on by unscrupulous manufactures and agents. For we must bear in mind that the buying of manure is virtually the buying of one or more of the principal elements, viz., nitrogen, phosphoric acid and potash. The more concentrated the material which contains these, the less will be the cost per pound of the actual plant-food furnished. The farmer by buying a large bulk of material, does not gain anything unless it contains plant-food in proportion, but rather buys weight only, and pays for quantity at the expense of quality. In buying a fertilizer. it is *well to ascertain how much of* the different elements it contains, and we can then see how much we are paying for our different ingredients.

The best mode for all farmers to pursue is to buy chemicals in the wholesale markets in any of our large cities and mix them for themselves. Almost any farmer has the appliances for doing this and can mix in a heap on the barn floor, doing the work on rainy days or at any time the weather is unsuitable for working out-side, and really not feel the cost of mixing. The chemicals he should buy would of course depend on the ingredients he wished. To procure nitrogen, he should buy nitrate of soda which contains when pure about 16 pounds of actual nitrogen per hundred pounds, or sulphate of ammonia, containing 20 pounds of nitrogen per hundred, but not in as soluble a form as in the nitrate. Therefore, if he wished to make a fertiliser that was not *too* soluble, but would remain in the soil long enough for a slow-growing crop *to get full benefit of it, he would use* some of both of these. He could also use some dried blood of a high grade, which would furnish about 14 pounds per hundred, or by using ammonite of high grade he would probably get 12 pounds of nitrogen and also 3 pounds of phosphoric acid, but not in a very soluble form. To get phosphoric acid, he could use bone-black superphosphate, a refuse from the sugar refineries composed of ground bones after being treated with acid. This would furnish 16 pound phosphoric acid per hundred. Also South-Carolina rock found principally in that State, and to some extent in Florida, and treated with sulphuric acid, which would furnish about 12 pounds per hundred of actual phosphoric acid.

(To be continued.)

(2) *Cinereal*=ash.—ED.