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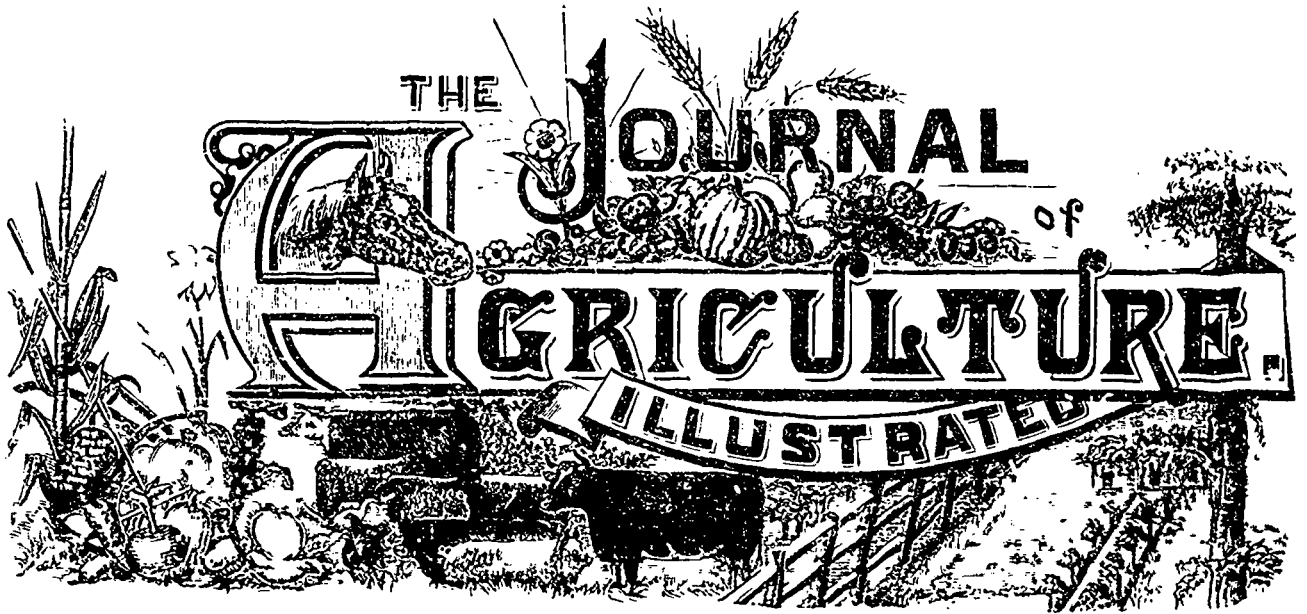
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Montreal Exhibition, 1884

(Continued.)

Every Montreal paper, the Gazette excepted, takes my view of the late Exhibition. If the present management of these most important meetings is to continue, I hope the members of the board will take warning by the past, and see that the people of the province are not to be trifled with. I know, of my own knowledge, that many hard things have been said as to the motives which guided the conduct of the council, and I can only trust that the accusations in question are unfounded. It cannot have been any intentional laches on the part of the very respectable committee that led to the complete failure of our Exhibition, but, probably, nothing more or less than inexperience, and, perhaps, in some measure, carelessness.

Holstein Cattle—The milk-cows of this breed are very striking in appearance. They are, doubtless, in some measure, the fore-runners of the Shorthorns; in truth, the Lon-

don dairyman's cow, the largest milk-producer with which I am acquainted, is, in all points except colour, a fac-simile of the Holstein, though better built in the hind quarters, and more suitable to the butcher's purpose after her dairy-duties are over. Still the Holsteins are fine roomy beasts, with good square udders, the teats well apart, and the fore-quarters and head as good as can be wished. The old bull, shown by Messrs Lord, Cook, and Son, of Aultsville, Ontario, was of gigantic height and bulk, and as full of faults as he could hold. He is, doubtless, a good specimen of the breed, but, if so, beauty is not a requisite. Mr. Pierce of Stanstead and the firm of Lord and Cook divided the prizes for this breed rather unequally: in the proportion of 5 to 1.

The Kyloes and Shetlanders of Mr. Whitfield demand little notice. Useful cattle in their particular localities, they are out of place in the province of Quebec, where, for many a long year, good milk-yielding cows, with a fair chance of making meat of the steers, must be the sort kept.

Canadian Cattle.—There were none! Poor M. Larocque, who offered through me a sum of \$80.00 to be given as prizes for this kind of stock, must feel grievously disappointed at the non-acceptance of his offer.

Sheep.—Allowing for the absence of Mr. Cochrane's Ox-fords and Shropshires, the sheep were well represented. A good many French Canadians usually distinguish themselves in this department—always in the long wool classes, I observe—and I doubt not, if they had the chance they would do equally well with their own breed of cattle. It is established, I think, beyond a doubt, that there is a race of cows tracing back to the original race imported from France into Canada, and the prices given by Americans for the picked specimens show the value they attach to them. It is childish to run the race down because there is no pedigree. Why, the Jerseys themselves were unpedigreed 30 years ago. No one can be more opposed than I to breeding from cross-bred male animals, but the Canadian bull is not a cross-bred at all, his almost unvarying colour alone proves it. I am not talking of the wretched little runts that run about from pillar to post at Sorel—they are scrubs and mongrels, if you like—but cows of the same stamp as La Major, as engraved in

the August number of the Journal, black, with brown muzzles, any number of which are to be seen in the neighbourhood of Joliette. (1) Of course they won't all give 5 gallons of milk a day, or any thing like it, but with care, good keep, and good training, they would make a most valuable race for the dairy.

There was a monstrous Cotswold ram which M. Casgrain was taking to be weighed; unfortunately I could not hear the result, as I was taken unwell and had to leave.

In the Southdown classes, Mr. Jackson, Abingdon, Ontario, had it all his own way, taking 17 prizes out of 18!!! I cannot conceive what guides the committee in offering such a lot of prizes for these sheep. They are in few hands; they don't pay to keep; and, anyhow, eight prizes would be plenty, as:

| | | |
|----------------------------------------------|-------|-------------|
| Ram two shears and over..... | | 1st and 2nd |
| Ram, shearing..... | | “ “ “ |
| Ewes, pen of three, two-shears and over..... | | “ “ “ |
| Ewes, “ “ “ shearing..... | | “ “ “ |

At last we have seen a genuine Hampshire-Down sheep in Montreal. Such a fine fellow, with Roman nose and all complete. He won 1st for old Downs (not Southdowns) Many must have remarked the bold, upstanding sheep among Mr. Beattie's Shropshires, without knowing what he really was. The shepherd, being interrogated, admitted the soft impeachment, but said that nobody was a bit the wiser. To my great delight, Mr. Featherston did not win all the prizes for Suffolk pigs this year, and the French Canadian farmers came out well in the Berkshires. In the Essex, of course, Mr. Featherston had no difficulty in taking every prize.

Poland Chinas I am not fond of. They fatten readily, but the lean meat is wanting. After all, what can beat the Berkshire for bacon and the Suffolks for roast pork? I have been treating four ordinary white pigs this summer with great care, to see what was the most economical way of rearing hogs. From the time the carrots were fit to thin out, their food has been vegetables and pease, and they have paid well, though pease have been scarce and, consequently, dear. I find the grand point to be: give them little water, and supply their thirst with the vegetables, or else they will refuse to eat enough of them. I gave a dollar a piece for the pigs in May, and as they have only eaten 9 bushels of pease = \$10.00, and weigh, as well as I can judge, about 15 stones, = 120 lbs., they have done well. They are very savage after sweet corn, eating cob and all with voracity. When slaughtered, I expect to find a fine mixture of fat and lean, and as I was accustomed in England to fatten from 120 to 140 pigs a year, I don't think I shall be disappointed.

Implements.—There were no new implements exposed except string-binders and manure-spreaders, both of which implements are approaching perfection. Mr. George Wilkinson's, of Aurora, Ont., ploughs were as good in construction as any non-wheeled ploughs can be. The cultivators, (2) want simplicity, and the grubber teeth are too perpendicular for work in weedy ground. Mr. Evans, of Montreal, had, as usual, a good show of nearly every thing a farmer can need.

The show of roots was, owing to the season, not nearly as good as I have seen at Mile-End, the Long Red Mangels, however, of Mr. O'Hara were superb; but, then, Mr. O'Hara is a market-gardener, and that will account for it.

The cheese and butter show was poor; and as for the fruit, it was not half ripe, as how could it be by the 3rd of Septem-

ber? The vegetables, such as cabbages and cauliflowers, were, as might be expected after such an August, very different from what we are accustomed to see. Well, I hope things will be changed by next year, or the Montreal Exhibition will come to a bad end.

Arthur R. Jenner Fust.

I have not yet received Capt. Campbell's report of the show of horses. (1)

OUR ENGRAVINGS.

Howard's String-binder.—This formidable implement is about as good as they make them. At the Royal Agricultural of England meeting this year the American makers of string-binders were nowhere.

Maud S.—This mare is still the Queen of the trotting turf. The strangely named "Jay-I-see" lowered the record to 2.10 last month; but the marvellous mare regained her position subsequently, and has since been sold by Vanderbilt for \$40,000!

Sheep-rack.—See article on this implement.

Festuca Elator.—See article on this plant.

Danish Separator.—Before many years, I prophesy that all farmers who milk more than seven or eight cows will be obliged to employ one.

A. R. JENNER FUST, ESQ.

Lincoln College Farm, Sorel, Que.

Dear Sir,—A friend of ours in Ontario, who has been making superphosphate of lime in a limited way for farmers in his own neighborhood, purposes going into the manufacture of artificial manures on a larger scale and wishes to get thoroughly up in the requirements of such articles as practically shown by the experiments of men like Sir J. B. Lawes.

Can you inform us where the reports of Lawes & Gilbert's experiments can be procured, and the titles of any other works or pamphlets which it would be desirable to study in this connection?

Should our friend see his way to go on with this business, we can bespeak for him that the articles manufactured will be thoroughly reliable and be sold at reasonable prices.

Not having the pleasure of your personal acquaintance we have presumed on a knowledge of the interest you take in farming generally, and in the subject of artificial manures particularly, to address you at the present time and we shall be pleased to have any suggestions which your own extended experience enables you to give on this matter, which is of such importance to at least the older parts of Canada.

We are yours respectfully,

BRODIE & HARVIE.

I will answer Messrs Brodie and Harvie by letter. I am delighted to hear that, at last, there will be a chance of obtaining manures at a fair price, as nothing else will induce farmers to buy them. Thirty dollars a ton for rubbish worth less \$20, would choke off even such enthusiasts as I.

A. R. J. F.

Canadian-Jersey bull calf for sale.

A Canadian-Jersey bull calf, three months old, 55 7/10 Stoke Pogis and 25 7/10 Albert Rex Alpea, from a hoifer

(1) I regret to say that my friend leaves us for England.

A. R. J. F.

(1) I have within the last few days found two heifers and a calf of unmistakable purity of breed. I hope to have them all three in my yard next week.

A. R. J. F.

(2) I presume horse-hoes are meant in the list

giving nearly ten pounds of butter per week on poorish grass alone.

This is really a beautiful animal and of great value, price \$30.00. Address:

ED. A. BARNARD,
Dir. of Agriculture.

Value of liquid manure.

TO THE EDITOR OF THE ILLUSTRATED JOURNAL
OF AGRICULTURE.

Dear Sir,—Under the above heading, I find another remarkable article from our good friend, Dr Hoskins. (1) *En passant*, let me say that his recent paper, in the *Journal*, on strawberry culture, is the most complete and most practical advice on this subject I have yet seen in print.

Respecting manure, you have shown that where no loss occurs from deperdition, in either solid or liquid excreta, the farmer of Canada is not in need of high-priced artificially prepared fertilizers: that he can purchase, with great benefit to his stock, either for beef or for milk, such foods as cottonseed cake, peas, bran, &c., &c., and obtain, in the manure alone, more real money value than the full cost of such food. However, in the practice, most of your readers must have found, as I have, that there must have been a leak somewhere. Otherwise, their farms would be richer, and their own purses more replete.

Dr Hoskins, in his turn, shows that, on an average, about 75 0/10 of the nitrogen contained in such food is voided as liquid. Now sir, how much of this precious liquid is lost through the floors of stables, or washed away from the dung heap before it reaches the ground for the fertilization of which it was intended? I say, most farmers lose fully 75 0/10 of such liquid. Am I right?

One of the most important subjects which the *Journal* might take up, in my opinion, is the best mode of saving liquid manure from waste, from the time it is voided by the animal to its final distribution as true plant food! Dr Hoskins speaks in a general way of a water tight gutter to receive both solid and liquid voidings. I suppose a water tight manure cellar is here meant in connection; as, both in Quebec and in Vermont, winters are too severe to have manure spread over the snow without loss.

Should Dr Hoskins and yourself give us farmers the way of utilizing all or nearly all of our liquid manure, without too much expenditure in tanks and manure cellars, cartage, &c., and without any injury whatever to our stock when it lies in the stable, such advice should prove invaluable. Your truly,

ED. A. BARNARD.

Quebec, 30 Sept. 1884.

LINCOLN COLLEGE FARM, SOREL.—OCT. 1884.

September did its best to remedy the destruction caused by the terrible drought of August. The opening of the month was hot enough, but a shower or two revived the drooping leaves of the root-crop, and though the crop of cabbages is not what it ought to be, still the heads of a majority are fine and firm, and look as if they would keep. (2) A

(1) The article in question was not written by Dr Hoskins, but was extracted from a paper the name of which Dr Hoskins has forgotten. I will do my best to comply with Mr Barnard's request next month—the subject is a very difficult one.

A. R. J. F.
A. R. J. F.

(2) I regret to say many are bursting.

fine rain on the 7th, succeeded by a smoking hot week. A pleasant day was Saturday the 13th! I who never wear a great coat in the coldest winter's day, was glad to sneak into the cabin of the steamer as I crossed from Berthier to Sorel. I had been very ill, though, all the Exhibition week; so perhaps that was some excuse for my chilliness.

It has been astonishing all through the drought to see how the Belgian carrots persisted in growing. The lower leaves of the cabbages and swedes dropped off by wholesale, but the *braves Belges* never flagged for a moment. I am just attacking them to-day, and hope to have them in the cellar this week; a crop worth gathering, as there are about a thousand bushels of them and all of first-rate quality. The tops alone must weigh six or seven tons, in fact I never saw so much food on an acre of land, and the cows seem to enjoy the greens very much and do not scour in the least on them: they have a mixture of pease, oats, and linseed as a corrective.

A sharp frost on the 19th. All the tomatoes done for, and worse, the Hungarian grass out to pieces, browned, and spoiled. It should have been fed off before, and would have been, but my stock had not arrived in time.

The potatoes turned out much better than I expected. About 300 bushels on a scant acre. They had no right to do so well, as the ground was not half prepared owing to no fall-ploughing having been done. One torment here is the grub of the cockchafer (May-bug it is called in the States, I believe), which this season has played the very mischief with the Early Roses. The grub is about an inch long, very thick, and its appearance is as brutal as its effects. I can't say more in its dispraise. If it would eat one potato and have done with it, I should not so much mind; but it goes into the finest, bites out a little piece, and travelling on, attacks the next best, never interfering with the small ones. I know of no cure for this complaint, but the first frosty morning I shall pass the cultivator across the piece, and see what that will do. The fat brutes, however, look so thriving, that I do not expect to profit much by the essay.

My neighbours will not believe that the frequent horse-hoeing between the rows of the root-crops can have any great effect on the yield! Now, my white turnips are the only ones on the western side of Sorel—both whites and yellows have utterly failed all along the St. Lawrence, none are bigger than a tennis ball, though the plant is perfect: how far this extends I can't say, all I know is, that my turnips, with 7 inches of loose mould between the rows, have thrown out roots, as large as a thick straw, which meet midway between the rows: the turnips are, on an average, 7 inches in diameter; quite large enough for whites, as a large white turnip is, generally, hollow and spongy. To night I send off a specimen of each of my root-crops to Mr. Lesage, Deputy Commissioner of Agriculture—I don't think he will have much fault to find with them.

Mr. Loonan, a Scotch farmer, whose reputation is great here, sent some swedes to the Sorel market on Saturday, the weight of which, I am told, was 8½ lbs. each! If so, he beats me by 1½ lbs.; but then he has cultivated his land for 16 years—I have had mine in hand only five months, and I leave it to Messieurs Les Sorelois to say what its condition was when I took it in hand.

My sheep are on the *rape*, and a nice job it is! They are all either *creepers* or *jumpers*, and if the hurdles are not adjusted to a nicety, the lambs of the flock are sure to be out the moment the keep runs a little short. It is not all play—accustoming a wild lot to confinement,—but with patience it can be done. The old ewes are quiet enough. One thing is curious, they won't work up the few white turnips there are at all; and this reminds me of a story current in South

Wales forty years ago. when turnips were first grown in that district there were no cutters, the sheep had to bite the roots as they could, and being unwilling to try the job, the Welsh farmers, instead of waiting till hunger compelled the sheep to do their duty, sent into Norfolk for a few sheep to teach their own the lesson! It may or may not be a true story, but knowing the impatience of my dear old Welsh (Celtic) friends, I believe it. The same excellent people, when first they sowed turnips, refused positively to thin them out, saying, in their charming patois. Well, well, indeed, and if the Almighty sends us a good plant of turnips, why should we cut them up? However, Wales is no longer behindhand in root growing; for I have seen as fine fields of swedes in Glamorganshire, as ever I saw in Scotland.

I regret to say that my cows prefer carrots to white turnips. I am not surprised at it, but it is a nuisance as regards butter-making, white turnips not being good for much after November, I should like to get rid of them before beginning the other roots. About the yield of cows: all I could get had calved down early in the Spring, and, consequently, what with the dry weather of August and the non existence of any green fodder, were nearly dry, giving only on an average, 3½ quarts a day. With the run of a bare pasture of 1½ acres, a few roots and some cabbage leaves, I have in 6 days brought them up to 6 quarts; (1) and as they began on mixed meals yesterday, I hope to see a great change by Saturday. I generally find that, with cows in fair order, it takes 6 days to work any visible alteration in the yield of milk with new food.

Meal of all kinds is so cheap now that it may be given to any sort of animal without fear of committing an extravagance. Taking our present prices, I find that my ration costs as follows, and I give actual prices paid at Sorel market last Saturday!

| | |
|---------------------------|----------|
| 4 Bush. oats at 36½ cents | = \$1.46 |
| 4 " pease at 80 " | = 3.20 |
| 1 " linseed at 95 " | = 95 |
| <hr/> | <hr/> |
| 9 | 5.61 |

And this equals, in round numbers, 1½ cents a pound, or, allowing five pounds to each cow per day, 6½ cents, that is, 46½ cents a week. The wholesale price of milk at Lincoln College is 5½ cents a quart, and an increase of 1.1 quarts a day will pay for the meal. I need hardly say that I expect an increase of at least 3 quarts from this food.

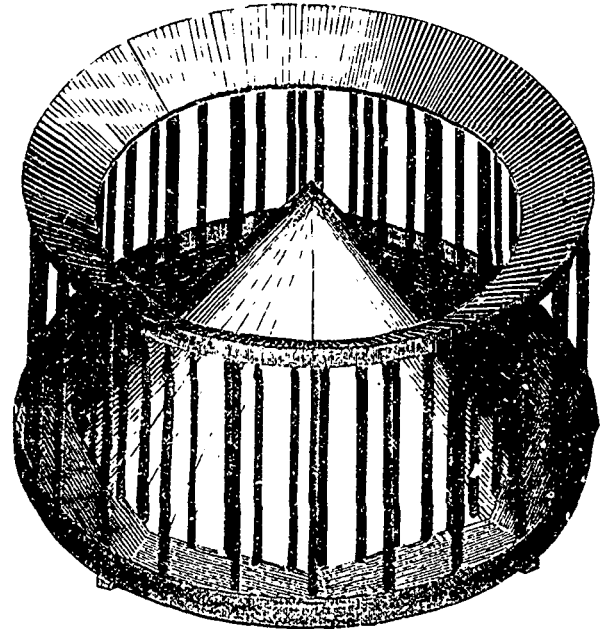
The proportion of linseed is small, as I have always found it advisable to begin with it in moderation until the cows get accustomed to the roots and tops.

RACK FOR SHEEP.

Mr. Eugène Casgrain, member of the Council of Agriculture of the province of Quebec, is well known to all our readers as one of the most skilful breeders of sheep in the country. After many trials, he has succeeded in bringing to perfection what may be called a model sheep-rack. Loving nothing so much as contributing to the improvement of agriculture. Mr. Casgrain has not patented his invention, and has had the kindness to furnish me with a photograph which enables me to introduce the rack to my readers' notice.

As may be seen by the engraving, the sheep-rack in question is circular in form, and is made with two ranks of bars,

with a basin to receive the forage, and a cone in the middle, which serves to divide the hay or straw regularly round the rack. Description of this useful invention. Diameter 5½ feet, height 4 feet 9 inches. Twenty-two bars in the outside rack admit of 21 sheep feeding at once. The bars, 1½ inch in diameter, are made to turn easily in the top and bottom sockets. There is a space of 7 inches between the outside and the inside bars, the latter, 33 in number, are 4 inches apart and a square inch in size. Within this rank of bars is a wooden cone, 3 feet and 9 inches in diameter at the base, and 3 feet high. This cone, with the arrangement which holds the two ranks of bars at the top of the rack, forms the receptacle of the forage. A plinth, 3 inches wide, is attached to the top and another to the bottom of the rack, outside the exterior rank of bars, and completes the whole.



SHEEP-RACK.

The following are the advantages of this rack: being circular, each sheep can feed without annoying its neighbour, and the ewes and lambs are thus freed from all chance of injury. The bars revolving on their supports, the sheep do not rub their necks in feeding. If the rack is placed under a shoot or trap door, the hay or straw can be dropped into it, without falling on the sheep, and thereby soiling the wool. If instead of forage roots are given to the sheep, the bottom of the rack, with its plinth, forms a convenient receptacle for them.

Mr. Casgrain will furnish racks of this pattern, delivered at L'Islet station, for 8 dollars.

I have seen this Sheep rack in operation for four or five winters consecutively, and I can give it my warmest approval. It was accorded an extra prize at Montreal in 1882.

From the French

J. C. Chapais

VETERINARY DEPARTMENT.

Under the direction of D. McEachran F. R. C. V. S.

CONFORMATION OF THE HORSE.

Errors detected by experience are allowed to be equal to demonstration, but this truism is not admitted by a vast ma-

(1) And now to 8 qts each after 10 days meal A. R. J. F.

majority of farmers, who persevere in the use of the heavy horse for agricultural purposes, for which, solely, he is by no means fitted from the slowness of his gait unless very highly fed. As long however as the ponderous vehicles made use of in our large cities for the transmission of heavy goods are persevered in, this equally ponderous animal, which sometimes weighs from 15 cwt. to one ton, may be necessary, but it is certain that lighter horses would do the business better, that is more speedily and at a less cost. Notwithstanding the objections to him, the heavy cart horse pays well for rearing, for being always saleable at two years old, a certain profit is insured. As for the first year, the expense of feeding him is trifling. The chief desiderata in the cart horse are substance and action. If possessed of the latter, his shoulders and fore quarters can scarcely be too heavy and coarse, for drawing being an effort of the animal to preserve himself from the tendency which his weight gives him to the centre of gravity when he inclines forward, the more weighty he is before, and the nearer he approximates to this centre, the more advantageously will he apply his powers. Notwithstanding this, we are not advocates of heavy horses for farmers' work, much less on the road. The lighter horse gets over in eight hours what would take the heavy one ten, and the great improvement in the present mode of cultivation, and in the implements used in agriculture does not require more weight and strength than what the Suffolk, Clydesdale, Cleveland bay, and other light breeds, are masters of. Besides, there are periods of the year when despatch of business is of great moment to the farmer.

It has often struck us, and no doubt has struck other rational minds, as being strangely anomalous, that men who know nothing about the anatomy of the horse should as a rule be chosen as judges of the make and shape of the animal at the various public shows. (1) The absurdity of the thing appears at first glance so glaring that we might at first be tempted to compare the so-called practical horseman, who lays down the law as to conformation merely from his knowledge of the exterior of the animal, to a person who thought himself qualified to decide on the value of a watch although he knew nothing of its internal mechanism. There is, however, a great deal to be said on both sides; for a knowledge of equine anatomy is not sufficient to instruct the judge on the subject in question. While we must go somewhat beyond its domain and that of practical experience in order to permeate the laws of conformation, the points of the horse may be broadly divided into those coming under the following heads.

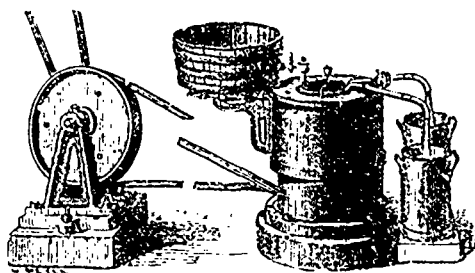
BEAUTY, STRENGTH, SPEED, AND WIND.

The subject of good looks may be soon dismissed, for its canons are well understood. However undesirable a Roman nose and a coffin shaped frontispiece may be, still, an unusually small and pretty head is not infrequently united to a judicious disposition. The neck should run into the head by means of a curve, which gives the part the beautiful set on which we so much admire in the game cock. Regarding colour, we need only remark on the not unreasonable prejudice against mealy chestnuts, and washy browns, especially when the colour becomes lighter under the abdomen, and on the inside of the limbs, and to state the fact that the darker the coat the better will the animal stand exposure to the influence of a tropical sun, other things being equal. We mention this merely as an interesting point of equine physiology, and one that is borne out by the fact that, in torrid zones, animal colours are more pronounced than in frigid, as demonstrated by the dark skin of the negro, and white coat of the hare in

(1) Very right A. R. J. F.

northern climates on the approach of winter. The reason of this is that although the dark surface will absorb heat more readily than the light coloured one it radiates heat much faster.

We now come to the important subject of strength and speed, which are dependent upon the shape and size of the muscles, and form and arrangement of the bones. The action of a muscle is affected by its length and by its transverse section, for the longer it is, the greater space will it be able to move the object in which it is inserted, while the thicker it is, the stronger will it be. We know that, as a rule, a high degree of speed, whether in horse or man, is unattainable without length of stride, in other words, successful race horses must have long muscles. It may therefore be assumed that, for speed, the muscles of locomotion in the horse should be as long as possible, while, if their length is granted, they cannot well be too thick, for, even in the race horse, strength is an essential condition for staying and carrying weight. The desirability of the cannon bone being short is admitted by everybody in all classes of horses, although the reason why this point should be considered valuable is not very generally understood.



THE DANISH CREAM SEPARATOR.

Let us just take the hind extremity: in it we find that one of the chief levers which move the body forwards is formed by the bones of the limb from the point of the hock downwards. When the hind toe is applied to the ground as a fulcrum, the power is furnished by the contraction of the muscles whose tendons go to the point of the hock while the thigh bone, "tibia," is the weight moved onwards. Here we have a lever of the second order and consequently the distance between the weight and the fulcrum, or, in other words, the shorter the hind cannon bone, the greater will be the mechanical advantage at which the extension muscles of the hock will work. In the fore leg, the bones below the knee serve as a lever for the flexors of that joint. These muscles are the power, the bones of the arm the fulcrum, and the pressure of the foot on the ground is the weight to be moved. Here we have a lever of the third order, and consequently the shorter the cannon bone the greater will be the advantage at which the muscles will act. Bent or sickle hocks are very faulty in conformation, for the horse that is cursed with this defect is unable to extend these joints as much as he ought to do. Amateur horsemen being probably misled by the term "bent" being applied to such hocks, not infrequently consider that a horse with sickle hocks can bend them better than an animal that has straight ones, and consequently that the former is superior to the latter for cross-country work: nothing can be more absurd; for both forms of hocks can be equally flexed, although they cannot be equally extended. From the fetlock joint to the hock, the flexor tendons should run as nearly as possible parallel to the cannon bone. If the lateral width of the fetlock is so great as to make them converge in a marked manner towards the head of the cannon bone, the leg will be ill fitted to stand hard work, no matter how much it will

measure below the knee. The reason for this appears to be, that with such a conformation these tendons not being able to work in a straight line between the fetlock, and their insertion into their respective muscles will be liable to sprain. Horses for fast work should have the pasterns of the fore legs moderately long, and fairly sloped, in order to obviate the risk of sprain to the suspensory ligaments, and of concussion of the bones of the fetlock joint. We think that the harder the ground, and the faster the pace the more imperative is the necessity for sloping pasterns, which, however, are disadvantageous when strength is a desideratum, as the chief office of the fore limb is to act as a weight bearer, while that of the hind extremity is to serve as a propeller. We find that in the true shaped horse the hind quarters are more upright than the fore. Long sloping shoulders are to be desired in all classes, except in the heavy cart horse, which requires a more upright and massive conformation to work well against the collar. The cross-country horse (1) above all others requires oblique shoulders, for the more sloping they are the less weight will there be in the front of the fore legs when the animal lands over a fence, and, consequently, the less liable will he be to come down. The saddle horse, as the old saying expresses it, "should be short above and long below" i. e. his back should be comparatively long, (2) while his sloping shoulders and long pelvis should enable him to cover a considerable distance of ground.

The light saddle horse and lady's horse may have more length of back. The points of conformation in which the heavy cart horse differs from the light saddle-horse are that his shoulders should be more upright and massive, chest broader, pasterns shorter, and straighter, while the muscles of locomotion should be distinguished by their thickness rather than by their length, and consequently the bones of his limbs will be thicker and shorter.

C. McEACHRAN.

POULTRY-DEPARTMENT.

Crosses for Table Fowls.

Results of English Experience.

EDS. COUNTRY GENTLEMAN—Considerable attention has been paid in this country, of late years, to the question of table poultry, and as is usually the case, we have learned a great deal. Whether it is true or not that Englishmen have insular prejudice very strongly developed, I, as a patriotic citizen of Britain, prefer not to say, but we have been fain to confess of late years that we have very much to learn in the matter of table fowls. This may be due to the fact that chickens and fowls (save geese and turkeys, which no one can beat us in) have not been a general article of diet. They have not been thought substantial enough—only fit for invalids and children, while strong men needed a fuller diet. But this is passing away. Chickens are now coming more into favour as a part of every-day food, and would still more do so were it not for the price at which they are sold. During the season, spring chickens sell at \$2 to \$5 per pair, and even at ordinary seasons it is difficult to get any chickens under a dollar, and it will be only a poor thing at that. The show of dead poultry in all

(1) For the benefit of our non-sporting readers, I may as well say that the writer means by "cross country work," hunting or steeple-chasing.

(2) *Short* I think the writer means

A R J F.
A R J F

our leading markets and poulterers' shops is no credit to producers or consumers—to producers, because they might make so much more of their produce; and to consumers, because they are content with such a poor sort of thing. It is true there is some improvement of late years. The example set by French poultry keepers, and the demand of those who have seen in other lands such fowls as are there produced, have compelled some attention to be paid to this question. But this has been more in the way of dressing than anything else, and we have yet much to learn ere we can compete with our French neighbors. There is much wanted yet to be done, both in the way of producing suitable fowls and preparing them for the table. The best preparation will be of little avail if the breed kept is not a right one, and the best breed will not have justice done to it, if simply picked up out of the poultry yard and killed without some previous fattening. On the question of fattening I hope to have something to say later on, but now my object is to show what we have learned as to the breeds for table purposes.

In the first place it may be acknowledged that, as a rule, cross-bred birds are more profitable than pure-bred ones, for the ordinary poultry producer, who is not a fancier, I mean. Cross-bred fowls are hardier, grow faster and feed quicker than pure-bred ones. For this reason, during the last two or three years some of our English shows have given classes for cross-bred fowls suitable for table purposes, and much has been learned from these. During the coming autumn and early winter at two shows—the Dairy and Birmingham—table fowl classes are to be liberally provided, and I hope to send a full description of them for your columns. There will be pure-bred birds shown also, a very wise arrangement, as then both these and the crosses can be seen and compared.

The breeds that we recognize as our best for table purposes, are 1st Dorking, 2nd Game, and 3rd French, and, as a rule, these are made the basis of all crossing, which is carried out with a real desire to arrive at the best results. Other breeds can be employed with these, or they can be intermixed one with another. But, as a rule, it is found that these do best of all as the foundation. The Dorking we give the first place, in spite of its inability to withstand damp places and clay soils. On suitable places these birds are first-rate, and we find that they cannot be beaten then. They have the decided advantage of being large, deep in the breast, with little meat on the thighs, and rich in flavour of flesh, and, what is regarded most of all by poulterers and old-fashioned cooks, they have white legs and feet. The prejudice against dark colored legs is still strong. There are many who think that white flesh and dark legs do not go together—a fallacy long since exploded, in spite of their unbelief. Here is a capital basis on which to work. The best cross is found to be the colored Dorking with Game, say Brown Reds, and the produce is simply splendid. Somewhat smaller than the Dorking alone, but richer and firmer in flesh, very light in bone and offal, and in every sense a first rate table fowl. If any of the readers of the **COUNTRY GENTLEMAN** wish to produce for their own table or for market really fine table birds, this is a cross that can be recommended with the greatest confidence. Another good cross is with the Houdan, or the La Flèche, either of which produce birds, if the parents are well selected, which, both for size of body distribution and quality of flesh are A 1. Birds from the Dorking Houdan cross have light colored legs, but with the La Flèche cross they are darker. The Brahma Dorking cross is a favorite one with farmers, and those who specially desire size in the birds. For really first rate quality, it is not equal to the others previously named, and the distribution of flesh is not so good also. The same may be said with all crosses in which Asiatics take part.

Game fowls, pure-bred, are remarkable for richness of flesh,

but it is just a little close in texture, and the size of the frame is small. As already named, the crossing with the Dorking is found to be about the best that can be obtained. A mixture of Game with the Houdan, or with almost any of the French breeds, especially La Flèche, will be found very good indeed, and equal to the Game-Dorking. I have seen well-fed Games, the brown-reds especially, with lovely white flesh and skin, and, as the meat is so well placed, and the offal so small in proportion to the weight of the birds, they are really economical fowls, whether pure bred or suitably crossed. A good cross can be made of the Langshan, and most breeds are better for an admixture of Game blood, but those I have mentioned first of all have been proved far and away the best.

Coming last of all to the French breeds, there are more opportunities of crossing with them. They can first of all be crossed with each other, and none can get far wrong in this way. Perhaps the best of all is the putting together of the Crève and La Flèche. If outside breeds are used, there are the crosses with the Game and the Dorking, as already named, and a suitable cross is with the Langshan, which produces a capital table fowl, large, well made, and good in quality of flesh. With the other Asiatic breeds there is the same trouble as I have already pointed out, and I cannot recommend the use of Asiatics for table fowls, except size is the first point aimed at.

In conclusion, let me urge all who breed cross-bred fowls to use pure ones only, at first, and never the crosses as breeders. This is a rule that ought not to be departed from, if success is to be maintained.

H—England, Aug.

STEPHEN BEALE

The Time to Cut Grass.

EDS. COUNTRY GENTLEMAN.—This is a very important question for the consideration of the farmer, and one which should have received more attention from practical farmers and feeders than it has. The experiments so far conducted to determine this point are hardly conclusive, though they are by no means valueless. One thing they have clearly established is, that farmers must carefully consider the time of cutting hay if they would secure hay of maximum value. The hay crop depends in value upon two things—quantity and quality, and value depends upon the one as much as upon the other. It is comparatively easy to determine quantity; but to determine quality is not so easy. For getting at the quality there are two methods—the scientific and the practical. The first proceeds by means of chemical analyses, and the second by means of actual feeding tests. The latter is the most reliable, but also the most difficult. Allowing grass to stand until quite ripe was formerly much more common than now, when many farmers cut it when in full bloom. These may have gone to the other extreme. So far as period of growth is concerned, grass is cut earlier than clover. Not infrequently the heads of clover are allowed to become quite brown before it is cut. The period for cutting varies with the locality, and it probably should. The kind of grass, the use for which it is intended, the demands of other branches of farm work, and other circumstances should all be considered.

To determine the question, experiments have been conducted for two years at the Pennsylvania State College. The grass was divided into plots, and the plots cut at different stages of growth. The grass from each plot was carefully cured, and weighed when stored in the barn, and again weighed after lying in the barn five or six months. It was also carefully analyzed. Experiments were conducted for two years

with timothy, but with clover only one year. Timothy was cut in only two stages of growth—full bloom, and approaching ripeness. The average time elapsing between the two cuttings was about sixteen days. The experiments showed that the growth during these sixteen days was quite material, making from 113 to 1,083 pounds of dry hay per acre; the average was 546 pounds, or 18.5 per cent, after the period of bloom. When the shrinkage in the barn was considered, it was found that the advantage was again in favour of late cutting. The hay cut when in bloom shrunk 25.7 per cent, after being stored in the barn, while that cut when approaching ripeness shrunk in weight only 18.8 per cent, on the average. In the first case the shrinkage ran from 14.9 per cent, to 26.5 per cent; in the latter, from 15 to 23.4 per cent.

So far the advantage clearly favoured late cutting, and it was shown that the advantage was quite large. The next step was to analyze samples of grass from the different cuttings. These analyses revealed the fact that the only material difference in the composition of grass in bloom, and grass nearly ripe was the larger percentage of protein in the former. In the early cut hay the relative amount of crude fibre was also larger, while of other carbohydrate matter the larger quantity was contained in the late cut hay. The conclusion arrived at was, that making all due allowance for error, nearly all the increase of weight was due to the growth of non-nitrogenous constituents of the grass, or such compounds as cellulose, starch, and allied substances, while the nitrogenous compounds (protein) increased none, or very little.

The results obtained by the experiments with clover were different in some respects. The clover was cut at three different periods of growth—when the heads were in bloom, when partly dead, and when nearly all dead. The dates of the different cuttings were June 22d, July 3d, and July 19th. The hay was weighed when put into the barn, and then reweighed in five or six months, to know the amount of dry hay. Instead of an increase of hay from the late cutting there was apparently a decrease. It is certain that this was not due to any lack of uniformity in the growth of the field. It was accounted for on the supposition of the decay of the leaves after full bloom, and the loss of the finer parts in curing the older grass. It was found that the quality of the clover steadily deteriorated after the period of full bloom. It was therefore plain that clover should be cut at the period of full bloom. This is the scientific statement of the case, the nutritive value of the hay being determined by chemical analyses.

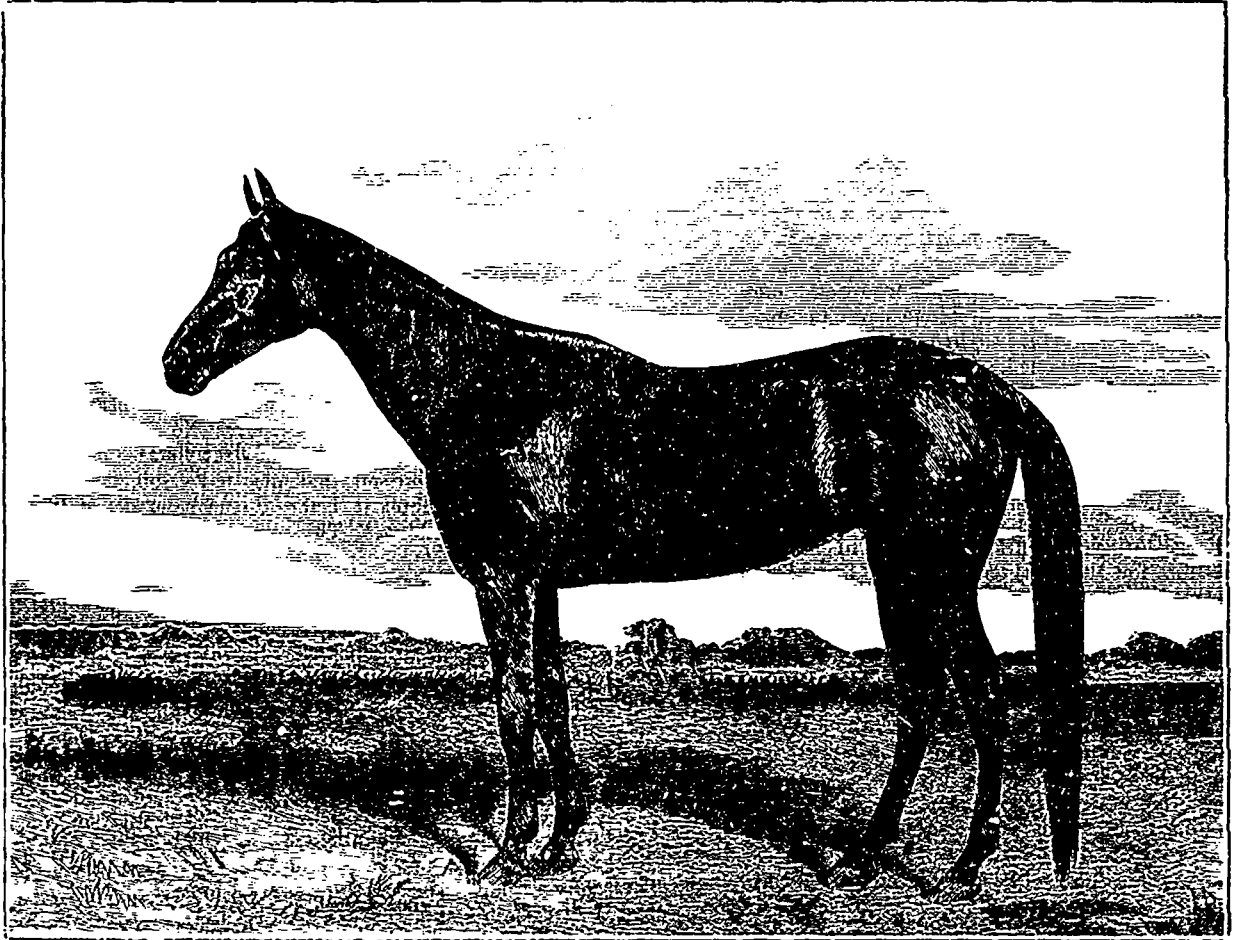
To present the other (the practical) side of the problem, we can find no better authority than Prof. Sanborn, now connected with the Missouri Agricultural College. Prof. Sanborn is entitled to equal respect with Prof. Gardner, and his opinions are at variance with the results obtained above. As might be expected, the greatest difference relates to the quality of the grass cut at different periods of growth. We should remember that until within the last few years Prof. Sanborn was a radical advocate of early cutting, and therefore his prejudice, if he had any, would have opposed and not favoured the conclusions he has finally reached. His experiments cover several years, and his conclusions are therefore supposed to be more conclusive than those arrived at the Pennsylvania College, as to the growth of grass subsequent to bloom. Prof. Sanborn fully agrees with the Pennsylvania experimenters, except that he has found this growth more marked than they have. One season he found that clover had made no growth subsequent to bloom, when tested at harvest, but the winter-weight revealed a greater shrinkage and a less net weight on the part of the early cut clover, making the gain by late cutting at the rate of 107 pounds per acre. Other trials revealed a notable gain in clover after

bloom, and always he found a large gain in timothy. He thinks it passing strange that any student of agriculture should hold that the plants we cut and store for hay made no growth after bloom, as it is certainly plain that a very rapid growth is made from bloom to seed formation in most of our farm crops.

That the feeding value of early cut hay is the greater, Prof. Sanborn, after, as he says, taking the testimony of the steer for four years, clearly disputes. Experimental feeding has shown him that timothy cut from 10 to 16 days after bloom, contains as much or more nutrition than when cut in bloom, and of course more per acre. He does not deny that this may be in opposition to the results obtained by scientific

one result, and that in favour of early cut hay. For the reason that early cut hay is more palatable than late cut; as a result after a change to late cut hay the animal for a time refuses to eat a normal ration, and the result will not be so satisfactory as with early cut hay. While palatableness is a valuable quality, it must not be mistaken for actual nutrition.

As to the exact time at which hay should be cut, I can heartily agree with Prof. Sanborn. While not believing in early cutting, I am clearly of opinion with him that it is improvidence to cut hay so late as maturity. A large proportion of the nutriment of plants is contained in the seeds. These seeds shatter in handling at maturity, and those which



MAUD S, "QUEEN OF THE TROTting TURF," RECORD 2-093.

chemical analyses; but he disputes the efficacy of these means to determine this question, and shows that they have often led to erroneous conclusions. Above them he would place actual, practical feeding trials; and the result of quite a number of these he finds to favour cutting after bloom, for the steer. Farmers will like his method best, though we may be inclined to half-way dispute his conclusions. Prof. Sanborn does not deny that many farmers will disagree with him as to the relative feeding values of early and late cut hay, founding their opinions upon actual feeding tests. But he thinks their results have been arrived at by feeding early cut hay one week, noting the yield of milk or fullness of steer, and then changing to later cut hay, and again noting the result. Such a system of testing, he says, can only show

do not shatter go through the system only partially digested. The later hay can be cut, and yet escape waste in handling, the better; and this is when the seeds are forming, or about what we term the milk stage in other crops. I am well aware that many good authorities oppose this, in fact, all theoretical writers do. I notice that Prof. E. W. Stewart says that grass should be cut just before blossoming. But with Prof. Sanborn I must say that the steer gives the better test. I may be wrong; but if experimenters would convince me of it, they must appeal to actual feeding tests and not to chemical analyses. (1)

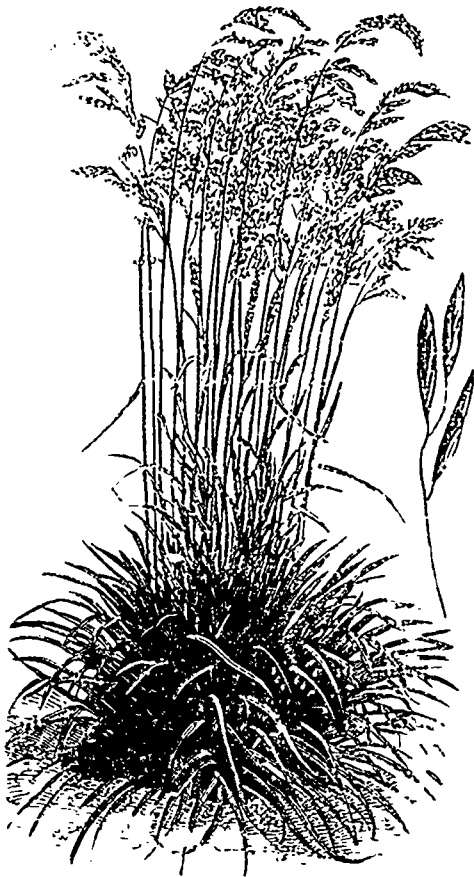
JOHN M. STAHL.

(1) The question is still undecided. Practically, I find that sheep and cows do best with hay cut young, horses with hay more matured.

A. R. J. F.

Valuable, but Little Known Grasses.

Timothy is so generally grown by our farmers, that one might suppose it to be the only grass suited to our climate. One reason for its culture, to the exclusion of other grasses, is the reputation that Timothy enjoys among buyers of hay. A city livery stable keeper, or other purchaser, will not usually accept any other hay than Timothy. As a hay crop, this grass has much to commend it, but there are others quite as valuable, while as a pasture grass, it is one of the poorest. It is very difficult to break up a long established practice yet we are glad to know that our frequent advocacy of Orchard grass in past years, has induced many farmers to sow it instead of Timothy, and they have found the change profitable, especially if the field was ultimately to be pastured. (1)



TALL MEADOW FESCUE.

Among other grasses to which farmers should turn their attention, is the Tall Meadow Fescue (*Festuca elatior*). This grass presents itself in three forms. The typical Tall Meadow Fescue (*F. elatior*), is three or four feet high, with an ample spreading panicle and broad leaves, as in the engraving. The Common Meadow Fescue (*F. pratensis*), is not so tall as the foregoing, and with a close, slightly branched panicle. The Spiked Meadow Fescue (*F. lolucea*), has the flowers in a spike. *i. e.*, the cluster is not branched. These three forms were regarded as distinct species, indicated by the names above given. They however run into one another, and while botanists regard them as forms of one species, the seeds of the varieties are kept distinct by seedsmen. Though rarely

(1) I regret to say that my "frequent advocacy" of Orchard grass has not had the same effect.
A. R. J. F.

sown in this country, these forms have been introduced, and one or all of them may be found in established grass lands, especially in the older States. In nutritive quality, the three forms are regarded as about equal, the principal difference among them being in size.

The second form (*F. pratensis*), is known in Virginia as "Randall Grass," and in North Carolina as "Evergreen Grass," and in the mountainous portions of both states is highly esteemed as a pasture grass, especially for sheep. These Fescues are very valuable on account of their adaptability to moist and even wet or marshy lands, and as their roots penetrate the soil to a great depth, they endure the droughts remarkably well. The seed catalogues advise sowing forty pounds of seed to the acre; a good stand has been made with half that quantity of seed of the best quality. Another, and related species, deserving attention, is the Sheep's Fescue (*F. ovina*). This was described and illustrated in February of last year. Like the species already noticed, this has several well marked forms, and is as valuable for elevated and dry soils, as is the other for wet ones. It is effected by the character of the soil to a remarkable degree.

The Supply of Organic Matter to Soils.

The *New England Farmer* quotes from this paper a mention of our own farming upon artificial fertilizers for seventeen years, with very little use of stable manure, and says: "We should not expect a full crop of anything without applying something to lighten the soil, so as to let in the heat of the sun, and let the water out after heavy rains. No concentrated fertilizer can at once take the place of strawy stable manure upon a compact, worn-out soil that must have something material put into it to lighten it before it can be made to produce a full crop of anything." This may be a correct judgment in reference to a compact, worn-out clay soil. The first thing we should do to such a piece of ground would be to thoroughly tile-drain it. Then, vegetable matter might be ploughed in to lighten up the land, and for this purpose even spruce sawdust answers a good purpose. It has been put on to cold clay land near the village of Newport Centre, Vt., as thick as it could be ploughed in, and repeated several times, with a remarkable effect in warming the soil and improving the crops. The editor of the *Furmer* speaks of our having used swamp muck for the same purpose. Unfortunately, proprietors between us on the lake, by stopping the outlet, have so raised the water as to overflow our muck bed, which before that was so wet that it was very difficult to dig—so difficult, indeed, that only a comparatively small quantity has ever been used.

Unquestionably Brother Cheever is right as to the benefit of vegetable matter in the soil. It makes it warmer (as tiling does) by letting in the air, and it also makes it warmer by darkening the color of the soil, for the sun warms up a dark soil quicker than a pale one. But we judge from his article that he has not given enough weight to the fact, that when a heavy crop of any kind is got by a dressing of artificial fertilizer, that crop itself leaves in the ground an amount of roots proportionate to the weight yielded above ground. When we have got a heavy corn crop, potato crop, bean or pea crop, we are satisfied that we have also, when the crop has been gathered, a vast amount of organic matter in the roots remaining in the soil, which have so penetrated it that every cubic inch, for at least a foot in depth, has ramifying through it, threads of organic substance which, decaying during the fallow seasons of fall and winter, not only leave open passages for water and air, but furnish material of their own substance, and of the soil they have made soluble in growth and decay, for succeeding crops.

The use of raw ground bone and ashes, in the place of acid fertilizers, also supplies a considerable quantity of animal organic matter to the soil, soluble and ready for plant use. And again, when you have made your soil rich, it becomes filled with angle worms, which swallow and eject vast quantities of earth, much enriched by passing through their bodies. The life of these worms is short, and their decaying bodies furnish an immense addition to the available organic matter of the soil. The French have a wise proverb, to the effect that "nothing succeeds like success." When land is well-farmed everything co-operates to make it continually grow better. Many may laugh at the notion of the land being enriched by the life and death of angle worms in it. But Darwin has shown, by actual tests, that the weight of living angle worms in a rich moist soil equals many tons to the acre. Once get the land rich enough to grow heavy crops, and after that the roots remaining from each crop, aided by the digestive action of the worms upon both vegetable and mineral matter, will render only moderate dressings of plant food necessary to keep up the fertility.

When we bought our present farm, seventeen years ago, we doubt if there was a single angle worm in the whole of it. At any rate we never could find any when we wanted to fish, or saw one when we were ploughing. Now, the ground is full of them. One cannot thrust a spade into it without cutting several of them in two. They have come in in consequence of the constantly increasing richness of the soil, and this richness has not been produced by large quantities of stable manure. As we have said before, we keep but little stock, and can buy but little manure. Consequently we have had to depend upon bones and shes. Of these we use from \$100 to \$125 worth in a year, with perhaps enough stable manure to fairly dress a single acre. The first is applied to about six acres, or half of the farm. The manure is mostly used for top dressing in that part of the orchard which is laid down to grass. For crops in tilled land, we used about a ton to the acre, every alternate year, of our mixture of ground raw bone and ashes (one part by measure, of bone to two or three parts of ashes), which we have so often spoken of, and which some of our readers say does no good for them—probably because they don't use it freely and continuously, as we do. With this kind of treatment we get constantly better crops of all sorts, including fruits, vegetables and seeds, which are supposed to draw so hardly on the soil. The land is plainly growing richer, year after year, under this treatment, and really all the organic matter accessible to the crops on the tilled land is that in the bone, in the roots left by the crop, and in the worms and insects that live and die in the soil.

Now if this is the case in a sandy soil, why may it not be (with suitable variation of management) equally so in a heavier soil? In general farming, the farmer would have this advantage over us, that he could occasionally turn down a sod, or plough in a fertilizing crop of clover or rye. We did that some at the first, with very good results, but do not now find it necessary, though it might be so in clay land, especially when the strawy stable manure recommended by Brother Cheever was not plenty enough. The point we are after in this article is that there are other sources of organic material besides manure, muck, sod and a green growth, which will stock the ground with a sufficiency of organic matter. The quantity really needed is not great at any one time, while too much makes the ground sour, and lessens its productiveness.

DR HOSKINS.

Breeds of British Sheep—VIII.

HAMPSHIRE-DOWNS.

Hants, Wilts and Berks are the Hampshire-Down counties.

The chalk hills of Sussex extend westward into these, and they here present the same general characteristics already described. The soil, however, is here deeper and richer, and the lands generally are much more productive. The food favoured a larger breed of sheep than the South-Downs, and such would naturally have resulted from feeding the Sussex breed upon these richer lands, but this end was more speedily obtained by using the large native ewes of the district, and crossing them with rams from Sussex. The produce were found to combine the best qualities of both parents, being prolific and having size, great constitutional vigor, early maturity, good fattening qualities and excellence of flesh. They have become so popular in England that it is said no other breed, unless it be the Shropshires, has so much increased in numbers in recent years. They have received no aristocratic favours, and have not been pushed into notoriety by wealthy admirers, but have developed their excellence and come into general esteem in the hands of the rent-paying farmers themselves. Their more recent improvement has not been accomplished by any one noted breeder, although Mr. Humphrey of Oak Ash, near Newbury, (1) was rather the leader in the advancement. As a consequence of this, the prizes at the great shows have been distributed among a greater number of breeders than is the case with other sheep. This was so at the Royal Show held this year at Shrewsbury.

The farmers throughout these counties are careful to maintain the quality of their sheep, and during a rather extensive inspection of the district, I saw greater uniformity in the flocks, and a higher average of excellence than I saw in other breeds in any section of the country. At Hsley fair, I saw 33,000 offered for sale in one day, and while two or three lots were better than the rest, they were generally of very even quality. The hold that the breed has upon this section is shown by the fact that while as many as 80,000 have been on sale at Hsley at one time, not a sheep of any other breed could be seen. The importance of the sheep interest here is illustrated by this great number, being all driven from the surrounding neighbourhoods, Hsley being then ten miles or more from the nearest railway station. It is a most interesting sight to see the shepherds in their smocks (2) slowly leading their flocks across the common downs, feeding as they advance, the dog guarding the rear. As they approach the little town, the different lots draw closer to each other until in the narrow streets they become crowded together, but rarely if ever mixed, and one wonders equally at the skill of the men, and the intelligence of the dogs, who finally get them safely within their hurdle enclosures. Buyers of fat sheep are present from London, and of store animals from places near and remote, and the busy scene is alive with interest. There are similar fairs at Overton and Weyhill in Hampshire, and at Britford (3) and Wilton in Wiltshire. The English farmer, accustomed to meeting his fellow farmers and many buyers at such fairs, and selling his stock and grain himself instead of consigning them to some commission dealer or selling them upon his farm, is better posted on the markets, and is generally a better business man than his American brother. He buys and sells on a large scale, and turns his capital quickly. This is one of the chief reasons why he prefers to rent the land rather than own it. Many a one answered my inquiry with the statement: "We cannot afford to tie up our capital in land. There, it produces only two and a half per cent. We must do better than that. Only those should own land who have so much capital that they don't know what else to do with it."

(1) And Mr Rawlence.

(2) The oldest of all Old-English garments: the *gaberdine* of Scott.

(3) Pronounced 'Berford.'

A. R. J. F.
A. R. J. F.
A. R. J. F.

The original sheep had horns, but these have been bred away, although abortive horns, called "snigs" sometimes appear on the rams. They have large heads and Roman faces. They may be described as larger and stronger than South-Downs, of coarser bone, and resembling them in general appearance, though not so symmetrically beautiful. Their faces and legs are blacker and their heads larger. The English breeders select rams with large heads and Roman faces, as being more vigorous and likely to beget stronger lambs. They are well wooled down to the eyes and over the cheeks. It is claimed that this is a protection against the fly, but one can scarcely see how it can be so. Their wool is of medium staple, something coarser than the South Down's. The average clip is six to eight pounds. The flesh is of good quality, with fineness of texture and fat well placed in the tissues. The Hampshires seem to be an exception to the rule that meat of close texture usually requires a longer time to deposit. The ewes are prolific and the lambs are very strong, being quickly upon their feet and ready for business. On this account the percentage of loss in lambing is small. They grow rapidly, the ewes being good milkers and they quickly take other food, whether it be in running before the hurdles in turnips, or in eating grain from troughs. They can thus be prepared for the butcher very rapidly. This is one of the strong points of the breed. It is claimed that a Hampshire-Down lamb is worth more than any other at any age under six months. What they can do under one year was strikingly proved at the Smithfield show, in London, last December. I quote from the London Live Stock Journal of that time: "In the sheep department the coveted distinction of champion was won by a trio of magnificent ten months old Hampshire lambs that were bred and exhibited by Mr. William Parsons; a victory which will do much to accelerate the growing popularity of this eminently valuable and practical breed of sheep. There can be no question that this breed of sheep is coming to the front as no other breed is at the present juncture * * * There were twelve entries in the lamb class. Here, Mr. Parsons carried off the first prize, the breed cup and also the champion plate. These three lambs were grandly even, substantial, and of the finest quality, and to have carried off the champion prize of the show was a striking credit, not only for the breeder but for the breed. In the two classes devoted to cross-bred sheep there were many excellent animals; all the best having Hampshire blood predominant."

The London Times' report contained the following: "The final competition for the £50 plate for the best sheep or lambs in the hall was extraordinarily keen, and the judges had much difficulty in deciding upon the best pen from among the splendid display of winners of breed cups. There went up a ringing cheer when the award was pronounced, and it was found that Lord Walsingham's South-Down wethers, although nominated as reserved for the champion plate, were beaten by a pen of lambs—the really marvellous Hampshire-Down lambs of Mr. William Parsons. These wether lambs, at about ten months old, have the growth, appearance, backs, rumps and legs of adult sheep, their live weight being 214 pounds per lamb, representing probably a good way over 30 pounds per quarter of meat."

It should be borne in mind that this was a competition of fat animals of any age and all breeds.

The Hampshires are kept in the fields all winter and fed on turnips, with chaffed hay and straw, the ewes in lamb receiving some bran and malt dust and fewer turnips. The lambs are dropped in February, in the open field, sometimes exposed to severe snow storms, sheltered only by hurdles so placed as to break the force of the wind. One would suppose that in such exposure every lamb would die, but the loss is rarely

serious. On no farm in the district did I see barns or sheds for housing the flock. The lambs receive the best early grass of the water meadows, where there are such, and the last of the mangolds, and the first growth of the sainfoin until the vetches are ready. The object is to have them ready for the butcher as lambs, and not to wait two or three years for a scarcely more valuable sheep. "Quick money" is the Hampshire motto. JAMES WOOD. *Mt. Kisco, N.Y.*

CORRESPONDENCE.

EDITOR OF JOURNAL OF AGRICULTURE.

Dear Sir,—At the Dairymen's Convention held at Richmond, P. Q., (last spring) I took what some were pleased to term, a novel view of the question of manure, but it was admitted by them to be worthy of investigation, and if my theory was correct, that the whole system of farming would be revolutionized by putting it in general practice.

I had neither the time, nor the opportunity at the said meeting to explain my position fully; therefore, by your permission, I will state my views to the readers of the Journal, and leave them open for criticism. I said that it would be a great economy to keep the dung in a pit until it was three years old, and then put it on the soil, and that the increased value of the same, would more than pay the interest on the investment.

I make a great distinction between the meaning of the words, "dung" and "manure." Dung is the excrement of animals, and is not manure until it undergoes a chemical change, which changes its nature, [for all substances are changed in their nature by chemical action] and dung is as unsuitable for manure as any indigestible substance is for human food. Manure, is food for plants, and the more perfectly it is decomposed, the more valuable it is for this purpose.

It is clearly shown in chemistry, that the chemical action which takes place in the process of decay, in all organic matter, produces a compound differing in its nature from what it was before this decay took place.

Hence, it does not follow that because manure promotes and stimulates vegetation, that dung will also have the same effect.

The whole question then lies in whether, it is better to haul the dung on the land at once, as many farmers do, or to haul it out after it has lain in heaps until spring and partly decomposed, or whether it is better than either to keep it in a pit until perfectly fitted for fertilizing purposes.

In the first case where the dung is hauled on the land at once and exposed, decomposition takes place more rapidly, and the gases are at liberty to escape into the atmosphere, and are lost forever, and the most valuable part is lost when the ammonia escapes. The second plan is an improvement, because the dung is partly decayed and is a plant food to a certain degree, and the ammonia and other substances have become partly compounded in the process, and hence there is less loss in the field; but there has been some loss in the heap, and especially where the heap has been kept outside the barn with no cover, as it is in a majority of cases. Now in the third case, where the dung is put in a pit and kept away from the action of the frost and the air, these elements do not act upon it to the same degree, the change goes on slowly, but perfectly, and when completed there has been scarcely any loss in ammonia or other valuable matter. This manure is as pleasant to handle as earth mould, and it is so soluble that its effects may be noticed in the color and vigor of plants within 12 hours after applying it to the roots.

There should be four pits on the farm, each pit large enough to contain all the dung, with plenty of absorbents for the liquid for one year. Those pits should be under the stable if practicable (if not, they may be constructed outside and well covered, and no manure should be taken out until perfectly decomposed, which by natural means will not be in much less than three years. Better have no manure for the first two years if by this means the value will be more than doubled for all years to come.

There are two or three very important questions growing out of this theory which must lead to untold benefits and a saving of

immense amounts to the whole agricultural community, and these are: 1st It would be the means of preventing the production of a large share of weeds. All the seeds that are put on the land in the dung would be destroyed by this, method, and this advantage alone would pay the cost of the pits and the interest on the value of the manure, on most farms. 2nd It would prevent the breeding of millions of destructive beetles and other insects, which are propagated and nourished and matured upon *dung*, and go out from these fields to destroy the crops of the whole farm.

Little does the farmer suspect, that while he is hauling the dung upon the land, he is preparing a nursery for the benefit of so many of those insect pests. It would be time well spent to gather the droppings from the pastures and lanes, and cart them to the pit for the same reason, and if all the bones were picked up and burned and thrown in along with all the ashes that could be scraped up, and if possible a sprinkling of *slaked* lime now and then, the farmer would soon realize that the manure pit was his bank and would be watching every opportunity to make a deposit where there are no dishonest officials to steal or speculate with.

Perfect manure has no attractions for the insects because it is a plant food and not in any way capable of sustaining insect life, and if the manure pits are well protected, the conclusion is that there will be a far less number of them to contend with.

There is another matter which is very important that must here be spoken of, and that is *smut* on the grain. Now when green dung is put on land in the spring and this land is then put into grain we are very often troubled with this black substance growing in such large quantities upon the heads of grain as to curiously injure the value of the crop. Now this smut is an unnatural growth caused by the food being given to the plant in too great a quantity at the wrong time. It is easy to understand that if a plant has only moderate nourishment, and a medium growth has been attained up to the time when the heads appear, that if an unusual amount of rich food is then presented to the roots, that these feeders will consume and throw this food up into the stalk so rapidly, that nature cannot in these small cells [that have not been enlarged at an early stage by high feeding] convert this surplus of food into a natural growth, and consequently she is compelled to throw it off in this unnatural manner.

Now this is caused by the dung decomposing at the wrong time, and if it was a perfect manure when put on the land, the plant would have a vigorous growth from the beginning, and smut would never appear.

J. M. JOCELYN. (1)

Notes from Western Ontario

Mr Editor,—The present season is now so far advanced that I can state with a certainty the results of 1884.

The fall wheat crop is the best we have had for many years, not so much on account of quantity as quality. 64 lbs. per bushel is a very common thing, and from 30 to 40 bushels per acre, spring wheat is also remarkably good. The same may be said of all the other grain crops. One reason for this result has been a remarkable absence of rust and mildew. There was a little frost about the 12th inst., but not enough to prevent corn ripening, so that it also will be good.

Roots are all good, potatoes extra. The only drawback to general prosperity among farmers is low prices. Cheese dairying will be a fair average, prices having kept up well, although quantity is short. Apples are the best as regards quantity I have seen for many years, the codlin moth that has been so destructive of late years having almost disappeared.

In some directions farmers are advancing. Wire fences are becoming common. New and more commodious buildings are taking the place of the old. Underdraining is largely prosecuted, while on the other hand troublesome weeds as such oxeye daisies, ragweed, &c., are on the increase.

Beef keeping has of late received quite an impulse. This industry seems well adapted to dairy sections, especially where white clover is abundant.

F. MALCOLM.

Innerkip, Sept. 18th 1884.

(1) I will make a few remarks on this article next month

A. R. J. F

HORTICULTURAL.

Asparagus—Practice vs. Theory.

I notice what Mr Garfield wrote about his planting an acre of asparagus, and ignoring the experience of writers because of what he calls their "fussiness." Well, he has put 12 cords of rotted and 10 cords of partially rotted manure to an acre, making but little over three-quarters of an inch of top spreading plow d in. His asparagus will probably grow well at first, and he will imagine he has beaten the books, but in the end he will find he has beaten himself. The asparagus grows in a night; it is succulent and prolific when properly cultivated, and that means when manured so richly that it is almost impossible to make the soil richer. Its roots, like small ropes, penetrate five and six feet down, and rich as its bed should be made, it will still require a constant and liberal top dressing of the richest kind in the Autumn, forked in and raked smooth as soon as the ground will permit. The writer also, over 25 years ago, made an asparagus bed in his garden. He dug a trench four feet wide, in deep, black loam, and threw out even the clay, until the trench was four feet deep. He covered the bottom to a depth of a foot with bones, pointing up the large ones. He filled in between the bones with the richest liquid refuse of the slaughter-house; then filled up the trench with alternate layers of the richest stable manure and thin layers of the rich, black soil, and left it in the Autumn, ridged like a house roof; in the Spring it required but little to even it. In this he planted the seed in two rows only, and *waited three years before he cut a head!* It has had occasional top dressings and forkings-in since, and after 25 years of cutting the bed is good and prolific still.

The probability is that Mr. Garfield will, after a year or two, find his crop yields thin, spindling, grass-like stalks, instead of stems as thick at least as his finger. The nature of asparagus and its return for liberal treatment, will be found the same whether it be grown by the acre or in a yard-bed 40 feet by 4, and friend Garfield will find, when too late, that he had better have followed the books, notwithstanding their "fussiness."

Bucyrus, Ohio.

"ASPARAGUS."

Value of Liquid Manure.

The average stock feeder and general farmer has a very imperfect idea of the value of the liquid droppings of his animals. He thinks the liquid is rich in fertilizing matter, but, as compared with the solid droppings, he rates its value as much less. I write this article with the endeavor of showing the farmer, in a familiar way, the basis of value in the liquid and solid droppings. We may regard all the manure, both liquid and solid, as coming from the food. This is not strictly correct, as all the waste of the body is carried off in the liquid excrement, and the new matter to supply this waste of the body is secreted from the blood, which is formed from the food. All farmers understand that a part of the food is indigestible—that the alimentary matters which the digesting fluid does not act upon are passed in the solid excrement—but they do not seem to realize that all the alimentary matters which are digested and not used to supply waste in the system, are passed in the liquid excrement. The careful German experimenters proved that about ninety-five per cent of all the valuable fertilizing matters digested were recovered in the liquid excrement. It will be understood that all the fertilizing matter in the liquid excrement is in solution, that is, ready to become plant food, and therefore has a greater value per quantity than the same elements in the solid manure, which

are still insoluble. Now the reader will perceive that the solid excrement contains only the insoluble refuse of the food, while the liquid excrement contains ninety-five per cent of all the valuable digestible fertilizing elements in the food. This statement would seem to render it easy to determine which is the more valuable, the liquid or solid excrement; the valuable and digestible part of the food goes into the liquid excrement, and the refuse and least valuable part goes into the solid excrement. We will give illustrations, by some short tables made from the German experiments, upon animals fed on barley meal:

NITROGEN STORED UP AND VOIDED FOR ONE HUNDRED CONSUMED.

| Animals. | Stored up as increase. | Voided as solid excrement. | Voided as liquid excrement. | In total excrement. |
|------------|------------------------|----------------------------|-----------------------------|---------------------|
| Sheep..... | 4.3 | 16.7 | 79.0 | 95.7 |
| Oxen..... | 3.9 | 22.6 | 73.5 | 96.1 |
| Pigs..... | 14.7 | 21.0 | 64.3 | 85.3 |

ASH CONSTITUENTS STORED UP AND VOIDED FOR ONE HUNDRED CONSUMED.

| Animals. | Stored up as increase. | Voided in total excrement. |
|-------------|------------------------|----------------------------|
| Sheep | 3.8 | 96.2 |
| Oxen | 2.3 | 97.7 |
| Pigs | 4.5 | 95.5 |

The following table shows the composition of the solid and liquid excrements of sheep fed on good hay:

| | Solid excrement. | | Urine. | |
|----------------------|------------------|-------|--------|-------|
| | Fresh. | Dry. | Fresh. | Dry. |
| Water..... | 66.2 | | 85.7 | |
| Organic matter | 30.3 | 89.6 | 8.7 | 61.0 |
| Ash..... | 3.5 | 10.4 | 5.6 | 39.0 |
| Nitrogen..... | 0.7 | 2.0 | 1.4 | 9.6 |

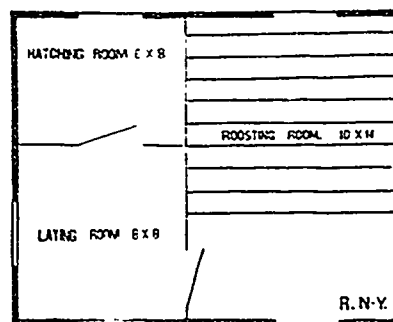
These tables are worthy of study. It will be seen that the soil would lose fertility very slowly if the total excrement were returned to it. Over 95 per cent of the nitrogen and ash constituents are voided by both sheep and oxen. The last table shows that solid and liquid excrements of sheep are rich in both nitrogen and mineral constituents when fed on hay. Two thousand pounds of the solid would contain fourteen pounds, and of the liquid twenty-eight pounds—the liquid containing double; but in feeding barley meal, the liquid contained about four times as much as the solid. When farmers fully consider the value of the liquid excrement of their animals, will they still think they can afford to waste it? Many farmers who give little thought to the loss of this most valuable fertilizing matter on their own farms are liberal purchasers of commercial fertilizers. Our examination shows what a large loss must occur where large stocks are kept, and only the ordinary precaution is taken to save the liquid. It is more frequently thrown out of side windows under the eaves, to be washed away by the rains, but a considerable part of the liquid goes through the stable floor into the earth under. Those who endeavor to save it best, wheel the manure out under a shed. But even here a good deal soaks into the earth. The only certain way to save the liquid excrement completely, is to have it flow into a water-tight receptacle under the stable floor; and the most economical

way is to have liquid and solid fall together into this water-tight gutter, and then both are carried to the field together, and it is no more labor to carry both than the liquid alone. The German farmers who know the great value of the liquid separate the liquid in a reservoir by itself, and pump it into a liquid-manure distributor, with water added, and then distribute over the soil. But this adds to the labor over that of taking both to the field together. The writer uses the manure spreader, which distributes both liquid and solid together evenly over the soil. All the manual labor bestowed upon the manure is to shovel with a scoop the liquid and solid manure into the spreader, and then the team does the spreading much more evenly than it can be spread by hand. The cost of these water tight gutters is but a trifle compared to the value of the fertilizers saved. One hundred millions of dollars expended for commercial fertilizers would go but a short way to replace the fertility wasted in liquid excrement in this country in a single year. This is a matter of so much consequence that our farmers cannot afford to treat it with indifference any longer. The agricultural press is now often calling attention to it, and I trust a few years will bring in a better practice.

DR. HOSKINS.

POULTRY-HOUSE.

At the following Fig. is given the plan of a convenient poultry-house. The laying room is separated from the roosting-room for the sake of greater cleanliness. The perches in the latter may all be the same height from the ground; or the first may be placed about 18 or 20 inches from the ground; the second about six inches higher, and far enough back so that the droppings will not fall on the fowls on the lower



PLAN OF POULTRY-HOUSE.

perch. The third may be six inches higher than the second, and so on. The lower perches are suitable for young fowls. The birds should not be allowed to roost in any other room. The nests in the laying-room may be movable boxes, and when a hen shows a disposition to sit, eggs may be put under her, and then moved, box and all, to the hatching-room, where she should be provided with a box of lime or ashes and plenty of water and food.

Rural N. Y.

SUCCESSION IN MEADOWS.

The indolent farmer likes to let his grass stand until it is ripe. After wheat harvest is over, the timothy stalk has become largely converted into woody fibre and sugar; it can often be cut with safety and hauled in the same day. At the

period of bloom, or before, it contains 75 or 80 per cent of water, which requires one or two days of sunshine for its evaporation. In June there are thunder and sudden dashes of rain. After harvest the weather is generally more settled, and then haymaking is less tedious and troublesome. To get a day's cutting of good hay wet is very provoking, to say nothing of the loss occasioned by the soaking.

Wheat must be harvested at a certain stage, timothy can be put off—so reasons the average farmer. With the great majority of farmers the paramount, controlling reason why grass is cut late, is simply that it is more convenient to cut it then—not that it is better.

As to the chemistry of hay—if the expression is allowable—the chemist of the Department of Agriculture teaches that, in most cases, the cultivated grasses are best cut at or about the bloom. At this time we secure a union of the greatest weight and highest nutritive value, correlatively. The absolute amount of nitrogen present in albuminoids is highest, woody fiber is not excessive, and digestibility is at an average. If cut earlier, digestibility and palatableness are higher, as well as the proportion of albumen; woody fibre is less, but the final weight is much less, on account of the great evaporation of water, and nutritive ratio is more abnormal. Cut after bloom, weight and woody fibre are greater, but the latter impairs the digestibility and palatableness, and the nutritive ratio is diminished by the conversion of albumen into amides.

In Mr. Stahl's excellent paper, page 532, I regret that he did not give any of his own experience. He gives what Prof. Sanborn calls the testimony of the steer as to the superiority of timothy cut after bloom, both in quantity and quality. Prof. Sanborn states that many farmers, probably, have been led to pronounce against late cut hay because they fed it on alternate weeks with early-cut, which is more palatable to stock; consequently they went back, during the week when late-cut was given to them, from distaste for their feed.

It is scarcely pertinent to inquire here, why cattle relish better the early-cut timothy, in the face of the fact that the late-cut contains more sugar. That such is the fact, the farmer need not resort to the laboratory to prove; he can satisfy himself of it by simply chewing the stalk. The grasses belong, together with the sugar cane, to the great family of *Gramineæ*, and it is a well known fact that the cane of Florida yields more sugar than that of Louisiana, because the absence of frost in the peninsular State allows the cane to become riper before it is harvested. That is to say, the cane and the timothy cut late have gained in sugar, but not in the albuminoids, over the greener-cut. And this statement agrees with the deductions of chemical analysis made by Prof. Gardner.

Now, the fact that stock of all kinds prefer the early cut hay, shows that sugar is not appetizing to them. They like, best of all, the green grass in the field, which contains an enormous proportion (75 to 80 per cent.) of water; and of dry feed they relish best those which were cut greenest. The nearest approach to grass is their choice. But, as will appear farther on, their taste is not an infallible guide to the feeder.

Take fodder corn and corn fodder—one cut when the plant is green and succulent, the nearest equivalent to green grass—the other, when it has developed its seed to a point just beyond the milky stage. Fodder corn is greatly relished by stock, and it will cause an abundant secretion of milk in the females, but no farmer will contend it is as nourishing food as corn fodder—pound for pound—for stock of either sex or any age.

In California they cut wheat and barley green for hay, and horses eat it as freely as they would timothy or clover.

Wheat or barley straw, that is to say, the same plants after they have concentrated the greater part of their nutriment in

the seeds, are not to be compared with this hay in nutritive value. In this case the animal's taste happens to coincide with the judgment and choice of the feeder. From the above very brief survey of facts, we see that not all members of the family of the *Gramineæ* advance *pari passu* in their proportionate feeding value from the stage of complete greenness to that of maturity.

Now, in imitation of Prof. Sanborn, I will give the testimony of the sheep on this subject, in which direction I have had some very positive and instructive experience. I have never fed sheep, week about, on early and late-cut hay, but I have fed flocks of all ages, for periods of different length, on hay cut at almost every stage of growth. This experience I cannot tabulate in columns, by weeks or by months, or deduce from it any nice comparisons of value in dollars and cents; but for my own practical guidance it is more available than if cut long or short by any procrustean method of figures.

The sheep craves, more intensely than any other domestic animal, a portion of green feed in winter, and eats hay with less grace than any other. Lambs, therefore, for their first winter, must have green, fine hay. If I had a certain meadow to be cut for lambs, and were certain that it would yield only two-thirds as much weight of hay cut at a particular stage, as it would if cut when mature, I would willingly sacrifice the third in weight for the sake of the quality. For several years

I cut my lamb's hay earlier each season, until I reached the date of May 28—that is, the earliest date at which I have begun haying. That was in orchard and June grass. In practice, I find that my lamb's hay has to be cut within a week or less after sheep-shearing. I want to commence in time, so as to lay it all down before the last heads are in bloom. A given weight of hay is richer, proportionately, in albuminoids before bloom or at bloom; in carbohydrates, after; and it is the former elements that young animals need, and their instinct seems to teach them that, for they steadfastly refuse the late-cut timothy. Lambs must have hay that they will eat, because it is difficult to induce them to eat enough even of the best.

For the same reasons, I want the same kind of hay for pregnant or suckling ewes; they are nourishing young animals. Grown sheep are more tolerant of mature-cut hay, and in the early stages of gestation, they may be fed on it if desired, but during the period of lactation they require something which, if the water were restored to it, would be a close approach to green grass. For my dry flocks I am not so particular, though I still wish to have the hay cut early enough to have a bright green color, like good breakfast tea.

To revert to the theories of late-cut hay. We find that the California farmers who make hay out of wheat and barley, treat them as we do, or ought to do, timothy; that is, as if they had no seeds. They learn that, as a feed-stuff, the stalk and leaf are of paramount importance, and that the seed must be neglected for their benefit. Now, wheat and barley (the kernels) have a high feeding value, while timothy seed has none whatever, (1) even for sheep, which are the closest grinders; hence we see the error of paying any attention to it in that capacity.

On the other hand, when we grow corn and wheat specially for their seeds, we find it advantageous to harvest them when the herbage is as green as possible consistently with the interests of the seed, on account of the enhanced feeding value of the former in that stage. Wheat straw is worth fifty per cent. more for feed if cut when the berry is just "out of the milk," than if cut when the berry is hard. With timothy, then, where the seed is of no importance, how much more should it be harvested when it is full of juices!

(1) This I doubt.

One thing more. Not all members of the *gramineæ* are equally tolerant of delay in harvesting. Timothy and corn will make passable feed (for horses and cattle, at least) if allowed to stand until the seed is ripe and hard, almost ready to fall to the ground. But orchard grass, June grass, wheat, barley, rye and some others, if permitted to stand until this stage is reached, make nearly as worthless feed as can well be imagined. This seems to be due to the greater amount of sugar in the culms of the former.

The above briefly-recited facts present a cogent reason why the farmer who cuts anything more than the most inconsiderable amount of grass, should seek to have succession in his meadows and not sow them all to the same grass. By reference to my farm diary, I find that I began on my orchard grass this year June 4, on my clover June 12, timothy June 23, while I have to-day (July 3) just finished some late timothy, grown on very low overflowed bottoms from March sowings. Thus I was enabled to cut some before wheat harvest and some after, and yet secure each kind at its best. Before harvest, hands are plenty and cheap; after harvest, everybody else is cutting grass.

Succession in meadows gives variety of feed, which is less perfectly secured by mixing the grasses. I do not like this plan. It gives perfection of pasture, but, for meadow, the different grasses had better grow by themselves. Clover needs a stiff grass to hold it up, it is true, but it is not suitable for mixture with timothy on account of the difference in their times of ripening. It does well enough with orchard grass in this respect, but the orchard grass exterminates it. White clover gives a good bottom and thickening to timothy, but tends to smother it out; but it will come in, and I do not mind re-seeding a timothy meadow once in a while, for white clover makes excellent hay. Otherwise I prefer not to have my grasses mixed in the meadow. I would rather feed to stock alternately from different mows.

Whether the farmer advocates early or late cutting, he should have a succession in meadows. The period when grass is at the perfect stage for hay, often in the hot weather of summer, embraces but a few days. The meridian of value is quickly passed, the bloom is soon gone, and orchard grass, especially, makes rapid strides in growth, and brooks no delay.

This paper has already grown to sufficient length, and I must defer to another some opinions as to the practical feeding value of the more common hay grasses, and my methods of handling them.

STEPHEN POWERS,

Washington County, O.

THE CANADIAN DAIRYMAN. (1)

What its object is

To develop our dairy industry. It is a new and growing industry. Those engaged in it, if they would succeed in this day of fast progress and stiff competition, must make themselves masters of the situation. To do this it will be necessary to improve the quality of product, cheapen cost of production, and perfect the marketing system. A good dairy Journal will be a great help towards accomplishing this object. The field of enquiry and instruction will be large, and will cover, principally, the following ground:—

1. Dairy stock:—Selection and breeding, feeding, shelter, care.

2. Food production.—Preparation of land, fertilizing, seeding, management of pastures, harvesting, preserving.

3. Milk production.

4. Manufacturing milk products.—Handling milk and cream, discussion of methods, machinery, private and co-operative dairying, etc.

5. Marketing:—Trade reports, local and foreign news, bearing on the dairy interests.

6. For the household.—Limited space devoted to current events, useful topics and pure literature.

DAIRYMEN'S ASSOCIATIONS.

The dairymen's associations in Canada to-day are six in number, as follows: two in Ontario—"Eastern" and "Western"; three in Quebec—one provincial, and two local; and one in Nova Scotia, provincial. The combined membership of these associations will be considerably under one thousand. The number of Canadian dairymen who have ever attended a convention of one of these associations is less than five thousand, and of those who have ever attended one more than a single time, perhaps less than one thousand.

The good results flowing from these associations and their annual conventions, especially in Ontario where they have been longest established, are not easily estimated. Our cheese exports have grown in a little over ten years from almost nothing to nearly seven millions dollars. It would be difficult to convince men who know most about our cheese trade, and have attended the most conventions, that without the associations we would have our present foreign cheese trade.

While we have reason to congratulate ourselves upon the development of so important a trade, there is yet much room for further progress, even in cheese dairying; and if in cheese much more in butter dairying.

It is a common experience to hear those who attend a convention for the first time say that they had formed no adequate idea of what such a gathering would be, and could not have believed it so excellent an opportunity for obtaining valuable information.

Those who have not attended a convention are not the ones most likely to appreciate their value and make a demand for them, yet they are the ones who most need these advantages.

Conventions, in Canada at least, so far have been organized by individual enterprise, or Government assistance, or both. Individual enterprise cannot always be counted upon to do alone all that is required. Enterprise would be encouraged by judicious Government help.

Government by a comparatively small outlay might do agriculture immense good, and the results of past expenditure are sufficient warrant for a far larger outlay.

The CANADIAN DAIRYMAN will advocate an intelligent, far-sighted policy, on the part of the Dominion Government, and if it can be the means of laying before the Canadian public as scheme of assisting agricultural associations, and create a public sentiment to successfully carry it out, it will have sufficient reason to justify its existence.

A word on this subject from the intelligent farmer and dairyman is in order, and these columns are open for that purpose.

TRIAL OF SHEAF-BINDING REAPERS.

With a view of testing how far the inventors may have

(1) We welcome our new brother to the ranks of agricultural athletes. There is plenty of room

succeeded in constructing mechanism by which horses can both reap and bind into neat sheaves our bulky and storm-broken English corn, the Royal Agricultural Society have offered two prizes of £100 for the best, and £50 for the second best sheaf-binding reaper, the binding material to be other than wire. The competition commenced a few days ago on farms near Shrewsbury, offering some 150 acres of wheat, oats, and barley for the experiments. The judges were Mr. Mason Cooke, Mr. W. Scotson, and Mr. T. Bell, with Mr. Courtney as engineer. On a field of Webb's Prolific Black Tartarian oats, on the farm of one of Earl Powis's tenantry, sixteen machines put in an appearance—three of Howard, of Bedford, three of Hornsby, of Grantham, two of Samuelson, of Banbury, three of M'Cormick, two of Walter A. Wood, one of Kearsley, of Ripon, one of the Johnston Harvester Company, and one of H. J. H. King, of Newmarket, Stroud. In the first runs with three-rod plots each, Mr. King's original and ingenious "narrow-width" machine proved itself too heavy in draught for the horses; and the machine of the Johnston Harvester Company met with so many misfortunes that the judges ruled it out of further competition. The contest was renewed between the remaining 14 machines. The crop was of Webb's Challenge White Canadian oats, well headed, with moderately short straw, but very tangled and storm-broken, though scrupulously clear from weeds. Next day the same 14 machines competed in an upstanding crop of red wheat, two acres to each machine; details as to time, area, stoppages, sheaves missed tying, and so on, being noted. With the exception of the machines of Walter A. Wood, the packing, knotting, and delivering mechanism is in all cases a modification, more or less original, of the so-called American Appleby binder. All the machines have acquitted themselves well, the advance made since the Derby trials in 1881 being remarkable. The number of sheaves missed tying is quite unappreciable, alike with hemp or Manila twine, costing 1s. to 2s. per acre. One feature of the present competition is that though the Americans have had the longest experience with binders, the English makers have now come up thoroughly abreast of the Transatlantic pioneers. One point authoritatively established by the trials is that these string-binding reapers can deal effectively with any crop, whether laid or twisted, which is not in too prostrate and rough a condition to be cut by an ordinary self-raking reaping machine. One novelty is the carrying of the bound sheaves till three are collected and then let fall together, side by side, upon the ground. By timing this delivery with his foot on a lever, Hornsby's man drops the triplets of sheaves round after round, so that the whole lie in straight rows exactly convenient for handy stooking. Another novelty is Samuelson's "low-level" binder, in which the cut corn is conveyed sideways by web to a binding table but slightly higher than the cutter-platform—that is, the sheaves are tied and delivered without the stuff being raised over the main wheel between two webs in the ordinary way. It is alleged that this form of construction is better adapted for sloping lands, and that the machine can be sold at a low price.

For the Society's £25 prizes for independent binders, or machines which pick up loose sheaf bunches or swathes after the cut corn has lain for some time to wither, two entries appeared. Kingsford, Fairless, and Co., of Kingston-on-Thames, were not successful in convincing the judges during a short trial of the value of their invention, neither were the Notts Fork and Implement Company, of Ranskill, Bawtry, more fortunate, though they certainly showed the ease and smartness with which their apparatus can pick up loose sheaf-bunches off the ground and tie with the band in any desired position round the sheaf. There may be a fu-

ture for both these inventions, upon which much time and money have been bestowed.

As an illustration of the ingenuity existing among some tenant-farmers it may be mentioned that in the field was one farmer, Mr. N. Rix, of London Colney, who last year cut 17 acres of wheat with a self-raking reaper drawn by a 6 horse power farm locomotive, the guiding upon a tolerably lry surface and alike up and down hill being accomplished without any difficulty.

The trials were concluded on Wednesday. Messrs Hornsby's machines won the first prize, and Messrs. Howard's machines the second prize.

Exhausted Soils.

G. C. A. asks. "Can good sandy loam soil (which is in grass, but run down) ploughed the coming spring and sowed to grass-seed only, be made to produce a good crop of grass by sowing fertilizers broadcast? If so, what kind do you consider the best, and how much to the acre? You can answer in *THE WATCHMAN*, as I read it every week. The land is in Duxbury, Vermont."

REPLY BY AGRICULTURAL EDITOR—Yes. Any of the standard commercial fertilizers may be used, or one of the formulas lately given in these columns. Fifteen bushels good hardwood ashes and five hundred pounds finely-ground raw bone to the acre, harrowed in before sowing the grass seed, has done first rate with us. From one such piece we sold the grass, guaranteeing it to yield two tons to the acre, for three successive years. The purchaser weighed the hay from one acre the first year, but took it without weighing afterwards. The fourth year it was ploughed and planted to Brooks' Seedling potatoes. The yield was not accurately measured, but we remember that the men who dug them said they were too large to be merchantable. Many bushels might have been picked up averaging a pound to each potato.

Vermont Watchman.

The assimilation of atmospheric nitrogen by plants.

By W. O. Atwater.

It is almost a universal opinion that free nitrogen is not assimilated by plants. He referred to the classic experiments of Boussingault, of Lawes, and Gilbert and Pugh, which, commonly regarded as decisive, may have been performed without consideration to certain conditions. Experiments made by the author show that at any rate certain plants grown under normal conditions do assimilate nitrogen. Peas grown in sand which had been purified by burning and washing, and to which were applied nutritive solutions containing known quantities of nitrogen. The amount of nitrogen supplied to the plant plus the amount contained in the seed was compared after the experiment with the amount given by analysis of the plant and the residual solution. The excess of the latter amount over the former, which in some cases was excessive represented the nitrogen acquired from the air.

Section B, Chemistry, will finish its work to-day and will not meet to-morrow.